MARYLAND DEPARTMENT OF NATURAL RESOURCES

PSC Case No. 9482
PPRP Exhibit____ (SS-3)

PPRP

DRAFT

Project Assessment Report for the Modification of the CP Crane Generating Station

March 194, 2019

MARYLAND POWER PLANT RESEARCH PROGRAM

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AERMOD	EPA air model used in analysis
AQS	Air Quality System
ARM2	Ambient Ratio Method 2
ASOS	Automated Surface Observation System
AST	Aboveground storage tank
BACT	Best available control technology
BWI	Baltimore Washington International Airport
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAM	Compliance Assurance Monitoring
CBCA	Chesapeake Bay Critical Area
CEMS	Continuous Emissions Monitoring System
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COMAR	Code of Maryland Regulations
CPCN	Certificate of Public Convenience and Necessity
CSAPR	Cross State Air Pollution Rule
CT	Combustion Turbine
DNR	Maryland Department of Natural Resources
EPA	U.S. Environmental Protection Agency
ERD	Environmental Review Document
ESC	Erosion and sediment control
FIDS	Forest interior-dwelling species
GE	General Electric
GEP	Good Engineering Practice
GHG	Greenhouse gas
GWP	Global Warming Potential

HAA	Health Air Act
HAP	Hazardous air pollutant
HFC	Hydrofluorocarbons
IAD	Dulles International Airport
IPaC	Information for Planning and Consultation
LAER	Lowest achievable emission rate
LPH	Liquid phase hydrocarbon
MACT	Maximum Achievable Control Technology
MDE	Maryland Department of the Environment
MDE-ARA	MDE Air and Radiation Administration
MDE-WSP	MDE Water Supply Program
MIHP	Maryland Inventory of Historic Places
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standard
NAMS	National Air Monitoring Stations
NA-NSR	Non-Attainment New Source Review
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Association
NO_2	Nitrogen dioxide
NO	Nitrogen monoxide
NO_X	Nitrogen oxides
NR	National Register
NSPS	New Source Performance Standard
NWI	National Wetlands Inventory
NWS	National Weather Service
O_3	Ozone
OTC	Ozone Transport Commission
OWS	Oil water separator
PAMS	Photochemical air monitoring stations
Pb	Lead
PFC	Perfluorocarbons
PJM	PJM Interconnection, LLC

PM	Particulate matter (filterable)
PM_{10}	Particulate matter; 10 microns in diameter
$PM_{2.5}$	Particulate matter; 2.5 microns in diameter (Fines)
PPRP	Power Plant Research Program
PSC	Maryland Public Service Commission
PSD	Prevention of Significant Deterioration
RICE	Reciprocating Internal Combustion Engine
SAM	Sulfuric acid mist
SAV	Submerged aquatic vegetation
SER	Significant Emission Rate
SF_6	Sulfur hexafluoride
SLAMS	State and local air monitoring stations
SPCC	Spill Prevention, Control, and Countermeasures
SO_2	Sulfur dioxide
SWM	Stormwater management
TAP	Toxic air pollutant
ULSD	Ultra low sulfur diesel
URDL	Urban Rural Demarcation Line
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile organic compounds
WHS	Wildlife and Heritage Service

UNITS

bgs	below ground surface
dB	decibels
dBA	A-weighted decibel
°F	degrees Fahrenheit
g/kW-hr	grams per horsepower hour
gpd	gallon per day
gpm	gallon per minute
g/s	grams per second
gr S/100 scf	grains sulfur per 100 standard cubic feet
hp	horsepower
hrs/yr	hours per year
kW	kilowatt
lb/event	pounds per event
lb/hr	pounds per hour
lb/MWh	pounds per megawatt hour
lb/MMBtu	pounds per millions of British thermal units
m/s	meters per second
MMBtu/hr	millions of British thermal units per hour
MW	megawatt
MWh	megawatt-hour
ppm	parts per million
ppmw	parts per million by weight
psi	pounds per square inch
tpy	tons per year

EXECUTIVE SUMMARY

On May 31, 2018, CP Crane, LLC (CP Crane) submitted an application to the Maryland Public Service Commission (PSC) for a Certificate of Public Convenience and Necessity (CPCN) that would authorize the modification of the existing Charles P. Crane Generating Station (Project), located in Baltimore, Maryland to permanently retire the two existing coal-fired units and install three new simple cycle combustion turbines (CTs). The PSC docketed the matter as Case No. 9482. In addition to the original application, CP Crane filed a supplement to the original application with revised pages of their Environmental Review Document (ERD) to correct air emissions netting errors on June 21, 2018. On August 31, 2018, CP Crane filed a second supplement to the original application to incorporate updated emissions performance data from the CT vendor into their ERD and testimony.

The proposed repowering Project will consist of three refurbished simple-cycle aeroderivative General Electric (GE) LM6000 CTs, with a water injection system to reduce nitrogen oxide emissions. The Project will result in a nominally rated 164-megawatt (MW) facility as each of the three turbines will be nominally rated at 50 MW and the facility will continue to use an existing 14-MW No. 2 fuel oil-fired CT. CP Crane has proposed to retire the two other existing generating units, two coal-fired boilers, at the facility.

To aid in their planned use as peaking units, the CTs will be designed to achieve full load after startup in no more than 10 minutes. CP Crane will limit the annual capacity factor of the units to 27%, equivalent to 2,365 hours per year (hrs/yr). The proposed Project will be completed with CTs that operate using natural gas as the primary fuel and No. 2 fuel oil as the backup fuel that can be used when natural gas supply is unavailable. The ultra low sulfur diesel (ULSD) fuel oil operations will be limited to 10% of the available hours or 237 hrs/yr.

The proposed Project will utilize the existing natural gas pipeline, water supply system, and electrical transmission system for the CP Crane facility. No new offsite natural gas supply or electrical transmission structures will be needed. All equipment, including the refurbished CTs, natural gas compressor, ULSD aboveground storage tanks and piping, water demineralization equipment, step-up transformers and substation, and other ancillary equipment, will be installed on areas of the site that have been previously developed.

The Department of Natural Resources (DNR) Power Plant Research Program (PPRP), coordinating with other State agencies, performed this environmental review of the Project as part of the licensing process administered by the Maryland PSC. Before the proposed Project can be constructed, CP Crane must obtain a CPCN from the PSC. PPRP's review was conducted to evaluate the potential impacts to environmental and cultural resources for the proposed Project, pursuant to Section 3-304 of the Natural Resources Article of the Annotated Code of Maryland. The review of the proposed Project was based on information filed by the company in its original CPCN Application, supplemental filings, and responses to PPRP Data Requests Nos. 1 through 6.

PPRP has evaluated the Applicant's proposed changes and has verified there will be no substantive impacts to water, terrestrial, ecological, or socioeconomic resources from the proposed Project. PPRP, in conjunction with the reviewing State agencies, conducted an analysis of the proposed Project and are making recommendations for appropriate license conditions to assure that the Project will not result in unacceptable impacts to environmental and cultural resources.

PPRP used the analysis of potential impacts as the basis for establishing recommended licensing conditions for operating the proposed facility, pursuant to Section 3-306 of the Natural Resources Article. The initial recommended licensing conditions are included as Appendix A. PPRP's recommendations are made in concert with other units within DNR, as well as the Maryland Departments of Environment, Agriculture, Commerce, Planning, and Transportation, and the Maryland Energy Administration.

1.0 INTRODUCTION

1.1 BACKGROUND

On May 31, 2018, CP Crane LLC (CP Crane) submitted an application to the Maryland Public Service Commission (PSC) for approval to modify the existing Charles P. Crane Generating Station (the "facility" or "site") in Baltimore County, Maryland by permanently retiring the two existing coal-fired units and installing three refurbished simple cycle combustion turbines (CTs). The repowering project (the "Project") will result in a nominally rated 164-megawatt (MW) facility as each of the three turbines will be nominally rated at 50 MW and the facility proposes to continue to use an existing 14-MW No. 2 fuel oil-fired CT.

CP Crane filed a supplement to the original application with revised pages of its Environmental Review Document (ERD) to correct air emissions netting errors on June 21, 2018. On August 31, 2018, CP Crane filed a second supplement to the original application to incorporate updated emissions performance data from the CT vendor. The second supplemental application included revised pages of the ERD and revised versions of the Applicant's direct testimony.

CP Crane has proposed to install three refurbished simple-cycle aeroderivative General Electric (GE) LM6000 CTs. While the existing coal fired generating units routinely took 20-24 hours to startup, the aero-derivative design of the proposed CTs will enable CP Crane to rapidly startup in significantly less time (typically less than 10 minutes) and allow for the needed shut down flexibility. CP Crane will limit the annual capacity factor of the proposed units to 27%, equivalent to 2,365 hours per year (hrs/yr). The proposed Project will be completed with CTs that operate using natural gas as the primary fuel and No. 2 fuel oil as the backup fuel that can be used when natural gas supply is unavailable. The ultra low sulfur diesel (ULSD) fuel oil operations will be limited to 10% of the available hours or 237 hrs/yr.

The proposed Project will utilize the existing natural gas pipeline, water supply system, and electrical transmission system for the CP Crane facility. No new offsite natural gas supply or modifications to the existing electrical transmission structures will be needed. All equipment, including the refurbished CTs, natural gas compressor, ULSD aboveground storage tanks and piping, water demineralization equipment, step-up transformers and substation, and other ancillary equipment, will be installed on areas of the site that have been previously developed.

The Department of Natural Resources (DNR) Power Plant Research Program (PPRP), coordinating with other State agencies, performed this environmental review of the CP Crane project as part of the PSC licensing process. Before the proposed facility can be constructed, the PSC must grant a Certificate of Public Convenience and Necessity (CPCN). The PSC has designated this case as PSC Case No. 9482. PPRP has evaluated the facility's potential impacts to environmental and cultural resources, pursuant to Section 3-304 of the Natural Resources Article of the Annotated Code of Maryland. This environmental and socioeconomic review was performed in coordination with other State agencies. PPRP used the analysis of potential impacts as the basis for establishing recommended license conditions (presented in Appendix A of this report) for construction and operation of the proposed facility, pursuant to Section 3-306 of the Natural Resources Article.

1.2 DOCUMENT ORGANIZATION

This report synthesizes the evaluations that PPRP has conducted to assess potential environmental impacts from the Project. The information is organized into the following sections:

- **Section 2** provides a description of the proposed Project;
- **Section 3** describes the existing environmental and socioeconomic conditions at the site and in the vicinity;
- **Section 4** describes the air impacts associated with the proposed Project and the relevant regulatory requirements;
- **Section 5** addresses other impacts, including terrestrial, groundwater from construction and operation, socioeconomic, and noise; and
- **Section 6** summarizes the findings of PPRP's evaluations.

Two appendices are also included in the report, as follows:

- **Appendix A** provides the State's recommended license conditions for the proposed CP Crane modification; and
- **Appendix B** provides CP Crane's responses to PPRP Data Requests that are specifically referenced in this document or relied upon as a basis for the recommended license conditions.

2.0 PROJECT DESCRIPTION

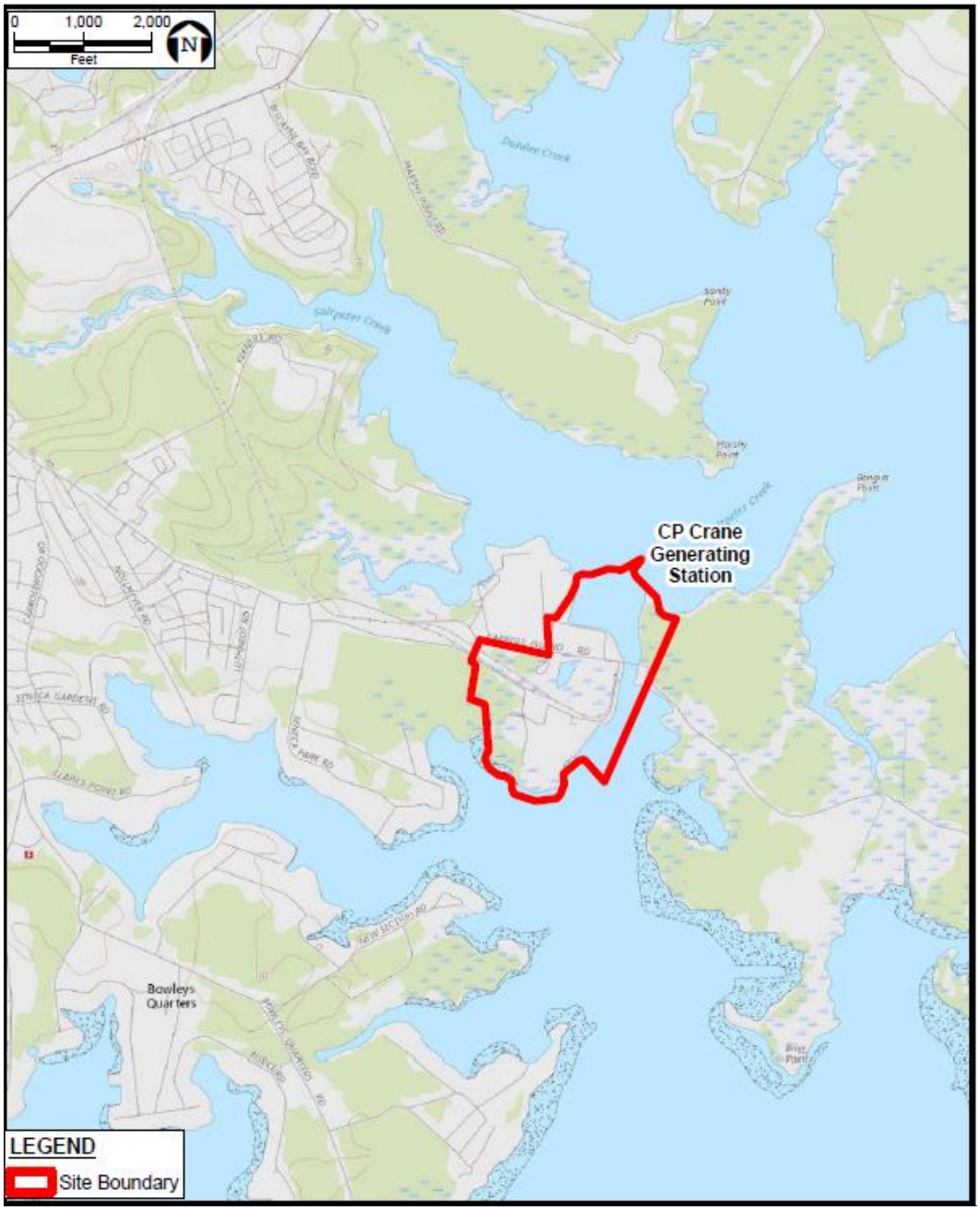
2.1 SITE DESCRIPTION

The site of the proposed modification is the existing CP Crane Generating Station. As show on Figure 2-1, the site occupies approximately 157 acres in Baltimore County at the end of a peninsula extending into Seneca Creek and the Chesapeake Bay. Carrol Island, which is connected to the peninsula via Carroll Island Road, is located to the east of the site. The site is bordered to the north by Saltpeter Creek and to the south by Seneca Creek with the land of the peninsula to the west. The Seneca Park Beach and Bowleys Quarters communities are the nearest neighborhoods and are located to the west and southwest of the site.

The site is located approximately at sea level and the topography is primarily flat. Portions of the site are located within the Chesapeake Bay Critical Area (CBCA) as further described in Section 3.5.3.

The proposed modification will occur in the southwestern portion of the site to the west of the existing power plant building. During construction, the Project construction is expected to disturb approximately eight acres of the site, while the post-construction Project area will be limited to approximately five acres. All equipment will be installed in areas of the site that have previously been developed.

Figure 2-1 Topographical Map of Site Location



Source: CP Crane ERD, 2018

2.2 *EXISTING FACILITY*

The CP Crane Generating Station was a coal-fired power plant that consisted of two solid fossil fuel-fired cyclone boilers with a combined

nominal generating capacity of 400 MW. The 190-MW Unit 1 and the 209-MW Unit 2 began operating in 1961 and 1963, respectively, as oil-fired units. The facility has been modified several times since initial operation began as follows:

- Modification to switch Units 1 and 2 from oil to coal firing (PSC Case No. 7443);
- Construction of a coal barge unloading system (PSC Case No. 9048);
- Installation of air pollution control devices to reduce nitrogen oxide (NO_X), sulfur dioxide (SO_2), and mercury (Hg) emissions to comply with Maryland Healthy Air Act (HAA) (PSC Case No. 9084). To meet the HAA requirements, CP Crane installed a Selective Non-Catalytic Reduction (SNCR) system to reduce NOx emissions, installed an Activated Carbon Injection (ACI) system to reduce Hg emissions, and switched to sub-bituminous coal to reduce SO_2 emissions; and
- Firing of reduced-sulfur subbituminous coal beginning on June 9, 2010 (PSC Case No. 9206).

The coal-fired units were retired on June 1, 2018. Two existing auxiliary boilers will no longer be operated as part of the proposed Project. CP Crane will continue to operate three existing air emissions units as part of the proposed Project as follows:

- One 14-MW No. 2 fuel oil-fired CT;
- One 399-horsepower (hp) diesel fuel-fired emergency fire water pump; and
- One 600-hp diesel fuel-fired emergency generator.

2.3 PROPOSED PROJECT COMPONENTS

CP Crane has proposed to install electric generating units and associated equipment for the Project including three refurbished 50 MW GE LM6000 SPray INTercooling® (SPRINT®) simple cycle CTs equipped with an inlet evaporative cooling system and one new 1,500-kilowatt (kW) black-start

generator. Ancillary equipment for the fuel, electric, and water systems will be installed to support the electric generating units.

The CTs will operate using natural gas as the primary fuel and ULSD as the backup fuel that can be used when natural gas supply is unavailable. The CTs will be fueled with the existing natural gas pipeline connected to the site. CP Crane anticipates the natural gas will contain a maximum of 0.5 grains of sulfur per 100 standard cubic feet (gr S/100 scf). CP Crane has proposed to install new electric-driven compression equipment to increase the natural gas pressure from 350 to 675 pounds per square inch (psi). The compression equipment will potentially include gas heaters, coalescing filters, and pressure-regulating equipment.

CP Crane has also proposed to install two 4980,000-gallon aboveground storage tanks (ASTs) to allow the CTs to operate on No. 2 fuel oil at full load continuously for 72 hours. The No. 2 fuel oil will be ULSD and contain no more than 15 parts per million by weight (ppmw) of sulfur. The ASTs will be stored within a berm that provides secondary containment in the event of a fuel leak and will be supplied via tanker trucks.

Although the existing water supply system will be used to supply raw water for the CTs, a new treatment system will be installed to demineralize the water prior to use. CP Crane has proposed to install reverse osmosis and electrodeionization equipment to reduce metal deposition and scaling of the CTs. The demineralized water will be stored in a new water storage tank(s). Wastewater produced from the demineralizing equipment will piped to the existing wastewater system. Other wastewater generated that has the potential to contain oil will be routed a new oil water separator (OWS) that will be connected to the existing wastewater system.

The electricity generated by the CTs will be transmitted to the electric grid using the existing 115-kilovolt transmission line located on the site. The three proposed CTs and the existing 14 MW CT will each be connected to a step-up transformer and all four pieces of equipment will be connected to a new substation. In addition, CP Crane will install new electrical equipment needed to power the proposed Project components.

Lastly, CP Crane will be leaving open space in the redeveloped area for the future addition of a battery storage system with a 400 megawatt-hour (MWh) capacity.

3.0 EXISTING SITE CONDITIONS

3.1 GEOLOGY AND GROUNDWATER

3.1.1 Site Characteristics

CP Crane lies within the Atlantic Coastal Plain Province and is immediately underlain by Quaternary surficial silt, sand, and gravel approximately 10 to 20 feet thick (also referred to as the Quaternary Lowland Deposits (Bennett and Meyer, 1952)). Below the surficial deposits are unconsolidated, Cretaceous Age, Potomac Group Sediments that include the Patapsco, the Arundel, and the Patuxent Formations. These units extend approximately 500 to 600 feet below ground surface (bgs) in this area (DNR, 1982) before the Patuxent's contact with crystalline basement rock. The Soil Conservation Service has classified the soils beneath the station as belonging to the Sassafras series (USDA, 1976).

The Quaternary Lowland Deposits constitute the surficial aquifer at the site; regionally these deposits vary in thickness from 0 to 150 feet with variable transmissivities ranging from approximately 2,000 square feet per day to over 20,000 square feet per day (Bennett and Meyer, 1952). The deeper water bearing aquifers under the station, the uppermost Patapsco and the lower Patuxent, are generally formed of red and gray gravel, sand, and clay. The Patapsco is approximately 100 feet thick, while the Patuxent is 150 to 300 feet thick in this area of Baltimore County (DNR, 1982). Separating the two units is a confining unit, the Arundel Clay. The Patuxent and the Patapsco aquifers are both widely used for domestic and commercial purposes due to their high productivity, with estimated transmissivities of 4,000 and 2,000 square feet per day, respectively.

Groundwater is not currently used for potable or non-potable purposes at the station. Water used at the station is obtained from the City of Baltimore municipal water supply.

3.1.2 Groundwater Conditions

Groundwater beneath a portion of the CP Crane site is undergoing remediation to address historic contamination, under the supervision of the Maryland Department of the Environment (MDE) Oil Control Program. According to the 4th Quarter 2015 Groundwater Monitoring Report prepared by EA Engineering, Science, and Technology, Inc. (dated

11 January 2016) and submitted to MDE, fuel oil was encountered in the subsurface in the southwest side of the power plant while conducting construction activities in the late 1980s (Furlong, *pers. comm.)*. The source of the fuel oil was determined to be a former underground fuel line connecting a 10,000-gallon aboveground storage tank with the plant boilers. Reportedly, the line was capped in the 1970s.

Upon learning of the contamination, the facility owner (then Baltimore Gas & Electric) initiated an investigation into the extent of subsurface impacts. By 1992, Baltimore Gas & Electric was operating an oil recovery system of five wells (PRW-1, 2, 4, 5, and 6) while PRW-3 was used as a monitoring well. A bail-down test in 1994 estimated the subsurface fuel oil plume to be 12,300 gallons. However, based on recovery estimates from 2004, approximately 17,500 gallons of liquid phase hydrocarbon (LPH) had been recovered. The active oil recovery system was discontinued in 2001 due to operational difficulties caused by excessive fouling and limited LPH recovery.

In July 2013, upon request by MDE, CP Crane submitted a Subsurface Investigation and LPH Recovery Work Plan proposing the installation of temporary monitoring points, monitoring/recovery wells, if needed, and an expanded approach toward LPH recovery. In January 2014, MDE approved the Subsurface Investigation and LPH Recovery Work Plan. The subsurface investigation was initiated during the First Quarter 2014, and the additional recovery activities began in June 2014. The belt skimmer recovery systems were installed and initiated at wells PRW-4 and PRW-5 in June 2014. A passive skimmer at MW-2 was relocated to PRW-6 in February 2015 due to the reduced LPH recovery at MW-2. In September 2015, the active skimmer at PRW-5 was relocated to PRW-6, and the passive skimmer in PRW-6 was installed in PRW-5.

As of December 2015, remediation efforts have consisted of manual LPH recovery using bailers during monthly gauging and semi-annual sampling events, as well as both passive and active LPH recovery systems at four wells. From January 2009 through December 2015, approximately 1,400 gallons of LPH had been removed using manual, active, and vacuum enhanced recovery methods. The cumulative recovery at the site as of December 2015 is approximately 18,900 gallons of LPH.

3.2 SURFACE WATER RESOURCES

3.2.1 Surficial Hydrology

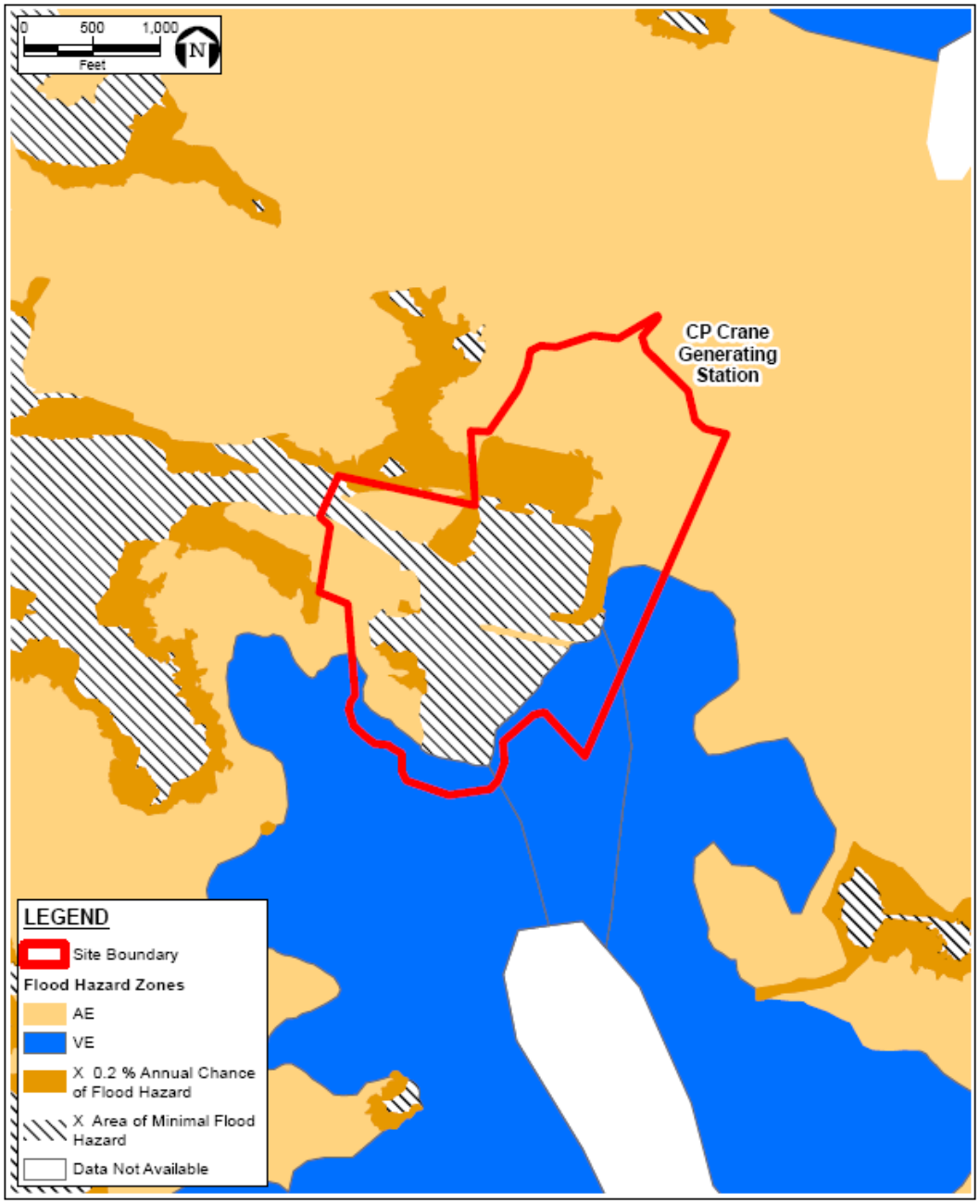
The CP Crane site is located within the Chesapeake Bay Watershed and the Gunpowder River Area (Sub-Basin 02-13-08; Crane ERD 2018). As shown in Figures 3-1, the site is bordered by Seneca and Saltpeter Creeks, both of which drain into Gunpowder River. According to Code of Maryland Regulations (COMAR) 26.08.02.07 and 08, the tidal Gunpowder River is designated for Use Class II (Support of Estuarine and Marine Aquatic Life and Shellfish Harvesting). As with all surface waters of the state, it is protected for water contact recreation, fishing, and protection of aquatic life and wildlife. Use Class II waters are also specifically designated as protected for shellfish harvesting, shallows waters with submerged aquatic vegetation (SAV), and/or spawning and nursery for migratory fish. Portions of the mouth of Gunpowder River Oligohaline (designated GUNOH1, immediately north of the site) and the Middle River Oligohaline (MIDOH, immediately south) are also designated Class II for multiple uses.

Figure 3-1 Surrounding Waterways at Site Location

Source: CP Crane ERD, 2018

Each of these waters, GUNOH1 and MIDOH, is impaired for several water quality parameters. Each is listed as impaired for the nutrients nitrogen and phosphorous and for sediments (total suspended solids). Portions of both waters are also listed for polychlorinated biphenyls in fish tissue. A portion of the CP Crane site is within the flood plain, as shown in Figure 3-2.

Figure 3-2 Flood Plains at Site Location



Source: CP Crane ERD, 2018

3.3 AIR QUALITY

3.3.1 Ambient Air Quality

Air quality measurements have been taken at thousands of monitoring stations across the country for several decades, producing data that reflects ambient air concentrations of the "criteria" pollutants, nitrogen dioxide (NO_2), SO_2, particulate matter (PM), ozone (O_3), carbon monoxide (CO), and lead (Pb). State, local, and tribal air quality agencies operate and maintain most of the stations following nationally consistent procedures established by the EPA. The United States Environmental Protection Agency (EPA) routinely summarizes and posts reported data to the Air Quality System (AQS)[1].

The pollutant monitors are situated above the ground at a height as prescribed in 40 Code of Federal Regulations (CFR) Part 58, Appendix E. If ambient air quality monitoring indicates that the concentration of a pollutant exceeds a National Ambient Air Quality Standard (NAAQS) in any area of the country, that area is classified as a "nonattainment area" for that pollutant, meaning that the area is not meeting the NAAQS. Conversely, any area in which the concentration of a criteria pollutant is below the NAAQS is classified an "attainment area" indicating that the NAAQS are being met.

States and the EPA make the attainment/nonattainment designations on a pollutant-by-pollutant basis. Therefore, the air quality in an area may be designated attainment for some pollutants and nonattainment for other pollutants at the same time. For example, many cities are designated nonattainment for ozone, but are in attainment for the other criteria pollutants.

Since the late 1980s, the NAAQS for particulate matter covered "PM_{10}," which represents PM less than 10 microns in diameter. In 1997, EPA revised the NAAQS for PM and added a standard for a new form of PM known as $PM_{2.5}$, PM that is less than 2.5 microns in diameter. Further revisions to the $PM_{2.5}$ NAAQS were published in 2006 (24-hour NAAQS) and in 2012 (annual NAAQS). $PM_{2.5}$, or "fine particulates," is of concern because the particles' small size allows them to be inhaled deeply into the lungs and these fine particles contribute to haze and other air quality

[1] http://www.epa.gov/airdata/

issues. In December 2014, EPA published updated designations of $PM_{2.5}$ for the 2012 annual $PM_{2.5}$ standard.

EPA and states make attainment designations based on air quality surveillance programs that measure pollutants in a network of nationwide monitoring stations. Historically, these networks were known as the State and Local Air Monitoring Stations (SLAMS), National Air Monitoring Stations (NAMS), and Photochemical Air Monitoring Stations (PAMS) (EPA, 1998). The SLAMS network designation is still maintained; however, NAMS and PAMS have been folded into the National Core Multipollutant Network and the $PM_{2.5}$ Chemical Speciation Network that provide specialized measurements focused on understanding the underlying causes of (and potential solutions to) nonattainment of the ozone and $PM_{2.5}$ NAAQS.

EPA's six stated objectives for the monitoring network design for the SLAMS are to (EPA, 1998):

- Determine highest concentrations expected to occur in the area covered by the network;
- Determine representative concentrations in the areas of high population density;
- Determine the impact on ambient pollution levels of significant sources or source categories;
- Determine general background concentration levels;
- Determine the extent of regional pollutant transport among populated areas, and in support of secondary standards; and
- Determine the welfare-related impacts in more rural and remote areas (such as visibility impairment and effects on vegetation).

EPA further explains that SLAMS monitors are intended to be located so that the samples they collect are representative of air quality over the entire area they are intended to cover. The EPA established "spatial scales of representativeness" to ensure that monitoring of specific pollutants is appropriate and representative. The scales of representativeness include microscale, middle scale, neighborhood scale, urban scale, and regional scale. The scale takes into consideration such factors as local terrain,

pollutant-specific criteria, and population density. EPA reviews the program annually to "improve the network to ensure that it provides adequate, representative, and useful air quality data" (EPA 1998).

In summary, EPA and state air agencies have established a monitoring network designed to allow collection of monitoring data sufficient for EPA and the state to determine ambient air quality of criteria pollutants. The monitoring data are used to determine background ambient concentrations of criteria pollutants, and to classify all areas of the country as attainment or nonattainment of the NAAQS.

Baltimore County, the location for the proposed CP Crane Repowering Project, is currently designated as attainment for NO_X, CO, PM, and Pb. Some counties in Maryland are designated ozone attainment areas and some are nonattainment areas. All of Baltimore County is designated a "marginal" ozone nonattainment area (on a scale that ranges from worst to best air quality of extreme – severe – serious – moderate – marginal) and is part of the Baltimore ozone nonattainment area (Baltimore, Carroll, Hartford, Howard, Anne Arundel counties and Baltimore City). In addition, the EPA, in June 2016, redesignated a portion of Baltimore County to be nonattainment for the 1-hour NAAQS for SO_2. The SO_2 non-attainment area extends 26.8 kilometers from the HA Wagner Generating Station Unit 3 stack in Anne Arundel County and encompasses the CP Crane Generating Station.

3.4 BIOLOGICAL RESOURCES

The Applicant assembled existing information about biological resources from online sources (e.g., MERLIN Online) as summarized in Appendix B of its ERD. The Applicant's key findings supported by MERLIN data are as follows:

- Both the Maryland DNR and National Wetlands Inventory (NWI) maps indicated the presence of wetlands in the site area;
- Neither source indicated any wetlands of special state concern to be present anywhere in the vicinity of the site;
- Neither source indicated any natural heritage areas, agricultural preservation lands, or forest legacy lands to be present anywhere in the vicinity of the site; and

- These sources indicated the presence of sensitive species near the site, as well as habitat suitable for forest interior-dwelling species (FIDS), green infrastructure, and SAV.

In addition to MERLIN, the Applicant queried the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool for records of species and other resources, such as critical habitat, under the USFWS's jurisdiction that are known or expected to be within a 1-mile radius of the CP Crane site. The IPaC report (USFWS, 2018a) identified no federally threatened or endangered species under the Endangered Species Act of 1973. The Migratory Bird Treaty Act of 1981 listed 31 avian species as birds of conservation concern by USFWS; these are species that are of concern throughout their range anywhere within the United States. Additionally, the IPaC identified bald eagle and golden eagle occurring within one mile of the Project site. Eagles receive protection under the Bald and Golden Eagle Protection Act of 1940. The IPaC also identified sixteen additional avian species within a 1-mile radius of the site that are potentially susceptible in offshore areas to certain types of development or activities (e.g., offshore energy development or longline fishing).

No National Wildlife Refuge lands are within one mile of the site, nor are any fish hatcheries. The Applicant queried critical habitat under the jurisdiction of National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries) to identify any anadromous or marine species that may exist near the site. Based on this query, the closest designated critical habitat (for Maryland darter, *Etheostoma sellare*) is approximately 18 miles northeast of the site (USFWS, 2018b).

The CP Crane site is located within the Maryland Piedmont Plateau Province. Characteristically, the landscape in the site region is typified by rolling hills with incised stream valleys. This area of Maryland is included within the Southeastern Mixed Forest Ecological Province as defined by the U.S. Forest Service. Typical vegetation is deciduous and mixed pine oak forests.

The Applicant obtained DNR and NWI wetland maps from DNR's Geospatial Data website. Figures 3-3 and 3-4 show these maps overlaying an aerial photograph. While there are wetlands located within the site boundary, the areas to be developed as part of the proposed Project will not impact these wetlands. The Applicant also used the DNR data site to obtain the more detailed information regarding sensitive species review

areas as delineated by the Wildlife and Heritage Service (WHS). The highlighted areas indicate the presence or possible presence of listed species. The areas closest to the site are classified as either Group 2, 3, or 4. Group 2 relates to state-listed species; Group 3 relates to species or natural communities of concern to DNR, but with no official status; and Group 4 indicates buffered locations of bald eagle nests. None of these areas is located on the site.

Figure 3-3 DNR Wetlands in the Site Vicinity

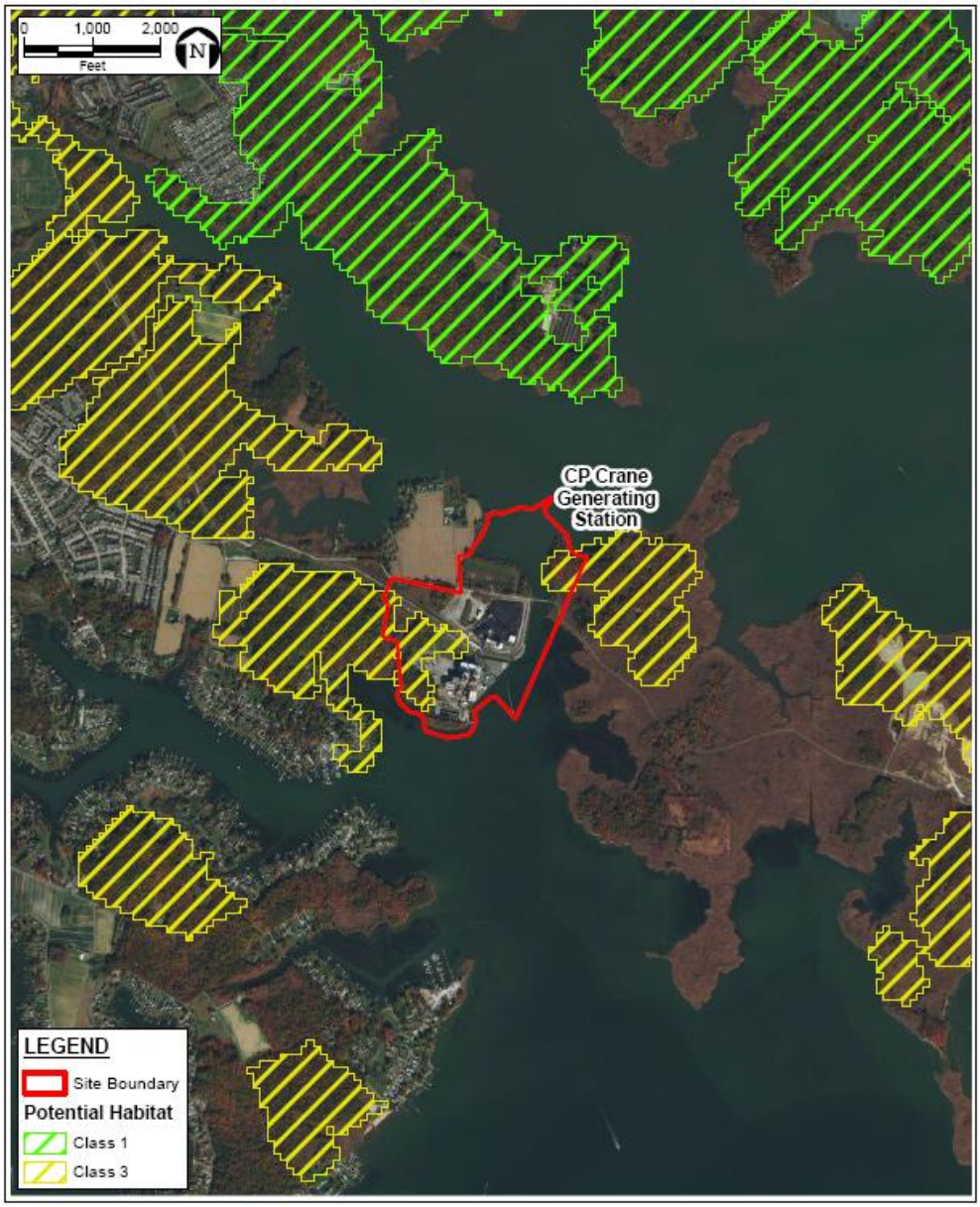
Source: CP Crane ERD, 2018

Figure 3-4 NWI Wetlands in the Site Vicinity

Source: CP Crane ERD, 2018

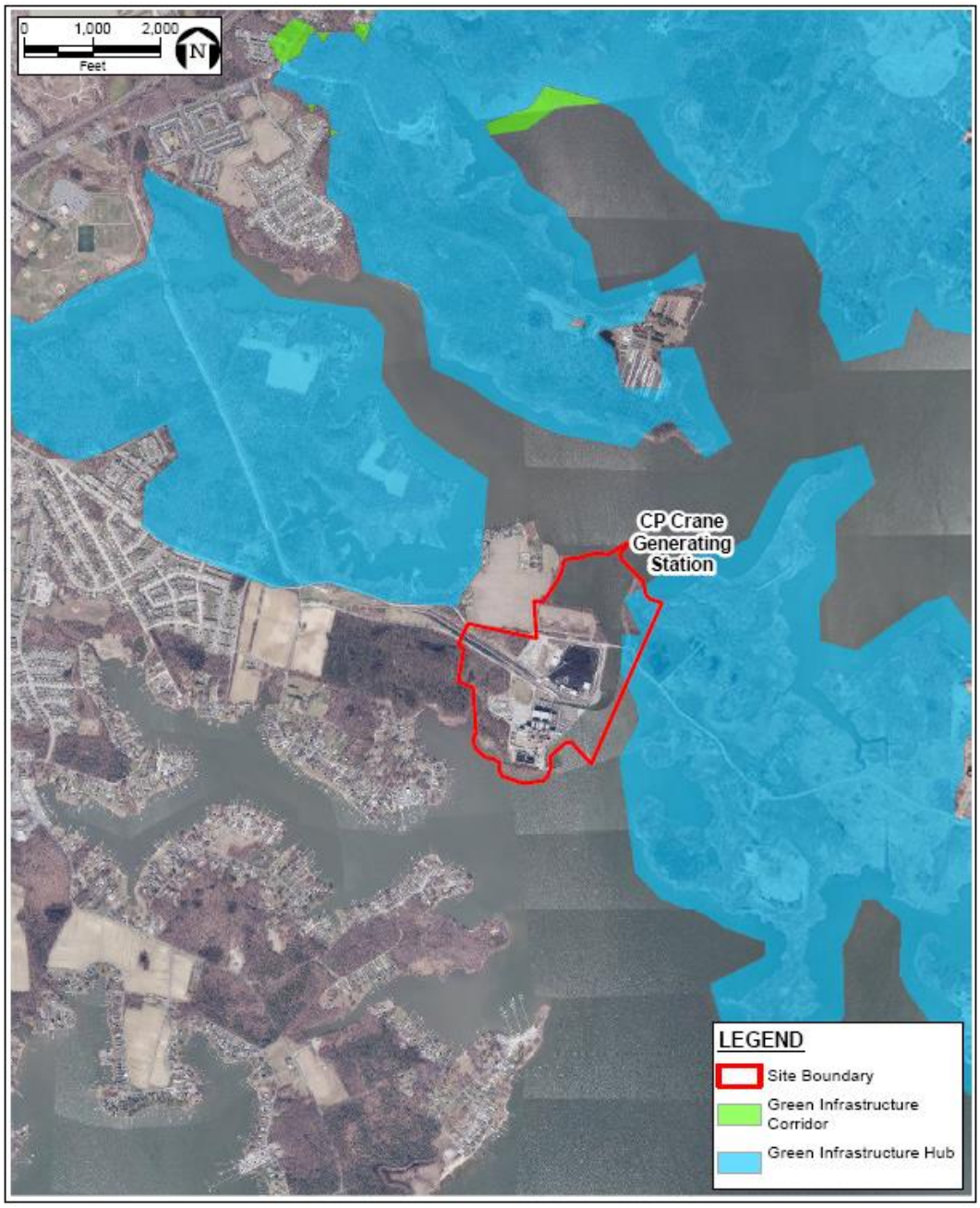
Potential habitat for FIDS and areas designated as green infrastructure were also obtained from the DNR. Figures 3-5 and 3-6 present this information.

Figure 3-5 Forest Interior-Dwelling Species Potential Habitat in the Site Vicinity



Source: CP Crane ERD, 2018

Figure 3-6 Green Infrastructure in the Site Vicinity

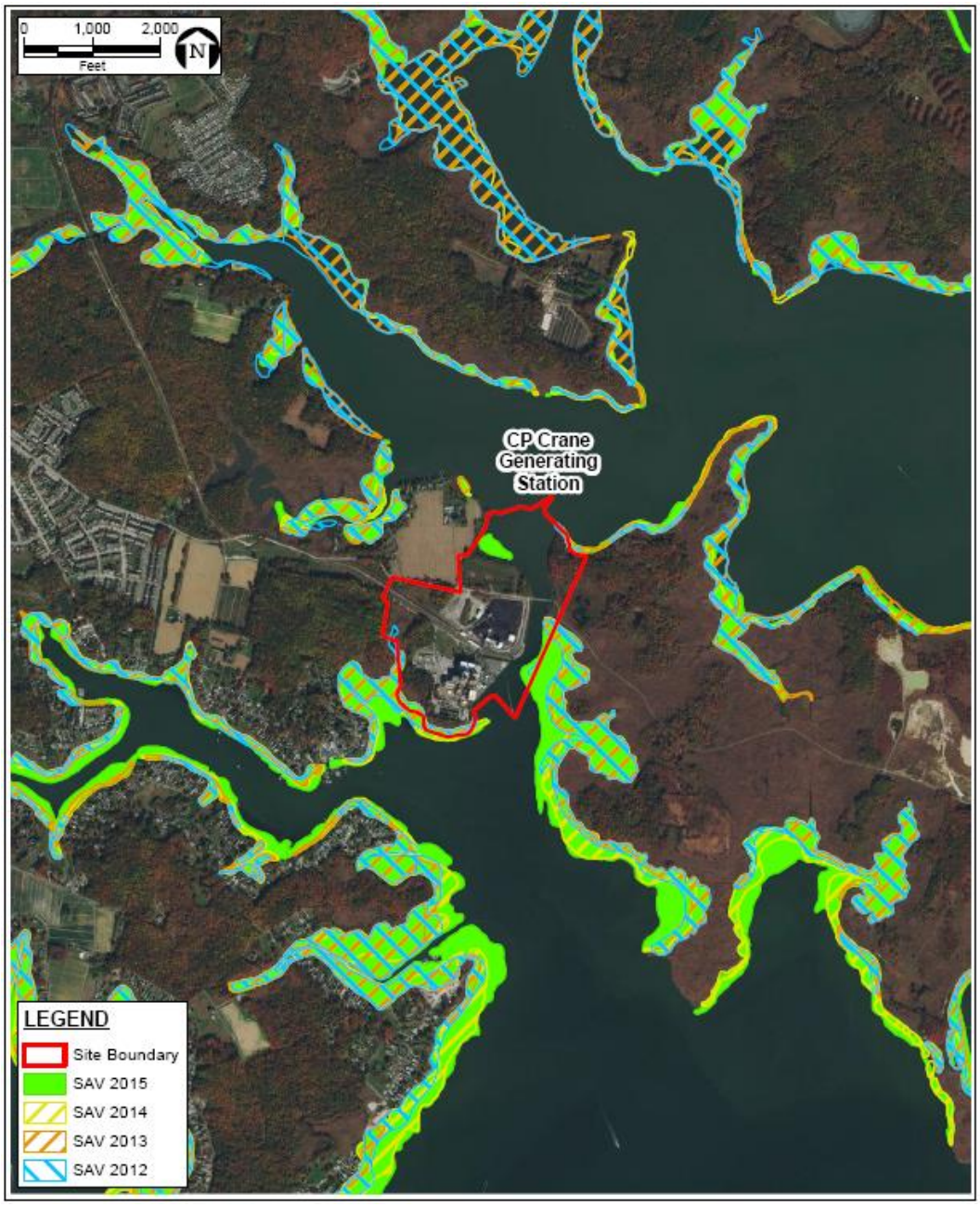


Source: CP Crane ERD, 2018

The Gunpowder River, including Seneca Creek, is an estuary with tidal characteristics. The average tidal range is approximately 1.4 ft with slightly higher spring tides. Estuarine systems consist of deep-water tidal wetlands and adjacent tidal wetlands. SAV is also established within this estuarine system (see Figure 3-7). The estuary supports numerous terrestrial and aquatic species. Terrestrial species include birds adapted to

urban environments, year-round and migratory fowl, raptors, mammals, reptiles, and amphibians. Aquatic species include zooplankton communities, benthic macroinvertebrates, and fish. For the latter, the Gunpowder River basin supports spawning and nursery areas for sport and commercial fish species.

Figure 3-7 Submerged Aquatic Vegetation in the Site Vicinity



Source: CP Crane ERD, 2018

3.5 REGIONAL SOCIOECONOMIC SETTING

3.5.1 Population Trends

Baltimore County is Maryland's third most populous county. As of July 2017, the population of Baltimore County was 832,468, an increase of 3.4% over 2010 (MDP, 2018). Population is projected to grow 3.6% by 2030, to 862,200 (MDP, 2017).

3.5.2 Employment and Income

The labor force in Baltimore County was estimated to be 453,926, with an unemployment rate of 4% in September 2018 (BLS, 2018). Baltimore County ranked second in Maryland in jobs by place of work (374,646 in 2017), with major employers accounting for more than 54,000 jobs. Major employers include Social Security Administration, University System of Maryland, Centers for Medicare and Medicaid Services, GBMC Healthcare, MedStar Franklin Square Medical Center, T. Row Price Group, and the Community College of Baltimore County (Baltimore County, undated).

Both the civilian and military branches of the federal government have a major presence in the county. Health care, professional and technical services, and finance and insurance industries have shown the largest job growth in Baltimore County, but manufacturing employment has declined, reflecting national trends. The county is projected to continue to experience positive employment growth, with employment projected to increase by 13,000 jobs by 2024.[2]

3.5.3 Land Use and Zoning

The CP Crane site occupies approximately 157 acres adjacent to Seneca Creek in the Bowleys Quarters community. The Project will be constructed within an 88.4-acre parcel currently occupied by the retired coal units. Bowleys Quarters is within the Middle River Neck Peninsula extending northwest to Eastern Avenue and north to Carroll Island. The peninsula is bound by Frog Mortar Creek, Middle River, Chesapeake Bay,

[2] https://www.baltimorecountymd.gov/Agencies/economicdev/meet-baltimore-county/stats-and-figures/econdev-statistics.html

Seneca Creek, and Saltpeter Creek. Bowleys Quarters has approximately 18 miles of shoreline, and approximately 85% of the community lies within the CBCA. The community is within the rural section Baltimore County's Urban Rural Demarcation Line (URDL), established in 1967. This concept was adopted to direct most employment, retail, and residential growth from the rural area by targeting public water and sewer infrastructure in the urban area.

Most of the land in Bowleys Quarters is zoned Rural Residential (RC-5), Resource Conservation Critical Area (RC-20), or Density Residential (DR-x). Water-based businesses are zoned Business Marine Boatyard (BMB) or Business Marine Marina (BMM).

The development pattern of Bowleys Quarters is one of waterfront homes, many originally constructed as summer residences (Baltimore County Council, 2001). Much of the interior of the peninsula is farmland or forested. Newer development is concentrated in the upper peninsula along Eastern Avenue, Carroll Island Road, and the east side of Bowleys Quarters Road at Seneca Garden Road. Residential development in these areas comprises both single-unit and multi-unit dwellings. Commercial development generally consists of restaurants, gas stations, and the Carroll Island Shopping Center, all concentrated on the upper peninsula. More than a dozen marinas are located on the rivers and creeks.

The CP Crane Generating Station is the only major industrial facility located in the community. Its 157 acres account for approximately 74% of the community's total industrial land use. Most of the remaining industrial land is at the intersection of Carroll Island Road and Bowleys Quarters Road. Overall, industrial lands comprise approximately eight percent of Bowleys Quarters. Land uses adjacent to the facility are forest along most of the site's western edge, with an agricultural/open space area at its northwest corner. Seneca Creek borders the station to the south and east, with Saltpeter Creek defining its northern boundary.

On July 9, 1957, the Zoning Commissioner of Baltimore County granted Baltimore Gas & Electric a special exception to the site's then-current zoning of R-6 to erect the original CP Crane facility. That decision was contested by a group of local landowners and the matter was brought before the Baltimore County Board of Appeals. The Board upheld the special exception and at the same time imposed the following conditions:

- This Special Exception shall apply only to the property petitioned for as amended by Petitioner's Exhibit #20;

- No more than four power producing units shall be constructed on the subject property;
- The temperature of the water at the point of expulsion in Saltpeter Creek shall at no time exceed 95 degrees Fahrenheit (°F);
- The requirements of the Maryland Water Pollution Control Law will at all times be met;
- An adequate sewage disposal plant shall be constructed and maintained;
- Bulkheading will be done where necessary to prevent erosion of neighboring property;
- Coal will be dumped within buildings only, and coal piles will be oiled when necessary to prevent leaching of sulfur, so as not to create acidity in the surrounding water; and
- No more than one shipment of coal per day per unit shall be received.

The land upon which the facility sits is currently zoned RC-5, a resource conservation zoning that provides for rural residential development in suitable areas where public water and sewer are not anticipated.

The Crane Station sits on land within the CBCA. The site is classified by Baltimore County as an Intensely Developed Area within the guidelines of the Chesapeake Bay Critical Area Act.

3.5.4 Recreational, Scenic, and Cultural Sites

Baltimore County retains significant cultural resources. More than 3,000 properties in the county, including county and National Register (NR) historic districts, are in the Maryland Inventory of Historic Places (MIHP). Several MIHP grids in the Bowleys Quarters peninsula indicate the potential presence of archeological resources, but are located outside the boundaries of the CP Crane site.

There are four MIHP-listed properties in Bowleys Quarters. The Scott-Andrew House (BA-1846) is unique in Baltimore County as a type of dwelling that characterized 18th century waterside tobacco plantations. The house stands on what was originally a 720-acre tract known as Scott's Improvement, recorded in 1725. The property was later divided and part now sits on the rail spur within the CP Crane property boundary. As noted in the MIHP inventory form, the historic orientation of the house toward Seneca Creek (and away from the CP Crane Generating Station)

has been compromised by the Seneca Park Beach subdivision on the waterfront.

The Mace-Luthardt House (BA-1847) is an undocumented property in the same vicinity of Seneca Park and the Scott-Andrew House. Bengies Community Center (BA-2823), located near the intersection of Eastern Avenue and Bowleys Quarter Road, is a former school dedicated to African-American students, probably erected in the late 19th or early 20th century. The property is not NR eligible. Bowleys Yacht Basin (BA-513) is a club house built in the early 20th century on land originally occupied by the Bowleys Quarters Ducking Club. The club reportedly entertained Presidents Grover Cleveland and Benjamin Harrison in the 19th century.

Historic properties of significance to Baltimore County are listed in the Baltimore County Landmarks List, which requires the Baltimore County Landmarks Preservation Commission to review and approve any proposal to change the exterior or demolish a listed structure. As of August 2018, the Baltimore County Council had placed 390 properties on the Landmarks List, including the Scott-Andrew House (Baltimore County, 2018).

Baltimore County has established 17 Historic Districts. Any exterior modification, addition, or demolition of a structure in a local historic district is subject to approval by the Baltimore County Landmarks Preservation Commission. Significantly, and in order to maintain the historical character of the district, the commission's authority within a local historic district extends to sites surrounding or adjoining a structure. There are no historic districts near the proposed Project.

There are nearly 350 properties on the National Register of Historic Places and 20 NR districts in Baltimore County. There are no NR properties in the Bowleys Quarters planning district. The closest NR District to Bowleys Quarters is the Dundalk National Register Historic District.

Although not on the MIHP, the Piney Grove United Methodist Church on Bowleys Quarters Road has been historically documented. Formed in 1874 after the Pennsylvania Railroad donated one acre of land to a congregation, the church was known as the Piney Grove Independent Evangelical Church until 1951. The original structure has since been replaced.

Baltimore County has 37 historically African-American communities, most of which are more than 100 years old and many of which were established and named by freed slaves (EHT Traceries, 2003). One of the county's top priorities is to improve basic services and infrastructure in these communities to retain their historical and cultural character. None of the nearby historically African-American communities of Chase, Hopewell Avenue, Back River Neck, or Goodwood is in Bowleys Quarters.

Baltimore County's scenic resources are among its many cultural resources. These resources consist of scenic corridors, scenic views, and gateways. Designation of scenic corridors or views is designed to inform development guidelines for protecting the county's scenic resources. Bowleys Quarters Road is identified as a County Scenic Route in Master Plan 2020, as are scenic views on the Chesapeake Bay from the shoreline of the peninsula, along Bay Road and from Miami Beach Park, and over the Middle River from Seneca Pointe. The closest designated Scenic Gateway leads to Rocky Point Park (Baltimore County Council, 2010).

The CP Crane site is within the Baltimore County Coastal Rural Legacy Area. Running from the Gunpowder River to the North Point State Park, it includes the highest concentration of forest and agricultural lands and fresh and tidal wetlands in Baltimore County. Baltimore County's Coastal Rural Legacy Plan seeks to protect large blocks of forest, wetlands, farms, and other open spaces having significant ecological value. There are two Rural Legacy land preservation easements flanking the CP Crane site to the west.

There is one county owned park in the Bowleys Quarters peninsula, Miami Beach Park, off Bowleys Quarters Road and Bay Drive, which is south of the CP Crane site and separated from it by Seneca Creek. The waterfront park contains 59 acres of trails, playgrounds, and picnic areas, plus restrooms and a pavilion. Just outside of Bowleys Quarters, the Marshy Point Nature Center is just north of the facility across Saltpeter Creek. A 492-acre park, the nature center is one of the newest facilities of the Baltimore County Department of Recreation and Parks, and offers trails and water-based recreation options in addition to an exhibit hall and outdoor decks for picnicking. Gunpowder Falls State Park is adjacent to the Marshy Point Nature Center across Dundee Creek. Near its junction with the Amtrak mainline, the rail spur to the CP Crane site traverses the 122-acre Eastern Regional Park at the tidal inlets of Saltpeter Creek in the vicinity of Eastern Avenue. The park has picnic facilities, a playground,

sport fields, trails, and a 9,000-square foot community center. The Aberdeen Proving Ground, a federal facility on Carroll Island, sits across from the CP Crane Generating Station.

3.5.5 Public Services and Safety

The Baltimore County water supply system is an extension of Baltimore City's metropolitan system. There are thirteen water service zones. Commerce and industry account for about 30 percent of water consumption in the county (Baltimore County Council, 2010). The county operates its own sewer system, but most sewage is treated at two Baltimore City waste water treatment plants. A new 120 million gallons per day (gpd) Fullerton water treatment facility is under construction. Located northeast of Baltimore City, construction began on February 1, 2017 and is expected to be completed by April or May 2020[3]. Although public water and sewer are generally limited to areas within the URDL, services have been extended to Bowleys Quarters to address pollution of Seneca Creek and Frogs Neck Creek from failing septic systems. The CP Crane Generating Station is serviced by public water and sewer. For solid waste, Baltimore County operates the Eastern Sanitary Landfill Solid Waste Management Facility, which includes a transfer station, composting operation, and recycling center. An additional 2,250 tons per day of municipal solid waste is processed by the Wheelabrator Baltimore waste-to-energy facility (Baltimore County Council, 2010).

Bowleys Quarters is in the Precinct 11 (Essex) service area of the Baltimore County Police Department. Fire and emergency medical services are handled by the Baltimore County Fire Department and Volunteer Firemen's Association. Bowleys Quarters is served by the Bowleys Quarters Volunteer Fire Company, located on Bowleys Quarters Road. The company maintains two engines and has a Marine Emergency Team for open water rescues on the Chesapeake Bay.

Education in Baltimore County is administered by the Baltimore County Board of Education. Bowleys Quarters is in the Southeast administrative area and is served by the Chase Elementary School on Eastern Avenue,

[3] http://www.wadekach.com/baltimore-county-council-agendas/baltimore-county-council-agenda-ws-may-15-2018-ls-may-24-2018/

the Middle River Middle School on Middle River Road, and Chesapeake High School on Turkey Point Road.

3.5.6 Transportation

Road access to the CP Crane site is via Carroll Island Road, which intersects Eastern Avenue (MD 150), less than two miles to the northwest. Eastern Avenue connects with US 40, I-695 and other regional highways. The road has three marked lanes at its intersection with Carroll Island Road, with spurs leading to and from the minor road. The "T" intersection is signalized and the posted speed limit is 40 mph. The Bowleys Quarters Community Action Plan 2000 notes that the intersection is potentially dangerous because of traffic entering and leaving two fast food restaurants, a drive-in theatre, and service stations, creating hazardous conditions. A traffic study was performed in 1999 and the intersection was found to perform a Level-of-Service "A", meaning that the average overall wait time for a vehicle to pass through the intersection is ten seconds or less. There is additional congestion, particularly at peak hours, at the signalized intersection of Carroll Island Road and Bowleys Quarters Road due to left turns into the Carroll Island Shopping Center (Baltimore County Council, 2001).

Until retired in June 2018, the main generating units at the plant were two coal-fired units. While operating, coal was delivered by rail along a dedicated spur off Amtrak's Northeast Corridor. The spur is approximately 8,300 feet long, running from a mainline switch in the Chase manor section of Middle River to the site boundary at Carroll Island Road.

3.6 NOISE

This licensing review incorporates an evaluation of noise impacts to ensure compliance with State noise regulations. The analysis of potential noise impacts focuses on the potential for sound pressure from generating equipment to exceed numerical limitations at the nearby noise sensitive areas.

3.6.1 Definition of Noise

Noise generally consists of many frequency constituents of varying loudness. Three decibels (dB) is approximately the smallest change in

sound intensity that can be detected by the human ear. A tenfold increase in the intensity of sound is expressed by an additional 10 units on the dB scale, a 100-fold increase by an additional 20 dB. Because the sensitivity of the human ear varies according to the frequency of sound, a weighted noise scale is used to determine impacts of noise on humans. This A-weighted decibel (dBA) scale weights the various components of noise based on the response of the human ear. For example, the ear perceives middle frequencies better than low or very high frequencies; therefore, noise composed predominantly of the middle frequencies is assigned a higher loudness value on the dBA scale. Subjectively, a tenfold increase in sound intensity (10 dB increase) is perceived as an approximate doubling of sound. Typical A-weighted sound levels for various noise sources are shown in Table 3-1.

Table 3-1 Typical Sound Levels for Common Sources

Noise Source	**Typical Sound Pressure Level (dBA)**
Lowest sound audible to human ear	10
Soft whisper in a quiet library	30-40
Light traffic, refrigerator motor, gentle breeze	50
Air conditioner at 6 meters, conversation	60
Busy traffic, noisy restaurant, freight train moving 30 mph at 30 meters	70
Subway, heavy city traffic, factory noise	80
Truck traffic, boiler room, lawnmower	90
Chain saw, pneumatic drill	100
Rock concert in front of speakers, sand blasting, thunder clap	120
Gunshot, jet plane	140

Noise monitoring is typically conducted continuously over a period of time to obtain a representative picture of the acoustic environment. The length of time required for noise monitoring, and the frequency of individual measurements, will vary depending upon a number of factors, including surrounding land use, time of day, the purpose of noise monitoring, the number of locations at which sound levels are being measured, and the capabilities of the monitoring equipment being used.

Ambient sound pressure levels can also be expressed in various ways. Quite often, noise levels are measured or reported as equivalent sound levels, L_{eq}, over a given time period. A one-hour L_{eq}, for instance, is the constant sound level that has the same energy content as the actual sound variations over a one-hour monitoring period.

Sound energy dissipates with increasing distance from the noise source. For every doubling of the distance, the sound pressure level produced by a given noise source decreases by approximately 6 dBA.

3.6.2 Existing Noise Levels

CP Crane conducted ambient noise surveys in January and April 2018 to characterize the existing acoustic environment in the area. The Applicant measured background noise at two locations on the site property (Locations 1 and 2) and two offsite locations (Locations 3 and 4). Locations 1 and 2 are within the property boundary to the south and north, respectively, of the proposed Project location. Location 3 is to the southwest of the site, in the nearest residential neighborhood. Location 4 is at the northern property boundary of the site.

The sample locations for the survey are shown in Figure 3-8. Sound levels were measured for short periods of time, less than one hour, between 10:30 and 17:50 over a two-day period.

Figure 3-8 CP Crane Noise Monitoring Locations

Source: CP Crane ERD, 2018

At Location 3, which is located in the nearest residential neighborhood, the highest L_{eq} was measured at 49.1 dBA. During both sampling days, noise from the CP Crane Generating Station was stated as the predominant noise source. Table 3-2 summarizes the maximum L_{eq} measured at each of the four monitoring locations.

Table 3-2 Maximum L_{eq} Sound Levels at Noise Monitoring Locations

Location	Maximum L_{eq} (dBA)
1	60.4
2	60.3
3	49.1
4	52.6

4.0 AIR QUALITY IMPACTS

4.1 AIR QUALITY IMPACT ASSESSMENT BACKGROUND AND METHODOLOGY

4.1.1 Overview

As part of the CPCN Application process, PPRP, in conjunction with the Maryland Department of the Environment Air and Radiation Administration (MDE-ARA), evaluates potential impacts to air quality resulting from proposed projects to be licensed in Maryland under COMAR 20.79. This evaluation includes emissions investigations and other studies, including air dispersion modeling assessments, to ensure that impacts to air quality from proposed projects are acceptable. PPRP and MDE-ARA also conduct a complete air quality regulatory review for two purposes: 1) to assist in the impact assessment, since air quality regulatory standards and emissions limitations define levels to protect against adverse health, welfare, and environmental effects, and 2) to ensure that the proposed Project will meet all applicable regulatory requirements.

For this proposed Project, MDE-ARA conducted an air quality evaluation of the proposed CP Crane Repowering Project to confirm that projected maximum potential air emissions would meet applicable regulatory thresholds and limits. The proposed Project was evaluated to determine whether emissions from the Project would have significant impacts on the existing ambient air quality in the region. MDE-ARA assessed the effects on current ambient air quality by performing air dispersion modeling analyses to predict the future ambient air concentrations resulting from emissions from the proposed Project.

4.1.2 Regulatory Considerations

EPA defines concentration-based NAAQS for several pollutants, which are set at levels considered to protect public health and welfare. Specifically, EPA defined the NAAQS for six "criteria" pollutants, including PM, SO_2, CO, NO_2, O_3, and Pb. Two forms of PM (or "total particulates") have specific NAAQS: particulate matter less than 10 microns (PM_{10}), and particulate matter less than 2.5 microns ($PM_{2.5}$).

Air emissions limitations and pollution control requirements are generally more stringent for sources located in areas that do not currently meet a NAAQS for a particular pollutant. Areas not meeting a NAAQS for a

pollutant are designated as "nonattainment areas", and areas achieving the NAAQS are known as "attainment areas".

Baltimore County, the location for the proposed CP Crane Repowering Project, is currently designated as attainment for NOx, CO, PM, and Pb. All of Baltimore County is designated non-attainment for ozone. Since ozone is a warm weather pollutant, Baltimore County has historically experienced high ozone concentrations during the ozone season (March – September). Baltimore County is part of the Baltimore Ozone Non-Attainment Area and has been designated as "Marginal" for the 8-hour ozone NAAQS. Emissions of the two pollutants that contribute to the formation of ozone, volatile organic compounds (VOCs) and NO_X, are regulated more stringently in ozone nonattainment areas such as Baltimore County to ensure that air quality is not further degraded (i.e., the ambient air concentration of ozone does not continue to increase as new sources of ozone forming pollutant emissions are constructed).

the EPA, in June 2016, redesignated a portion of Baltimore County to be non-attainment for the 1-hour NAAQS for SO_2. The SO_2 non-attainment area extends 26.8 kilometers from the HA Wagner Generating Station Unit 3 stack in Anne Arundel County and encompasses the CP Crane site. Also, it should be noted that EPA has changed the air quality designation of Baltimore County with respect to $PM_{2.5}$ NAAQS from nonattainment to attainment. Specifically, on October 6, 2014, EPA issued a final rule re-designating the Baltimore metropolitan area (which includes Baltimore County) to attainment for the 1997 annual $PM_{2.5}$ NAAQS. The EPA final rule became effective on November 5, 2014.

Potential emissions from new and modified sources in nonattainment areas are evaluated through the nonattainment new source review (NA-NSR) regulatory program. Major new and modified sources in designated nonattainment areas of Maryland must meet the regulatory requirements of COMAR 26.11.17. The goal of the NA-NSR program is to allow construction of new emission sources and modifications to existing sources, while ensuring that progress is made towards meeting, or attaining, the NAAQS. NA-NSR requires major sources to limit emissions of affected pollutants through the implementation of the most stringent levels of pollution control, known as Lowest Achievable Emission Rate (LAER).

Potential emissions from new and modified sources located in attainment areas are evaluated through the Prevention of Significant Deterioration (PSD) program. The goal of the PSD program is to ensure that emissions from major sources do not degrade air quality in areas that currently meet

NAAQS. Triggering PSD requires use of the Best Available Control Technology (BACT) and requires affected sources to evaluate impacts usually through dispersion modeling analysis.

Activities associated with the proposed Project have the potential to emit the following regulated pollutants: PM, PM_{10}, $PM_{2.5}$, CO, NO_X (nitrogen oxide (NO) and NO_2), SO_2, sulfuric acid mist (SAM), Pb, ozone precursors (VOC and NO_X), greenhouse gases (GHGs) expressed as carbon dioxide equivalent (CO_2e), and hazardous air pollutants (HAPs). The potential emissions associated with the Project are discussed in Section 4.3. An applicability determination pertaining to major New Source Review regulations is discussed in Section 4.4.

Other federal and state air quality regulations also apply to the Project. These regulations apply because of either the type of emission source constructed or the pollutants that are emitted. These regulations, discussed in Sections 4.5.1 and 4.5.2, specify pollutant emissions limitations and provides details regarding notification, monitoring, testing, recordkeeping, and reporting requirements.

4.2 PROPOSED PROJECT SOURCE CHARACTERIZATION

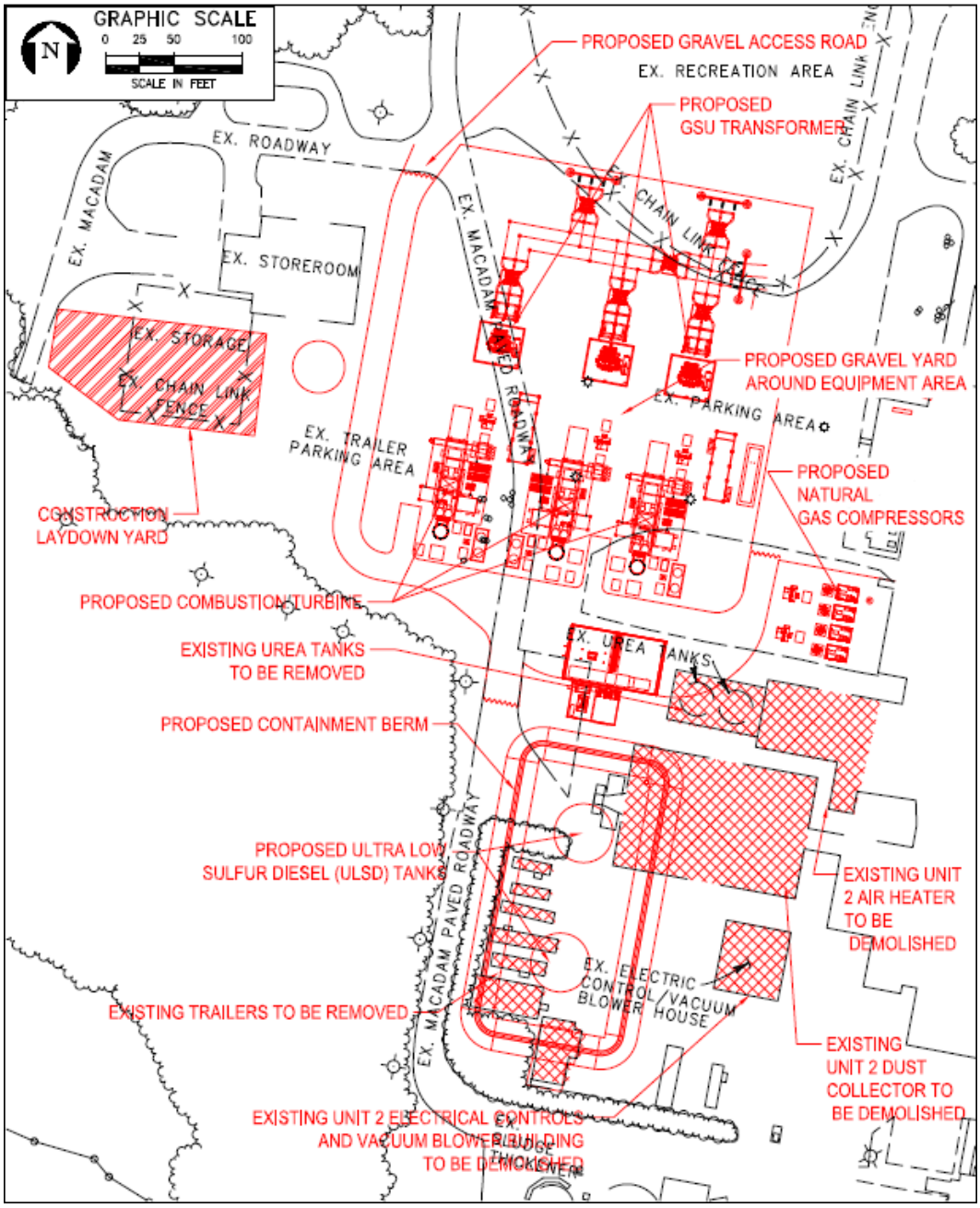
The proposed CP Crane Repowering Project involves the permanent shutdown of the coal-fired units (Unit 1 and Unit 2) and replaces them with three refurbished GE aero-derivative LM6000 CTs fired primarily with natural gas and with ULSD as backup. Table 4-1 provides a summary of the new emissions sources under review.

Table 4-1 CP Crane Project Air Emissions Sources

Component (Number of Units)	Type/Model	Rated Capacity of Each Unit	Fuel	Maximum Allowable Operations
Combustion Turbines (3)	GE LM6000PC	50 MW (nominal)	Natural gas No. 2 oil backup	2,365 hours/year per CT
Black Start Generator	Tier 1/Cummins Model KTA50G9	1,500 kW	ULSD	100 hours/year for maintenance and testing

Figure 4-1 depicts a detailed arrangement of the primary equipment associated with the Repowering Project.

Figure 4-1 CP Crane Project Equipment Arrangement



While the total generating capacity of the proposed Repowering Project will be less than the original coal fired power plant, the generating units will provide the PJM Interconnection, Inc. (PJM) system with additional and efficient generating flexibility, load changing capacity, and fast startup capability. Specifically, the CTs are expected to serve as peaking units and operate up to a 27% annual capacity factor or 2,365 hours per year. In addition, the aero-derivative design of the CTs will allow them to

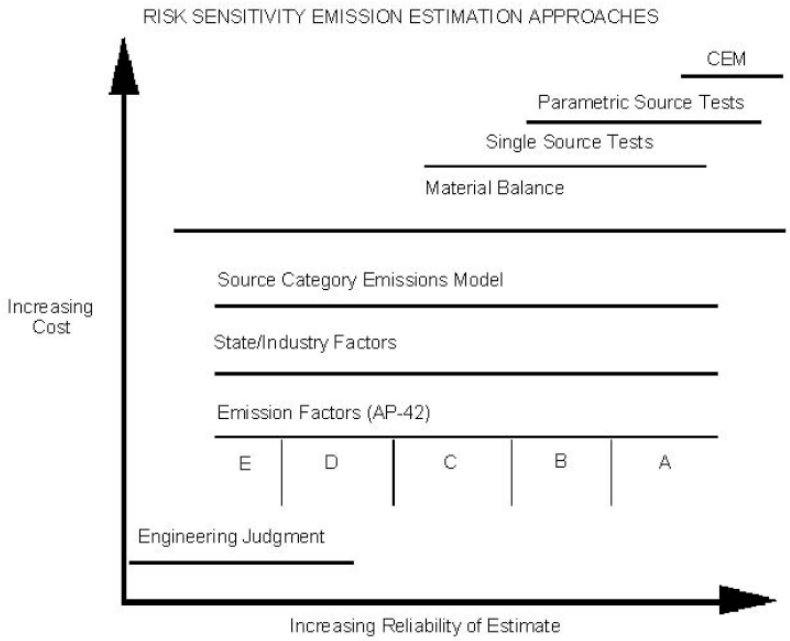
start up and reach full load in 10 minutes or less and shut down quickly numerous times a day if circumstances warrant.

The proposed Project will also include one new 1,500-kW black start generator that will be used to provide startup capability for the CTs when there is no electricity on the power grid. The black start generator will not be used to produce electricity for the grid and will be restricted to operating 100 hours per year for routine maintenance and testing. The black start generator will combust ULSD fuel exclusively.

CP Crane provided background information in the CPCN Application on the methods used to calculate potential emissions for the Project. MDE-ARA independently calculated emissions from the proposed modification Project, with results of this analysis summarized in Section 4.3. The State based its evaluation of emissions on the recommended hierarchy of emission factors discussed in EPA's Compilation of Air Pollutant Emission Factors (AP-42) introduction document[4] as shown in Figure 4-2. Potential emissions from the Project were estimated using vendor data, AP-42 emission factors, material balance calculations, New Source Performance Standards (NSPS) emission standards, and/or engineering calculations. MDE-ARA is generally in agreement with the methodologies adopted by CP Crane to determine emissions for the proposed Project.

[4] USEPA, 1995. Introduction to AP-42, Volume I, Fifth Edition. January 1995

Figure 4-2 Recommended Approach to Estimating Emissions



4.3 PROJECT AIR EMISSIONS

4.3.1 Combustion Turbines

CP Crane has selected ProEnergy Services (ProEnergy) as the vendor to refurbish the CTs in a manner that will comply with all applicable federal and State emission standards. Potential emissions for most pollutants emitted by the refurbished GE LM6000 CTs are based on vendor specifications provided by ProEnergy as included in CP Crane's August 31, 2018 Supplemental Filing to its CPCN Application. The CTs are designed to operate during periods of peak load or system outages up to a 27% annual capacity factor or 2,365 hours per year.

ProEnergy provided vendor specifications for 21 operational cases each for natural gas and No. 2 fuel oil combustion. The scenarios represent a combination of different ambient temperatures (°F) and operational loads (MW). These 42 operational cases include predicted emissions resulting from operating the CTs at various loads.

The concentration based turbine emissions, in parts per million (ppm), for NO_X, CO, PM, SO_2, and VOC were based on guarantees provided to CP Crane by ProEnergy. CP Crane based the short-term (lb/hr) emission

rates for NO_X, CO, PM, SO_2, and VOC on the ppm limit for each pollutant, and short term (lb/hr) lead emissions on an emissions factor from AP-42. The short-term emission rates for the CTs were calculated for each of the different operational cases to determine the worst-case short-term (lb/hr) emissions rate for each pollutant for any normal operational case. The worst-case short-term emissions rates for each fuel type are presented in Table 4-2.

The vendor specification for the CTs also included emissions rates for GHGs. GHGs are defined by EPA to include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), and other fluorinated greenhouse gases[5]. For the proposed CTs the total GHG emissions are calculated as the sum of CO_2, CH_4, and N_2O, expressed as CO_2e. Each GHG pollutant has a varying potential to contribute to global warming, which is expressed in terms of a global warming potential (GWP). The GWP potential for CO_2 is 1, CH_4 is 25, and N_2O is 298. CP Crane calculated projected GHG emissions from the CTs using emission factors from EPA's Mandatory GHG Reporting Rule for combustion sources codified at 40 CFR Part 98 Subpart C. The heat inputs for the CTs provided on the vendor specification sheets, along with the GHG Reporting Rule emission factors were used to calculate short-term (lb/hr) emission rates.

[5] USEPA, 2010. 40 CFR Part 98, 74 FR 16621

Table 4-2 CT Short Term Emission Rates

Pollutant	Maximum Emissions Rate (lb/hr)	
	Natural Gas	ULSD
NO_X	44.73	75.07
CO	35.15	41.19
VOC	3.46	6.43
PM #	5.10	15.51
PM_{10}	5.10	15.51
$PM_{2.5}$	5.10	15.51
SO_2	0.68	0.72
Lead	0.0002*	0.0067"
H_2SO_4	0.10	0.11
CO_2e	54,224	74,930

All particulate matter is considered $PM_{2.5}$.
* Based on AP-42 Table 1.4-2 (EPA, 1998)
" Based on AP -42 Table 3.1-5 (EPA, 2000)
Source: ProEnergy, Performance Data, 2018. ECT, 2018

The aero-derivative design of the proposed CTs allow the units to achieve full load within 10 minutes and quickly shutdown within 8 minutes should circumstances warrant. CP Crane has assumed a maximum of 250 startups per year, including 25 startups using ULSD. Table 4-3 provides a summary of emissions associated with a typical startup/shutdown event when burning natural gas or ULSD fuel.

Table 4-3 CT Startup/Shutdown Emissions Per Unit

Scenario	NO_X (lb per event)	CO (lb per event)	VOC (lb per event)	Duration (minutes)
Natural Gas				
Startup	3.6	3.2	0.5	10
Shutdown	3.1	2.5	0.33	8
ULSD				
Startup	12.8	11.6	0.4	10
Shutdown	10.9	9.9	0.4	8

Sources: ProEnergy, 2018; ECT, 2018

4.3.2 Black Start Generator

The 1500 kW black start generator will be used to provide startup capability for the proposed CTs when there is no electricity on the power grid. The black start generator will not be used to produce electricity for

the grid and will be restricted to operating 100 hours per year for routine maintenance and testing. As such, the projected emissions of NO_X and other criteria pollutants are minimal and summarized in Table 4-4. The black start generators will combust ULSD fuel exclusively.

Table 4-4 Black Start Generator Annual Emissions (tpy)

Unit	NO_X	CO	VOC	PM	CO_2e
Generator	1.52	1.88	~~10~~.21	0.09	115.16

4.3.3 *HAP Emissions*

In addition to criteria pollutants, CP Crane presented estimated HAP emissions for the proposed Project. The Clean Air Act (CAA) major source thresholds for HAPs are 25 tons per year (tpy) for total HAPs and 10 tpy for any individual HAP. The potential annual HAP emissions associated with the Project are ~~1.82~~ 2.04 tpy for total HAPs and 1.28~~1.15~~ tpy for largest individual HAP (formaldehyde). Because the potential HAP emissions are below the applicable CAA emission threshold, the facility is classified as an area source of HAPs.

4.3.4 *Toxic Air Pollutant Emissions*

Toxic air pollutants (TAPs) are those pollutants that are known or suspected to cause serious health problems. TAPs are regulated by Maryland under COMAR 26.11.15 and 16 and are divided into two categories—Class I and Class II. Class I TAPs are known as potential carcinogens specifically identified in COMAR 26.11.16.06. Class II TAPs include all other chemical compounds that have other potential acute or chronic health effects.

The Maryland TAP regulations include provisions for exempting sources with low levels of TAP emissions. Further, certain types of sources, such as fuel burning equipment, are specifically exempt from the TAP regulations in accordance with COMAR 26.11.15.03B. As the CTs and black start generator are fuel burning equipment, they are not subject to TAP regulation and thus a TAPs evaluation is not required for the proposed modification.

4.3.5 *Greenhouse Gases*

Potential GHG emissions were estimated for all fuel burning equipment associated with the proposed Project. The emissions factors and

methodology were obtained from 40 CFR Part 98. The GHG emissions on a CO_2e basis are summarized in Table 4-5 in Section 4.4.

4.4 NEW SOURCE REVIEW

4.4.1 Applicability Evaluation

Potential emissions from new and modified sources in nonattainment areas are evaluated through the NA-NSR regulatory program. Major new and modified sources located in areas designated as non-attainment in Maryland must meet the regulatory requirements of COMAR 26.11.17. The goal of the NA-NSR program is to allow construction of new emissions sources and modifications to existing sources, while ensuring that progress is made towards meeting, or attaining, the NAAQS.

Potential emissions from new and modified sources located in attainment areas are evaluated through the PSD program. The goal of the PSD program is to ensure that emissions from major sources do not degrade air quality in areas that currently meet NAAQS. Triggering PSD requires use of the BACT and requires affected sources to evaluate impacts, usually through dispersion modeling analysis.

Applicability of the NA-NSR and/or PSD programs for the proposed modification is determined by evaluating whether there is a "significant net emissions increase" of each PSD/NA-NSR regulated pollutant that could potentially be emitted by emissions units associated with the proposed Project. As the three (3) CTs and one (1) black start generator were the only emissions units to be installed as part of the Project, these were the only emission units evaluated for PSD applicability.

As discussed in Section 3.1.2 of this document, the Project is located in an attainment area for all criteria pollutants except ozone and SO_2. Therefore, project related NSR regulated pollutant emissions will be evaluated for NSR applicability for both PSD and NA-NSR. As an existing major stationary source, the proposed changes were evaluated to determine if they were considered a major modification. A major modification is a physical change or a change in the method of operation of a major stationary source that would result in a significant emissions increase of a regulated NSR pollutant (Step 1) and a significant net emissions increase of that pollutant (Step 2) from the major stationary source. An emissions increase is considered significant for a regulated pollutant if it exceeds the applicable Significant Emissions Rate (SER). The potential emissions for the Project and NSR applicability thresholds are presented in Table 4-5.

Table 4-5 Projected Maximum Annual Emissions and Comparison to the Significant Emission Rate

Pollutant	Percent Load	Emissions for Three Turbines (tpy)	Emissions for Black-start Generator (tpy)	Project Total (tpy)	SER (tpy)	Netting Required
NO_X	100	169.93	1.52	171.45	25	Yes
CO	75	127.08	1.88	128.96	100	Yes
VOC	50	13.38	0.21	13.59	25	No
PM	100	21.82	0.09	21.91	25	No
PM_{10}	100	21.82	0.09	21.91	15	Yes
$PM_{2.5}$	100	21.82	0.09	21.91	10	Yes
SO_2	100	2.44	1.22E-03	2.44	40	No
H_2SO_4	100	3.73E-01	9.34E-05	3.73-01	7	No
Lead	100	3.23E-03	---	3.23E-03	0.6	No
CO_2e	100	200,060	115.16	200,175	75,000	Yes

Note: All pollutants assume normal operation, burning natural gas at 90 percent; ULSD fuel oil at 10 percent; and inclusive of startup/showdown.
Sources: ProEnergy, 2018; CP Crane, 2018; ECT, 2018

The proposed Project Results in a significant emissions increase in NO_X, CO, PM_{10}, $PM_{2.5}$, and GHGs. For those NSR regulated pollutants exceeding the SER, the Applicant has the option to conduct a netting analysis in order to avoid NSR. In Step 2 of the analysis, the net emissions increases from the Project were calculated for the five pollutants for which the Project resulted in emissions increases that exceeded the SER. The actual emissions decrease from the removal of the existing coal fired units were evaluated to determine if there would be a significant net emissions increase associated with the project. In accordance with COMAR 26.11.17.01, CP Crane established actual baseline pollutant emissions for Units 1 and 2 based on a consecutive 24 month period beginning ~~June~~ September 2013 and concluding ~~May~~ August 2015. Those emissions are summarized in Table 4-6.

Table 4-6 Units 1 and 2 Baseline Actual Emissions (BAE) (tpy)

Parameter	NO_X	CO	PM_{10}	$PM_{2.5}$	CO_2e
Baseline Actual Emissions	1,235.03	131.83	82.87	35.87	776,674

Sources: ProEnergy, 2018; CP Crane, 2018; ECT, 2018

As there were no other contemporaneous changes that occurred at CP Crane in addition to the shutdown of Units 1 and 2, the netting analysis shown in Table 4-7 demonstrates that the projected emissions associated with the Project will not result in a significant net emissions increase for any NSR regulated pollutant. Consequently, the Repowering Project is not subject to NSR.

Table 4-7 Project Net Emissions

Description	NO_X	CO	PM_{10}	$PM_{2.5}$	CO_2e
Project Emissions Increase (tpy)	171.45	128.96	21.91	21.91	200,175
Units 1 and 2 Baseline Actual Emissions Decrease (tpy)	1235.03	131.83	82.87	35.87	776,674
Other Contemporaneous Emissions (tpy)	0.00	0.00	0.00	0.00	0.00
Net emissions increases/decreases (tpy)	**-1,063.57**	**-2.87**	**-60.95**	**-13.95**	**-576,499**
NSR SERs (tpy)	25	100	15	10	75,000
Major Modifications (Yes/No)	**No**	**No**	**No**	**No**	**No**

4.4.2 Air Quality Modeling Analysis

4.4.2.1 Introduction

As part of the CPCN Application process, MDE-ARA evaluated potential impacts to air quality resulting from proposed project to be licensed in Maryland under COMAR 20.79. This evaluation included dispersion modeling assessments, to ensure that impacts to air quality from proposed projects are acceptable.

As part of the air application for a CPCN, CP Crane submitted an air dispersion modeling analysis for the proposed Repowering Project. Dispersion modeling files were initially submitted to PPRP and MDE-ARA as part of CP Crane's initial and supplement CPCN Application. MDE-ARA as part of its assessment have reviewed the emission calculations and all model input parameter selections. In addition, MDE-ARA performed an independent modeling analysis, following the guidance found in Appendix W to 40 CFR Part 51 (The Guideline on Air Quality Models), published January 17, 2017 in the Federal Register.

The purpose of the modeling analysis was to demonstrate that the proposed Project will comply with all applicable NAAQS. It should be noted that a cumulative impact analysis is not required since the proposed Repowering Project is not a major modification under NSR, and hence does not trigger federal NSR requirements.

For NAAQS compliance demonstration, the pollutants modeled and their respective averaging periods were as follows: CO (1-hour and 8-hour), NO_2 (1-hour and annual), PM_{10} (24-hour), $PM_{2.5}$ (24-hour and annual), SO_2 (1-hour and 3-hour), and Pb (3-month rolling average).

The MDE-ARA modeling methodology are provided in the following subsections.

4.4.2.2 Modeling Methodology

4.4.2.2.1 Model Selection

The EPA AERMOD (version 18081) dispersion model was used to perform the air quality impact analysis using the regulatory default option. The meteorological data used as input to AERMOD was processed by MDE-ARA using AERMET (version 16216). The terrain data used as input to AERMOD was processed by MDE-ARA using AERMAP (version 18081). In addition, the EPA LeadPost Processor (version 13262) was used to post-process model predicted monthly average Pb concentrations to obtain the 3-month rolling averages as required for comparison to the NAAQS. The dispersion coefficient selected was rural, which was consistent with previous modeling conducted for CP Crane.

4.4.2.2.2 Pollutant Averaging Times

To demonstrate NAAQS compliance, model runs were conducted for pollutants and their respective averaging times below.

- CO: 1-hour and 8-hour
- NO_2: 1-hour and annual
- $PM_{2.5}$: 24-hour and annual
- PM_{10}: 24-hour
- SO_2: 1-hour and 3-hour
- Lead: monthly averages

4.4.2.2.3 *Treatment of NO_2 in AERMOD*

EPA recommends a multi-tiered approach in obtaining hourly and annual estimates of NO_2 concentrations. The Tier I method conservatively assumes all NO_X species are converted to NO_2. The Tier II method is a refinement over Tier I. For Tier II, the Ambient Ratio Method 2 (ARM2) is applied to the results of Tier I. ARM2 assigns a NO_2/NO_X ambient ratio that is dependent on the total modeled concentration of NO_X. Representative equilibrium ratios of NO_2/NO_X are derived from national data from the EPA's AQS.

For this modeling analysis, the ARM2 method was applied to the 1-hour NO_2 modeling. The EPA recommended national default minimum and maximum NO_2/NO_X ratio of 0.5 and 0.9, respectively, were used in this modeling analysis. It should be noted that ARM2 does not allow for the use of multiple source scenarios as part of a single AERMOD run. In other words, multiple source groups cannot be applied when ARM2 was selected. In order to reduce the amount of model run time, also for the purpose of conservatism, the most conservative Tier I method was applied to the NO_2 annual modeling run.

4.4.2.2.4 *Site Layout*

The CP Crane facility layout is shown in Figure 4-3. The sources and buildings layout is shown in Figure 4-4.

Figure 4-3 CP Crane Site Layout

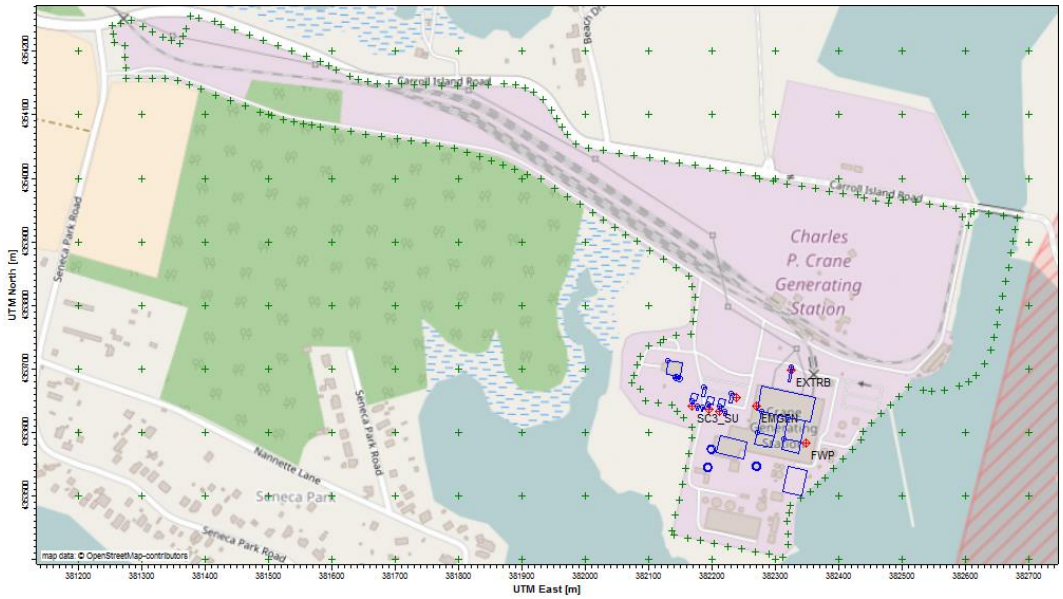
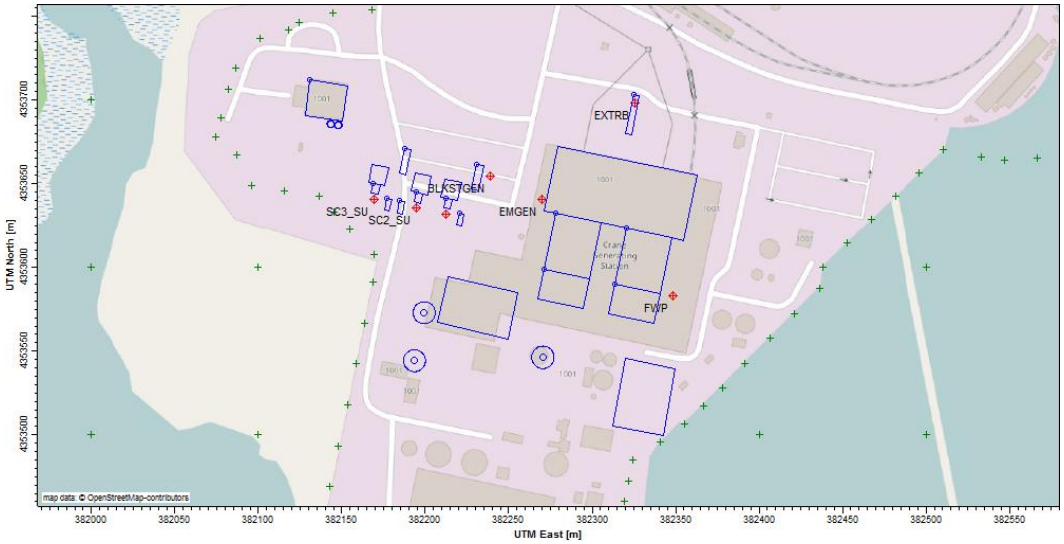


Figure 4-4 CP Crane Emissions Sources and Buildings



4.4.2.2.5 *Source Type and Emissions*

All emissions sources were modeled as point sources. The modeling analysis included the three proposed refurbished CTs and the new black start generator. Existing ancillary equipment that will remain operational, such as the 14 MW oil-fired CT, were also included in the modeling analysis.

4.4.2.2.5.1 *CT Operating Emissions*

CT emission rates vary with turbine load conditions and ambient temperature. For the purpose of this analysis, four operating loads were evaluated: 100%, 75%, 60% and 50%. ProEnergy provided specifications for 42 cases covering the above mentioned four operating loads, across the ambient temperature range of 0°F, 59°F, and 95°F. For the purposes of conservatism, maximum emission rates of each criteria pollutant, lowest exhaust temperature, and lowest exhaust flow rate (if applicable) across all cases under the same operating load and the same type of fuel were selected to be modeled.

The CTs will use natural gas as a primary fuel and ULSD as backup. For short term averaging periods, emissions from firing natural gas and ULSD were modeled separately. For annual averaging period, a scenario that included dual fuel firing was also modeled. This scenario assumed 90% operation on natural gas and 10% on ULSD. An annual capacity factor of 27% (excluding startups and shutdowns) was applied to calculate annualized emission rates.

Short-term emissions rates of CO, NO_X, $PM_{2.5}$, PM_{10}, and SO_2 were provided by ProEnergy. SO_2 emission rates were also calculated by CP Crane based on fuel usage and sulfur content of the fuel. The short-term emission rate of Pb was calculated based on EPA AP-42 emission factors. Annual emissions were estimated by CP Crane and annualized emission rates were used in model runs that require annual averaging.

All emission rates have been reviewed and verified by MDE-ARA. One notable difference in the calculated emission rates is the annual-averaged emission rates for NO_X during startup and shutdown operations. MDE-ARA calculated annualized NO_X emission rates were 0.20 lb/hr firing natural gas and 0.26 lb/hr firing dual fuel during startup and shutdown operations. The emission rates calculated by CP Crane were 0.030 lb/hr for natural gas and 0.038 lb/hr for dual fuel, respectively.

Table 4-8 summarizes varying emission rates and exhaust parameters for the proposed CTs for the load conditions evaluated.

Table 4-8 CT Emissions Rates and Exhaust Parameters Varying with Load Conditions

Load Condition		100%	75%	60%	50%
Natural Gas					
Exit Temperature (°F)		815	741	729	699
Exit Velocity (ft/sec)		121.43	127.12	124.20	106.97
Emission Rate (lb/hr)	CO	32.67	35.15	35.05	34.64
	NO_X	44.73	41.24	37.89	35.56
	$PM_{2.5}/PM_{10}$	5.10	4.07	3.45	3.01
	SO_2	0.68	0.55	0.46	0.40
	Lead	2.39E-04			
ULSD					
Exit Temperature (°F)		828	761	740	711
Exit Velocity (ft/sec)		122.72	128.72	123.62	108.24
Emission Rate (lb/hr)	CO	39.17	40.67	41.19	40.66
	NO_X	75.07	68.45	63.16	59.70
	$PM_{2.5}/PM_{10}$	15.51	12.37	10.56	9.37
	SO_2	0.72	0.57	0.49	0.434
	Lead	6.66E-03			

Note: All particulate matter is considered $PM_{2.5}$. Source: ECT, 2018

4.4.2.2.5.2 CT Startup and Shutdown Emissions

The proposed CTs are designed to allow for multiple startups and shutdowns during a day. During startup and shutdown operations, there is the potential of elevated levels of emissions. These emissions combined with lower plume rise, could potentially result in higher ground level pollutant concentrations. Therefore, MDE-ARA evaluated startup and shutdown events using these assumptions/inputs as follows:

- Startup and shutdown modeling included emissions of CO (1-hour, 8-hour) and NO_X (1-hour, annual) since these pollutants are most likely to have elevated emission rates during startup and shutdown events;
- Because emissions are higher for startup operations than shutdown, to be conservative it was assumed all startup/shutdown operations have emission rates equal to startup operations;
- Duration of startups is 10 minutes. Duration of shutdowns is 8 minutes;
- Startup emissions were provided as lb/event. It was assumed the CTs were operating at 100% load for the balance of the averaging period. For example, for 1-hour averaging period, emissions were calculated as a composite of startup emissions per event for 10 minutes and 100% load emissions for 50 minutes;
- For the annual averaging period, it was assumed 250 startup/shutdown events per year when firing natural gas. When firing dual fuel, it was assumed 225 startups/shutdowns for natural gas and 25 startups/shutdowns for ULSD;
- For the 8-hour averaging period, it was assumed 1 startup/shutdown event during the averaging period; and
- The annual capacity factor was not applicable to startup and shutdown emissions.

Table 4-9 summarizes CO and NO_X emission rates during startup events.

Table 4-9 Summary of CO and NO_X Emissions During Startup Events

Natural Gas					
	Startup Emissions (lb/event)	Startup Emission Rate During Averaging Period (lb/hr)	Emission Rate for Balance of Averaging Period (lb/hr)	Startup Emissions (g/s)	Balance of Averaging Period (g/s)
CO (1-Hr)	3.2	3.2	27.23	0.40	3.43
CO (8-Hr)	3.2	0.8	31.31	0.10	3.94
NO_X (1-Hr)	3.6	3.6	37.28	0.45	4.70
NO_X (Annual)	3.6	0.20	12.18	0.026	1.53
ULSD					
	Startup Emissions (lb/event)	Startup Emission Rate During Averaging Period (lb/hr)	Balance of Averaging Period (lb/hr)	Startup Emissions (g/s)	Balance of Averaging Period (g/s)
CO (1-Hr)	11.6	11.6	32.64	1.46	4.11
CO (8-Hr)	11.6	2.9	37.54	0.36	4.73
NO_X (1-Hr)	12.8	12.8	62.56	1.61	7.88
Dual Fuel					
	Startup Emissions (lb/event)	Startup Emission Rate During Averaging Period (lb/hr)	Balance of Averaging Period (lb/hr)	Startup Emissions (g/s)	Balance of Averaging Period (g/s)
NO_X (Annual)	3.6/12.8	0.26	12.48	0.032	1.57

4.4.2.2.5.3 Black Start Generator and Existing Ancillary Equipment Emissions

The modeling analysis also included existing sources at CP Crane that will remain, including an existing CT, an existing emergency generator, and an existing emergency fire water pump. The proposed black start generator was also included in the modeling analysis. All ancillary equipment are fuel-oil fired.

Emission rates for the existing CT were calculated based on the maximum actual emissions for this unit during 2012 – 2016. The existing emergency generator is tested for 30 minutes every month and the existing emergency fire water pump is tested for 30 minutes every week. The new black start generator will be tested for 1 hour every year. For short term averaging periods (24-hour or less), the modeled emission rates were normalized to operate 30 minutes (or 1 hour) within the averaging period. The modeled emission rates for annual averaging period were based on 100 hours of annual operation for the internal combustion engines.

Testing of the emergency generator, emergency fire water pump, and the proposed black start generator was assumed to not occur during startup or shutdown periods and therefore were only included during the normal operation scenarios. Table 4-10 provides hourly emissions rates for all ancillary equipment.

Table 4-10 Hourly Emissions Rates for Ancillary Equipment

Source		Existing CT	Existing Emergency Generator	Existing Fire Water Pump	New Black Start Generator
Hours of Operation		192 hours/year *	30 min/month; 100 hours/year	30 min/week; 100 hours/year	100 hours/year
Emission Rate (lb/hr)	CO	0.90	2.00	1.33	37.7
	NO_X	4.80	0.21	0.14	0.35
	$PM_{2.5}$	1.04	0.028	0.018	0.074
	PM_{10}	1.13	0.028	0.018	0.074
	SO_2	28.06	0.62	0.41	0.024
	Lead	3.67E-03	-	-	-

* Maximum actual hours of operation during 2012 – 2016.

The EPA guidance document[6] allows for intermittent sources, such as emergency generators, to be omitted in the modeling of 1-hr NO_2. Due to the limited hours of operation, the ancillary equipment were considered

[6] EPA Memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard", March 01, 2011.

intermittent sources and therefore were not included in the modeling of 1-hr NO_2.

4.4.2.2.5.4 Model Input Summary

The emissions rates and parameters MDE-ARA used in the modeling analysis are summarized in Tables 4-11 through 4-13.

Table 4-11 CT Source Parameters and Short-Term Emissions Rates (Firing Natural Gas)

Description	CT 100% Load	CT 75% Load	CT 60% Load	CT 50% Load	CT Startup	CT Normal During Periods Including Startup
Release Height	45.72 m (150 ft)					
Stack Diameter	2.74 m (9 ft)					
Exit Temperature	815 F (708.15 K)	741 F (667.04 K)	729 F (660.37 K)	699 F (643.71 K)	699 F (643.71 K)	815 F (708.15 K)
Exit Velocity	37.01 m/s (121.43 ft/sec)	38.75 m/s (127.12 ft/sec)	37.86 m/s (124.2 ft/sec)	32.60 m/s (106.97 ft/sec)	32.60 m/s (106.97 ft/sec)	37.01 m/s (121.43 ft/sec)
Exit Flow Rate	219 m^3/s (7724 ft^3/s)	229 m^3/s (8087 ft^3/s)	224 m^3/s (7901 ft^3/s)	193 m^3/s (6803 ft^3/s)	193 m^3/s (6803 ft^3/s)	219 m^3/s (7724 ft^3/s)
Emission Rate (g/s)						
CO 1-Hr	4.116	4.429	4.416	4.365	0.403	3.430
CO 8-Hr	4.116	4.429	4.416	4.365	0.101	3.945
NO_X 1-Hr	5.636	5.196	4.774	4.481	0.454	4.697
NO_X Annual	1.522	1.403	1.289	1.210	0.026	1.535
NO_X Annual (Dual)	1.370	1.263	1.160	1.089	0.023	1.326
$PM_{2.5}$ 24-Hr	0.643	0.513	0.435	0.379	N/A	N/A
$PM_{2.5}$ Annual	0.173	0.138	0.117	0.102	N/A	N/A
$PM_{2.5}$ Annual (Dual)	0.156	0.125	0.106	0.092	N/A	N/A
PM_{10} 24-Hr	0.643	0.513	0.435	0.379	N/A	N/A
SO_2 1-Hr	0.086	0.068	0.058	0.050	N/A	N/A
SO_2 3-Hr	0.086	0.068	0.058	0.050	N/A	N/A
Lead	3.01E-05	3.01E-05	3.01E-05	3.01E-05	N/A	N/A

Table 4-12 CT Source Parameters and Short-Term Emissions Rates (Firing ULSD)

Description	CT 100% Load	CT 75% Load	CT 60% Load	CT 50% Load	CT Startup	CT Normal During Periods Including Startup
Release Height	45.72 m (150 ft)					
Stack Diameter	2.74 m (9 ft)					
Exit Temperature	828 F (715.4 K)	761 F (678.2 K)	740 F (666.5 K)	711 F (650.4 K)	711 F (650.4 K)	828 F (715.4 K)
Exit Velocity	37.41 m/s (122.74 ft/sec)	39.23 m/s (128.71 ft/sec)	37.68 m/s (123.62 ft/sec)	32.99 m/s (108.24 ft/sec)	32.99 m/s (108.24 ft/sec)	37.41 m/s (122.74 ft/sec)
Exit Flow Rate	221 m^3/s (7807 ft^3/s)	232 m^3/s (8187 ft^3/s)	223 m^3/s (7863 ft^3/s)	195 m^3/s (6885 ft^3/s)	195 m^3/s (6885 ft^3/s)	221 m^3/s (7807 ft^3/s)
Emission Rate (g/s)						
CO 1-Hr	4.935	5.124	5.190	5.123	1.462	4.113
CO 8-Hr	4.935	5.124	5.190	5.123	0.365	4.730
NO_X 1-Hr	9.459	8.625	7.958	7.522	1.613	7.882
NO_X Annual (Dual)	0.255	0.233	0.215	0.203	0.009	0.246
$PM_{2.5}$ 24-Hr	1.954	1.559	1.331	1.181	N/A	N/A
$PM_{2.5}$ Annual (Dual)	0.053	0.042	0.036	0.032	N/A	N/A
PM_{10} 24-Hr	1.954	1.559	1.331	1.181	N/A	N/A
SO_2 1-Hr	0.091	0.072	0.062	0.055	N/A	N/A
SO_2 3-Hr	0.091	0.072	0.062	0.055	N/A	N/A
Lead	8.39E-04	8.39E-04	8.39E-04	8.39E-04	N/A	N/A

Table 4-13 Ancillary Equipment Source Parameters and Emissions Rates

Description	Existing CT	Existing Emergency Generator	Existing Fire Water Pump	Black Start Generator
Release Height	9.75 m (32 ft)	3.05 m (10 ft)	2.44 m (8 ft)	2.84 m (9.33 ft)
Stack Diameter	2.29 m (7.5 ft)	0.23 m (0.75 ft)	0.15 m (0.5 ft)	0.21 m (0.7 ft)
Exit Temperature	900 F (755.37 K)	695 F (641.48 K)	853 F (729.26 K)	750 F (672.04 K)
Exit Velocity	46.05 m/s (151.08 ft/sec)	29.20 m/s (95.79 ft/sec)	59.43 m/s (194.98 ft/sec)	44.91 m/s (147.34 ft/sec)
Exit Flow Rate	189 m^3/s (6674 ft^3/s)	1.20 m^3/s (42.3 ft^3/s)	1.08 m^3/s (38.3 ft^3/s)	1.65 m^3/s (58.3 ft^3/s)
Emission Rate (g/s)				
CO 1-Hr	0.113	0.253	0.168	4.750
CO 8-Hr	0.113	0.032	0.021	0.594
NO_X 1-Hr	*	*	*	*
NO_X Annual	0.604	0.027	0.018	0.044
$PM_{2.5}$ 24-Hr	0.131	0.0035	0.0023	0.0094
$PM_{2.5}$ Annual	2.88E-03	1.90E-03	1.27E-03	2.57E-03
PM_{10} 24-Hr	0.142	0.0035	0.0023	0.0094
SO_2 1-Hr	3.536	0.078	0.052	0.003
SO_2 3-Hr	3.536	0.026	0.017	0.001
Lead	4.62E-04	-	-	-

*Not included; intermittent source.

4.4.2.2.6 Source Groups

The startup event and balance of the averaging period were modeled as separate stacks and were source-grouped together to get the overall concentration. Similarly, for dual fuel scenarios, the two types of fuel were modeled as separate stacks and source-grouped together to get the overall concentration.

4.4.2.2.7 Building Downwash

MDE-ARA performed a Good Engineering Practice stack height analysis using the USEPA approved Building Profile Input Program with Prime (BPIPPRM, v04274). The BPIPPRM output was used in the AERMOD modeling analysis.

4.4.2.2.8 Terrain Features

MDE-ARA utilized the most recent version of AERMAP terrain processor (v18081) to develop elevations for receptors used in the air quality modeling analysis. U.S. Geological Survey (USGS) National Elevation Dataset 1/3 arc second resolution data in GeoTIFF format was used as source of input elevation data.

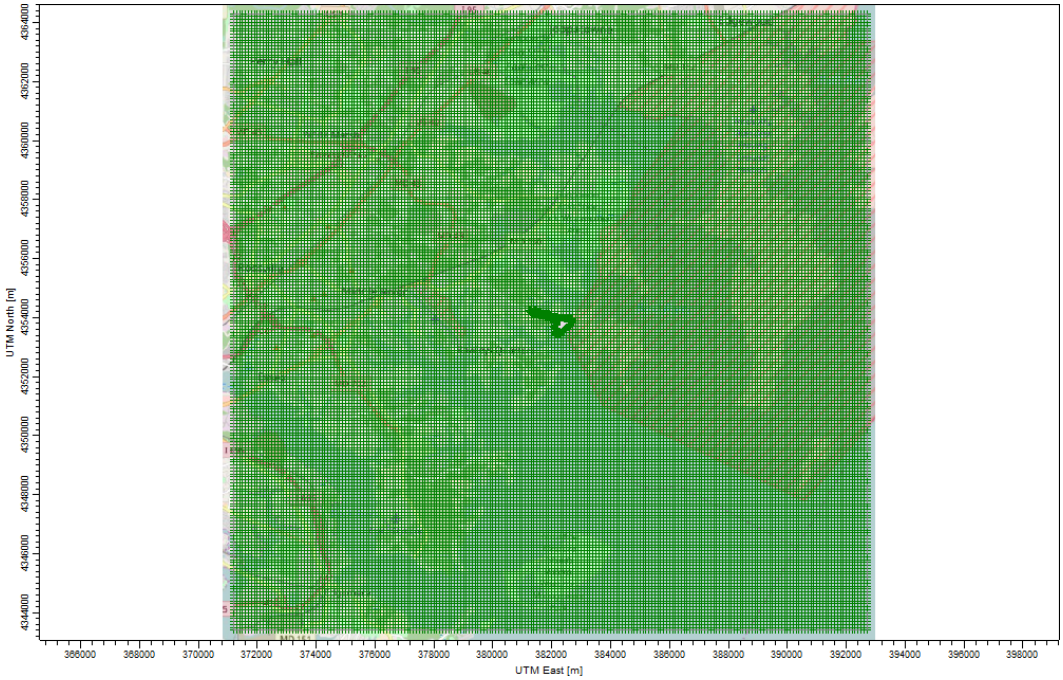
4.4.2.2.9 Receptor Grid

A total of 45,531 discrete Cartesian receptors were used in the modeling analysis. The receptor grid is as follows:

- Receptors were placed along the site fence line and spaced in increments of 25 meters; and
- The receptor grid extends to approximately 10 kilometers starting at the site fence line using 100-meter spacing.

Figure 4-5 shows the receptor grid used in the modeling analysis.

Figure 4-5 Receptor Grid



4.4.2.2.10 Meteorological Data

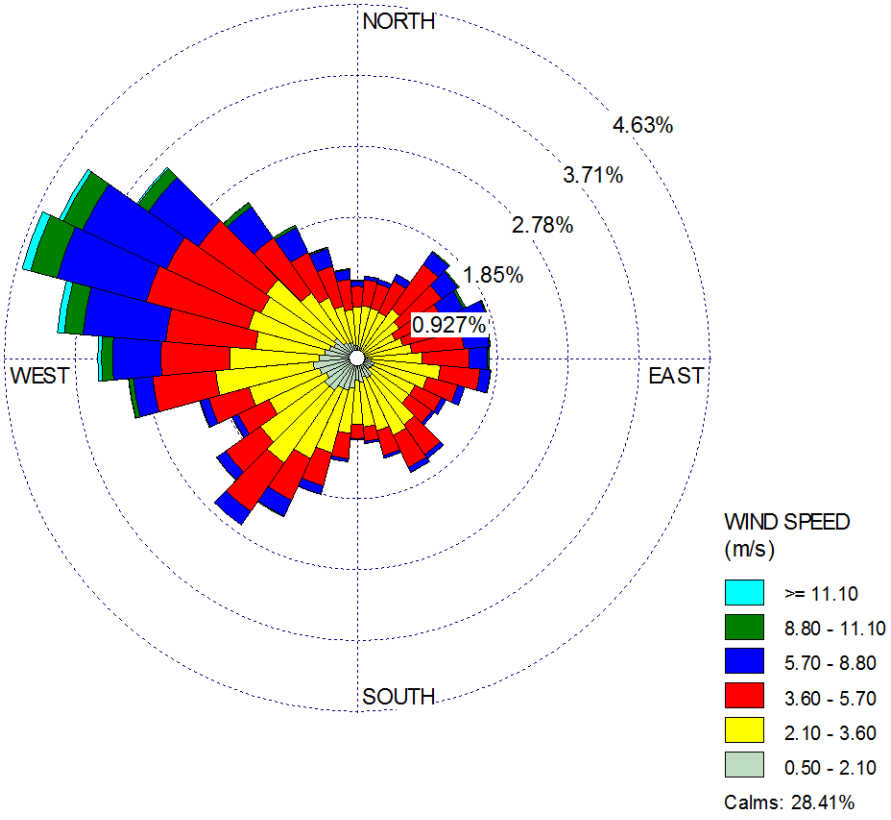
The meteorological data used in this modeling analysis was processed by MDE-ARA. Data from Baltimore Washington International Airport (BWI) national weather service (NWS) was used as the source of surface-based input meteorological data. MDE-ARA processed the BWI data for 2012 – 2016 in conjunction with upper air data from Dulles International Airport (IAD) in Sterling, VA, and followed all EPA recommended practices outlined in the AERMOD Implementation Guidance, including the use of AERSURFACE (version 13016) and one-minute Automated Surface Observation System (ASOS) archive data. The meteorological data from BWI/IAD has been used previously in air quality modeling analyses that involves CP Crane Station, including the modeling analysis in support of the development of the State Implementation Plan.

MDE-ARA has processed the meteorological data for BWI (WBAN 93721) with the most recent 5 years of data available (2012-2016) and corresponding upper air data from the NWS station in Sterling, VA (WBAN 93734). AERMET (version 16216) was used to process the met data.

A 5-year wind rose for BWI is presented in Figure 4-6. The prevailing wind is from west-northwest. The specific procedures and assumptions

used by MDE-ARA to process the BWI meteorological data in AERMET are described in the following paragraphs.

Figure 4-6 5-year Wind Rose (2012-2016): BWI Airport



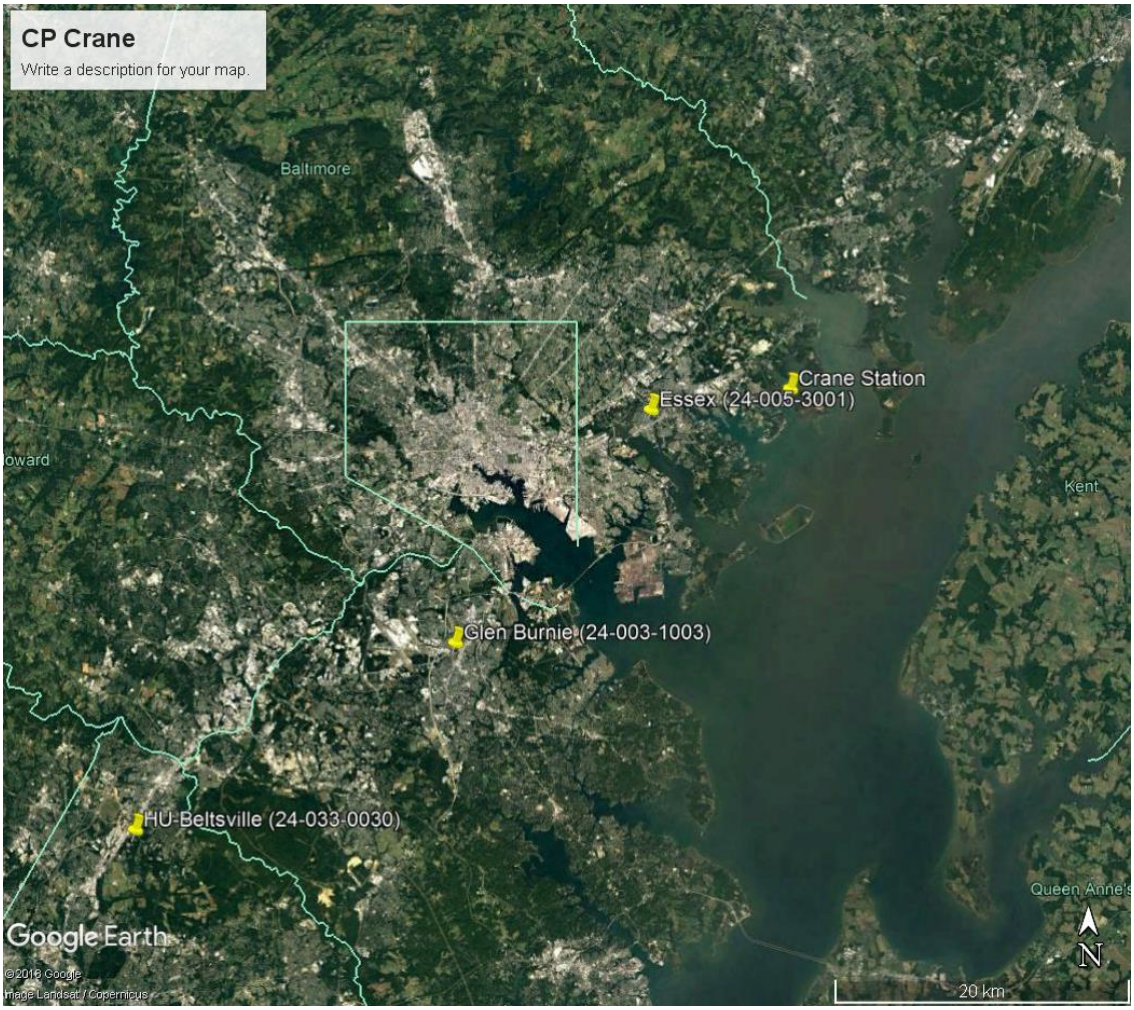
AERMET was run using EPA recommended settings to produce the meteorological data needed for AERMOD. The AERMET analysis included the use of both the AERMINUTE and AERSURFACE preprocessors. The AERMINUTE (version 15272) meteorological data processor was used to produce wind speed and direction data based on archived 1-minute ASOS data for BWI, for input into AERMET Stage 2. A 0.5 m/s wind speed threshold was applied to the 1-minute ASOS derived wind speeds in AERMET. The AERSURFACE run was based on USGS National Land Cover Data from 1992. AERSURFACE was configured assuming 12 wind direction sectors and a monthly temporal resolution.

4.4.2.2.11 Background Air Quality

MDE-ARA reviewed locations of nearby ambient monitoring sites and selected representative monitor locations based on geographic proximity

and data availability. The Essex monitor (AQS # 24-005-3001) is located about 10 km to the west of the site. It measures ambient concentrations of CO, NO_2, $PM_{2.5}$, and SO_2. The Glen Burnie monitor (AQS # 24-003-1003) is located about 30 km to the southwest of the site and measures ambient concentration of PM_{10}. Ambient concentration of Pb is measured at the HU-Beltsville monitor (AQS # 24-033-0030) which is located at Howard University's Beltsville Laboratory, about 55 km southwest of the site. Figure 4-7 below shows the relative locations of the monitoring stations and the CP Crane site.

Figure 4-7 Location of Monitoring Sites



Ambient monitoring data for 2014 – 2016 was obtained from the EPA Air Data website. Table 4-14 below shows background concentrations used in the modeling analysis.

Table 4-14 Background Ambient Concentrations

Pollutant	Averaging Period	Ambient Concentrations ($\mu g/m^3$)			Background Concentration ($\mu g/m^3$)	Monitor Name (AQS #)
		2014	2015	2016		
SO_2	1-Hour	68.1	47.1	34.0	49.7(1)	Essex (24-005-3001)
	3-Hour	84.0	60.0	29.1	84.0(2)	
NO_2	1-Hour	86.5	90.3	92.2	89.7(3)	Essex (24-005-3001)
	Annual	20.8	21.4	19.6	21.4(4)	
CO	1-Hour	2748	5268	2290	5268(2)	Essex (24-005-3001)
	8-Hour	1603	1947	1718	1947(2)	
PM_{10}	24-Hour	29	33	30	33(5)	Glen Burnie (24-003-1003)
$PM_{2.5}$	24-Hour	22	26	20	22.7(3)	Essex (24-005-3001)
	Annual	9.7	10.1	8.6	9.5(6)	
Lead	Rolling 3-month	0.006	0.042	0.013	0.042(2)	HU-Beltsville (24-033-0030)

(1) Average of 99th percentile.
(2) Max of the 1st highs.
(3) Average of 98th percentile.
(4) Max of annual mean.
(5) Max of the 2nd highs.
(6) Average of annual mean.

4.4.2.3 Modeling Results

Maximum predicted criteria pollutant concentrations across all fuel types and all operating loads are provided in Table 4-15.

Table 4-15 Maximum Predicted Criteria Pollutant Concentrations with Background

Pollutant	Averaging Period	Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	% of NAAQS
CO	1-Hour	5,293.17(1)	5,268	10,561.17	40,000	26%
	8-Hour	262.28(1)	1,947	2,209.28	10,000	22%
NO_2	1-Hour	45.72(2)	89.7	135.42	188	72%
	Annual	3.03(3)	21.4	24.43	100	24%
$PM_{2.5}$	24-Hour	2.12(2)	22.7	24.82	35	71%
	Annual	0.19(4)	9.5	9.69	12	81%
PM_{10}	24-Hour	3.81(5)	33	36.81	150(1)	25%
SO_2	1-Hour	116.23(6)	49.7	165.97	196	85%
	3-Hour	68.39(1)	84.0	152.41	1,300	12%
Lead	Rolling 3-Month Average	0.0005	0.042	0.042	0.15	28%

Notes:
(1) 1st high over five (5) years.
(2) 98th percentile (8th high) averaged over five (5) years.
(3) Highest annual mean of the five (5) years.
(4) Average of annual mean over five (5) years.
(5) 6th high over five (5) years.
(6) 99th percentile (4th high) averaged over five (5) years.

4.4.2.4 *Conclusion*

The air quality modeling analyses conducted by CP Crane have been independently verified by MDE-ARA. Based on the air quality modeling analyses, the proposed CP Crane Repowering Project demonstrates compliance with all applicable NAAQS, and the results indicate that the proposed Project will not adversely impact air quality in the region.

4.5 REGULATORY APPLICABILITY ANALYSIS

As a part of its review of the CPCN Application, MDE-ARA determined the applicable air regulatory requirements for CT and black start generator air emissions sources proposed to be installed as a part of this Project. The applicable regulatory requirements and the associated compliance demonstration approaches are discussed in this section of the document.

4.5.1 Federal Regulatory Requirements

4.5.1.1 New Source Performance Standards (NSPS)

4.5.1.1.1 Standards for Stationary Combustion Turbines (40 CFR Part 60 Subpart KKKK)

The CTs are subject to 40 CFR §60 Subpart KKKK, "Standards of Performance for Stationary Combustion Turbines." All stationary gas turbines with a heat input at a peak load equal to or greater than 10.7 gigajoules per hour (10 MMBtu/hr), based on the higher heating value of the fuel, which commenced construction, modification, or reconstruction after February 18, 2005 are subject to this Subpart. As per §60.4305(b), stationary CTs regulated under Subpart KKKK are exempt from the requirements of Subpart GG.

Applicable Requirements

The NSPS includes the following requirements: general compliance requirements (§60.4333), monitoring requirements (§60.4335-§60.4370), reporting requirements (§60.4375-§60.4395), and performance testing (§60.4400-§60.4415). CP Crane will also be subject to applicable notification, monitoring, and reporting and related applicable provisions of 40 CFR §60.7 and §60.8.

Recommended Compliance Demonstration Approach

a. **Monitoring –**

CP Crane will operate a continuous emissions monitoring system (CEMS) at the outlet of the CT stacks. The system will continuously analyze, monitor, and record the concentrations of NO_X. Compliance with the SO_2 emission standard shall be demonstrated by either of the following:

i. The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for natural gas is 20 grains of sulfur or less per 100 standard cubic feet, has potential sulfur emissions of less than 26 ng SO_2/J (0.060 lb SO_2/MMBtu) heat input; or

ii. Representative fuel sampling data which shows that the sulfur content of the fuel does not exceed 26 ng SO_2/J (0.060 lb

SO_2/MMBtu) heat input. At a minimum, the amount of fuel sampling data specified in Section 2.3.1.4 or 2.3.2.4 of Appendix D to 40 CFR Part 75 is required.

If CP Crane elects to comply with the minimum fuel sulfur content limit under 40 CFR §60.4330, CP Crane must monitor the total sulfur content of the CT's fuel using the methods described in 40 CFR §60.4415 at a frequency described in 40 CFR §60.4370. Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than half the applicable limit, ASTM D4084-82, 94, 05, D4810-88 (1999), D5504-01, or D6228-98 (2003), or Gas Processors Association Standard 2377-86, may be used to assess compliance with the applicable fuel sulfur limit [40 CFR §60.4360].

b. **Reporting –** CP Crane must submit reports of excess emissions and monitor downtime, in accordance with §60.7(c). Excess emissions must be reported for all periods of unit operation, including startup, shutdown, and malfunction. Units that perform an annual performance test must submit these reports within 60 days of testing.

c. **Performance Testing –** As per §60.8, CP Crane is required to conduct an initial performance test. Subsequent NO_X performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test). EPA Method 7 or 7E will be used for performance testing.

4.5.1.1.2 NSPS for Stationary Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII)

The black start generator (1,500 kW) engine is subject to the requirements of this regulation as it is considered compression ignition reciprocating internal combustion engines (RICE) installed after July 2005. This engine is subject to the applicable monitoring, compliance, testing, notification, reporting, and recordkeeping requirements (40 CFR §60.4200 *et seq*.) and related applicable provisions of 40 CFR §60.7 and §60.8. Note that the engine is EPA Tier 1 certified and not subject to the Tier 4 requirements under Subpart IIII given the engine has cylinder displacement less than 10 liters per cylinder. The emissions standards for the black start generator are shown in Table 4-16.

Table 4-16 Emissions Standards for the Black Start Generator (g/kW-hr)

Emergency Engine	Model Year	NOx	NMHC	CO	PM
1,500 kW Black Start Generator Engine Displacement <10 and <2,237kW (3,000hp)	TBD	9.2	1.3	11.4	0.54

Notifications

As the black start generator engine is used only for emergency purposes, it is not subject to the initial notification requirements of the rule.

Compliance Demonstration

a. **Fuel:** The sulfur content in the distillate fuel oil is limited to 15 ppm (0.0015%).

b. **Compliance**: CP Crane is required to install a non-resettable hour meter prior to the startup of the engine as per 40 CFR §60.4209(a).

c. **Recordkeeping:** CP Crane is required to maintain the following records:

   i. A copy of each notification submitted to comply with this subpart;

   ii. Records of the occurrence and duration of each malfunction of operation or the air pollution control and monitoring equipment;

   iii. Records of all required maintenance on the air pollution control and monitoring equipment;

   iv. Records of hours of operation and the reasons for operating the engines (maintenance, readiness, or emergency); and

   v. Records of actions taken during periods of malfunction to minimize emissions in accordance with 63.6605(b), including malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation.

4.5.1.1.3 *NSPS for Greenhouse Gas Emissions for Electric Generating Units (40 CFR Part 60 Subpart TTTT)*

The CTs are subject to the NSPS TTTT requirements as they are stationary combustion turbines that commenced construction after January 8, 2014 or commenced reconstruction after June 18, 2014. Because the ~~The~~ CTs are only permitted to burn fuels with a consistent chemical composition (e.g. natural gas and ULSD), the CTs are not subject to any monitoring or reporting requirements under this subpart. ~~the applicable monitoring, compliance, testing, notification, reporting, and recordkeeping requirements (40 CFR §60.5508 *et seq.*) and related applicable provisions of 40 CFR §60.7 and §60.8.~~

Applicable Requirements

~~The CTs are subject to a CO_2 limit of 1,000 lb/MWh gross energy output or 1,030 lb CO_2/MWh (net) based on a 12-month rolling average.~~ The CTs are subject to 40 CFR 60, Subpart TTTT which establishes the following CO_2 emission standard (Table 2 of Subpart TTTT) for reconstructed stationary combustion turbines which combust at least 90% natural gas on a heat input basis on a 12-month rolling average basis: 120 lbs CO_2/MMBtu.

~~The NSPS includes the following requirements: general compliance requirements (§60.5525), monitoring requirements (§60.5535-§60.5540), reporting requirements (§60.5550-§60.5555), and record keeping requirements (§60.5560-§60.5565). CP Crane will also be subject to applicable notification, monitoring and reporting and related applicable provisions of 40 CFR §60.7 and §60.8.~~

Recommended Compliance Demonstration Approach

a. **Monitoring –** CP Crane must operate a CEMS at the outlet of the CT stacks. The system will continuously analyze, monitor, and record the concentrations of CO_2. Alternatively, CP Crane must demonstrate compliance with the emission standard by measuring fuel flow as specified in the applicable appendices to 40 CFR Part 75 and calculating emissions using this fuel rate.

   ~~In addition, CP Crane shall install, calibrate, maintain, and operate a sufficient number of watt meters to continuously measure and record the hourly gross electric output or net electric output, as applicable, from the CTs.~~

~~b. **Reporting** – CP Crane must submit quarterly reports of the rolling average CO_2 emission rate in accordance with §60.5555.~~

~~d.~~b. **Record Keeping** – As CP Crane is subject to the Acid Rain Program, the facility must comply with Subpart TTTT by following the applicable recordkeeping requirements and maintaining records as required under Subpart F of 40 CFR Part 75.

4.5.1.2 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

National Emission Standards for Hazardous Air Pollutants (NESHAPs) are federal HAP requirements in 40 CFR Part 63 that apply generally to "major" sources of HAPs, which are defined as facilities with the potential to emit 10 tpy or more of any single HAP, or 25 tpy or more of two or more HAPs. HAP standards, known as Maximum Achievable Control Technology (MACT) standards, for major HAP sources are established for classes or categories of sources. Some MACT standards, known as "area source MACT" standards, apply to minor source HAP facilities. The total potential HAP emissions for the facility are projected to be less than 25 tpy for all HAPs combined and less than 10 tpy for individual HAPs; therefore, CP Crane is considered an area HAP source.

4.5.1.2.1 NESHAP for Combustion Turbines (40 CFR Part 63 Subpart YYYY)

NESHAP Subpart YYYY applies to stationary CTs located at a major source of HAP emissions. As an area source of HAPs, the requirements of this subpart do not apply to CP Crane.

4.5.1.2.2 NESHAP for RICE (40 CFR Part 63 Subpart ZZZZ)

The black start generator is subject to the requirements of NESHAP Subpart ZZZZ for RICE. Pursuant to 40 CFR §63.6590(c)(1), a new stationary RICE located at an area source is required to comply with NESHAP ZZZZ by meeting the applicable requirements under 40 CFR Part 60 Subpart IIII.

Notifications

No additional notifications are required for emergency units.

4.5.1.2.3 NESHAP for Coal- and Oil-fired Electrical Utilities (40 CFR Part 63 Subpart UUUUU)

The rule is applicable only to coal-and oil-fired electrical utility systems. Since the CTs are proposed to use oil for no more than 10% the annual average capacity factor, the CTs are not considered oil-fired under Subpart UUUUU. As such, these emissions units are exempt from applicability to this rule.

4.5.1.3 Acid Rain Program (40 CFR Parts 72 through 76)

The CTs meet the definition of an "affected unit" as defined in 40 CFR §72.6, and therefore, are subject to the requirements of the Acid Rain program, including emissions standards (40 CFR §72.9) and monitoring requirements (40 Part 75), among other requirements. References to these requirements are included in the recommended license conditions. In addition, CP Crane was required to apply for, and obtain, an Acid Rain permit (under 40 CFR §72.30); terms of the Acid Rain permit will be incorporated into the facility's Title V operating permit by MDE-ARA.

4.5.1.4 Clean Air Interstate Rule (CAIR)/Cross-State Air Pollution Rule (CSAPR)

The Clean Air Interstate Rule (CAIR) was a federal rule promulgated in March 2005 that implemented a cap and trade program on power plant NO_X and SO_2 emissions in the eastern half of the United States. This rule was promulgated for implementation under 40 CFR Part 97. Maryland had promulgated implementing regulations under COMAR 26.11.28. According to 40 CFR §97.4, CAIR applied to any emission unit that, at any time after January 1, 1995, has a nameplate generating capacity of greater than 25 MW and sells any amount of electricity or has a maximum design heat input of greater than 250 MMBtu/hr.

On July 6, 2011, the EPA finalized the Cross-State Air Pollution Rule (CSAPR), which replaces CAIR. The first phase of compliance was scheduled to begin January 1, 2012 for annual SO_2 and annual NO_X emissions and May 1, 2012 for ozone season NO_X emissions. In August 2012, CSAPR was vacated, pending appeal. On April 29, 2014, the Supreme Court reversed the lower court's decision and reinstated the CSAPR.

Compliance with CSAPR Phase 1 emission budget program is required in 2015 and 2016, while the program's Phase 2 emission budgets and assurance provisions are effective in 2017 and beyond. The CSAPR

requirements have been added to CP Crane's recommended license conditions.

4.5.1.5 Risk Management Planning

This regulation covers the requirements for owners or operators of stationary sources concerning the prevention of accidental releases, and the State accidental release prevention programs approved under section 112(r) and codified as 40 CFR Part 68. This regulation applies to owners and operators of facilities that store regulated substances used in a process in quantities greater than certain threshold levels. Under Subpart G of the regulation, a facility is required to develop a Risk Management Plan if the quantity of regulated substances exceeds the threshold quantities. CP Crane does not store quantities of any regulated substances in quantities that exceed the regulatory threshold.

4.5.1.6 Mandatory Reporting of Greenhouse Gases

40 CFR Part 98 applies to direct GHG emitters, fossil fuel suppliers, industrial gas suppliers, and facilities that inject CO_2 underground for sequestration or other reasons. In general, the threshold for reporting is 25,000 metric tons or more of CO_2 per year. Reporting is at the facility level, except for certain suppliers of fossil fuels and industrial greenhouse gases.

At CP Crane, the CTs are addressed in Subpart D (Electricity Generation). Emergency equipment, including the black start generator, are not included in the source category under Subpart C as per 40 CFR §98.30(b)(2); therefore, the unit is exempt from the rule.

Under Subparts C and D, emissions of CO_2, CH_4 and N_2O must be determined and reported to EPA in accordance with the following requirements:

- Procedure to estimate emissions (§98.33, §98.43);
- Monitoring and QA/QC Requirements (§98.34, §98.44);
- Procedures for Estimating Missing Data (§98.35, §98.45);
- Data Reporting Requirements (§98.36, §98.46); and
- Records that Must Be Retained (§98.37, §98.47).

CP Crane will be required to submit an annual report of GHG emissions and data for the previous calendar year. The facility will be required to use the electronic reporting tool developed by EPA. The annual report will be due by March 31st.

4.5.2 State Regulatory Requirements

In addition to the federal regulatory requirements, CP Crane is subject to several Maryland air regulations codified at COMAR 26.11. The following list provides the requirements for the entire facility and for specific pieces of equipment, as applicable.

a) COMAR 26.11.01.04A - Requirements for Testing:

MDE-ARA may require CP Crane to conduct, or have conducted, testing to determine compliance with the permit. MDE-ARA, at its option, may witness or conduct these tests. This testing will be done at a reasonable time, and all information gathered during a testing operation will be provided to both parties.

b) COMAR 26.11.01.04B - Requirements for Monitoring:

MDE-ARA or the control officer (appropriate health officer at Baltimore County under COMAR 26.11.01.01B.12) may require CP Crane to install, use, and maintain monitoring equipment or employ other methods as specified by MDE-ARA or the control officer to determine the quantity or quality, or both, of emissions discharged into the atmosphere and to maintain records and make reports on these emissions to MDE-ARA or the control officer in a manner and on a schedule approved by MDE-ARA or the control officer.

i. MDE-ARA or the control officer, at reasonable times, shall have access to and be permitted to copy any records and inspect any monitoring equipment or methods required under this section.

ii. Except when otherwise specified by MDE-ARA or the control officer, records required under this regulation shall be available for inspection by MDE-ARA and the control officer for a period of not less than 90 days.

iii. All records and reports submitted to MDE-ARA or the control officer required under this regulation shall be available for public inspection.

c) COMAR 26.11.01.04C - Emissions Test Methods:

Compliance with the emissions standards and limitations in these Conditions shall be determined by the test methods designated and described in these Conditions or other test methods submitted to and approved by MDE-ARA.

d) COMAR 26.11.01.05-1 and COMAR 26.11.02.19C and COMAR 26.11.02.19D - Emissions Certification Report:

i. CP Crane is required to certify annual emissions of regulated pollutants from the facility on a calendar year basis.

1) The certification shall be on forms obtained from the Department and submitted to MDE-ARA not later than April 1 of the year following the year for which the certification is required;

2) The individual making the certification shall certify that the information is accurate to the individual's best knowledge. The individual shall be:

a. Familiar with each source for which the certifications forms are submitted; and

b. Responsible for the accuracy of the emissions information.

ii. CP Crane is required to maintain records necessary to support the emission certification, including the following information if applicable:

1) The total amount of actual emissions of each regulated pollutant and the total of all regulated pollutants;

2) An explanation of the methods used to quantify the emissions and the operating schedules and production data that were used to determine emissions, including significant assumptions made;

3) Amounts, types, and analyses of all fuels used;

4) Emission data from continuous emission monitors that are required by COMAR 26.11 or EPA regulations, including monitor calibration and malfunction information;

5) Identification, description, and use records of all air pollution control equipment and compliance monitoring equipment, including significant maintenance performed, malfunctions and downtime, and episodes of reduced efficiency of this equipment;

6) Limitations on source operation or any work practice standards that significantly affect emissions;

7) Other relevant information as required by MDE-ARA; and

8) The logs and other records of information required by COMAR 26.11.02.19C(1) shall be retained for a period of five years and made available to MDE-ARA upon request.

e) COMAR 26.11.01.07C-D - Malfunctions and Other Temporary Increases of Emissions:

i. CP Crane is required, in the case of any occurrence of excess emissions expected to last or actually lasting for one hour or more, to report the onset and the termination of the occurrence to MDE-ARA by telephone. Telephone reports of excess emissions shall include the following information:

1) The identity of the installation and the person reporting;

2) The nature or characteristics of the emissions (for example, hydrocarbons, fluorides);

3) The time of occurrence of the onset of the excess emissions and the actual or expected duration of the occurrence; and

4) The actual or probable cause of the excess emissions.

ii. When requested by MDE-ARA, CP Crane shall submit a written report to MDE-ARA within ten days of receiving the request regarding excess emissions; the report shall contain the information required in COMAR 26.11.01.07D(2).

f) COMAR 26.11.01.11 - Continuous Emission Monitoring Requirements:

Before installing a CEM, CP Crane is required to submit to MDE-ARA a plan containing the CEM design specifications, proposed location,

and a description of a proposed alternative measurement method. The location of the CEM, the amount and recording of measurements, and reporting requirements are specified by COMAR 26.11.01.11.

g) COMAR 26.11.02.04B – Duration of Permits:

CP Crane is required to commence substantial construction or modification within 18 months after the date of issuance of the approval, unless MDE-ARA specifies a longer period in the approval.

h) COMAR 26.11.02.14D – Application for State Permit to Operate:

CP Crane shall submit a complete application for an initial State permit to operate no later than 60 days before the source is to commence operating.

i) COMAR 26.11.02.19A – Fee Schedule:

CP Crane is required to pay annual Title V operating permit fees. **This is a state-only enforceable requirement.**

j) COMAR 26.11.03.02B(4) - Applicability and General Requirement:

CP Crane is required to apply for and obtain a Part 70 operating permit.

k) COMAR 26.11.04.02 - Ambient Air Quality Standards, Definitions, Reference Conditions, and Methods of Measurement:

CP Crane shall comply with applicable NAAQS using dispersion modeling. CP Crane has performed an air quality analysis, including air dispersion modeling, which demonstrates compliance with the NAAQS.

l) COMAR 26.11.06.03B(21)(a) - Particulate Matter Emissions from Confined Sources:

The CP Crane air emission sources including the CTs and black start generator are subject to this requirement. CP Crane may not cause or permit particulate matter to be discharged into the outdoor atmosphere from any other installation, particulate matter in excess of 0.05 gr/SCFD (115 5g/dscm).

m) COMAR 26.11.06.03C – Particulate Matter Emissions from Unconfined Sources:

CP Crane is prohibited from causing or permitting emissions from an unconfined source without taking reasonable precautions to prevent particulate matter from becoming airborne. These reasonable precautions shall include, when appropriate as determined by MDE-ARA, the installation and use of hoods, fans, and dust collectors to enclose, capture, and vent emissions. In making this determination, MDE-ARA shall consider technological feasibility, practicality, economic impact, and the environmental consequences of the decision.

n) COMAR 26.11.06.03D – Particulate Matter From Materials Handling and Construction:

CP Crane is prohibited from causing or permitting any material to be handled, transported, or stored, or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne.

o) COMAR 26.11.06.08 – Nuisance:

CP Crane is prohibited from operating or maintaining a source in such a manner that a nuisance or air pollution is created. **This is a state-only enforceable requirement**.

p) COMAR 26.11.06.09 – Odors:

CP Crane is prohibited from causing or permitting the discharge into the atmosphere of gases, vapors, or odors beyond the property line in such a manner that a nuisance or air pollution is created. **This is a state-only enforceable requirement.**

q) COMAR 26.11.06.12 - Control of NSPS Sources:

CP Crane is prohibited from constructing, modifying, or operating, or causing to be constructed, modified, or operated, a NSPS source as defined in COMAR 26.11.01.01B(23), which results or will result in violation of the provisions of 40 CFR Part 60, as amended.

r) COMAR 26.11.09.05(A)(1) - Visible Emissions:

Areas III and IV. CP Crane may not cause or permit the discharge of emissions from any fuel burning equipment, other than water in an uncombined form, which is visible to human observers, except that for the purpose of demonstrating compliance using COM data, emissions

that are visible to a human observer are those that are equal to or greater than 10 percent opacity.

s) COMAR 26.11.09.07 - Control of Sulfur Oxides From Fuel Burning Equipment:

This requirement is applicable only to equipment burning diesel fuel which includes the CTs and black start generator. CP Crane may not burn, sell, or make available for sale any fuel with a sulfur content by weight in excess of or which otherwise exceeds 0.3% for distillate fuel oils.

t) COMAR 26.11.09.08B(1)(a) and COMAR 26.11.09.08K – NO_X Standards for Fuel Burning Equipment:

CP Crane may comply with the NO_X emission limits in COMAR 26.11.09.08B(1)(c) or the applicable NO_X requirements in COMAR 26.11.09.08C - J. As an installation equipped with a CEM, compliance with the NO_X emissions standards in COMAR 26.11.09.08 shall be established using CEM data for the CTs. CEMs shall be certified in accordance with or Part 75, Appendix A. CEMs shall meet the quality assurance criteria in the CAA (Acid Rain), 40 CFR Part 75, Appendix B. Except as otherwise established by MDE-ARA and approved by the EPA, for a person who establishes compliance with the NO_X emissions standards in this regulation using a CEM, compliance shall be determined as 30-day rolling averages. When demonstration of compliance with the NO_X emission standards in this regulation is based on CEM data, quarterly emission reports shall be submitted to MDE-ARA on or before the thirtieth day of the month following the end of each calendar quarter.

u) COMAR 26.11.09.08G - Control of NO_X Emissions for Major Stationary Sources, Requirements for Fuel-Burning Equipment with a Capacity Factor of 15 Percent or Less:

This requirement is applicable to the black start generator. Requires CP Crane, for fuel-burning equipment with a capacity factor of 15% or less, to annually certify the capacity factor of the equipment to MDE-ARA in writing, and if the equipment operates for more than 500 hours during a calendar year, to conduct a combustion analysis and optimize combustion for that equipment.

v) COMAR 26.11.15 and COMAR 26.11.16 - Toxic Air Pollutants and Procedures Related to Requirements for Toxic Air Pollutants:

CP Crane is required to determine the applicability of the TAPs requirements and perform facility-wide air quality analyses, if applicable. **This is a state-only enforceable requirement.**

w) COMAR 26.11.36 – Distributed Generation:

The black start generator must comply with NESHAP ZZZZ and NSPS IIII to comply with this requirement. **This is a state-only enforceable requirement.**

x) COMAR 26.09 - The Regional Greenhouse Gas Initiative:

CP Crane is required to participate and adhere to the requirements of COMAR 26.09. An initial CO_2 Budget Permit will be issued in conjunction with the Part 70 permit. CP Crane is required to submit an initial CO_2 budget permit application 12 months before the date on which the CO_2 budget source commences operation. **This is a state-only enforceable requirement.**

5.0 ANALYSIS OF OTHER ENVIRONMENTAL IMPACTS

5.1 IMPACTS TO BIOLOGICAL RESOURCES

5.1.1 Overview

The following sections provide a review of the potential environmental effects of the proposed Project on biological resources, including wetlands; surface waters; vegetation; and wildlife and rare, threatened and endangered (RTE) species. The proposed CP Crane Project has minimal potential to negatively impact biological/ecological resources. There is little potential for the proposed modification to negatively impact either wetlands or terrestrial and aquatic resources; therefore, the applicant conducted no baseline monitoring of ecological resources. PPRP concurs that no baseline monitoring is needed.

The Applicant assembled existing information from online sources (e.g., MERLIN Online) as summarized in Appendix B of their ERD. The Applicant's key findings supported by MERLIN data are as follows:

- Both the Maryland DNR and NWI maps indicated the presence of wetlands in the site area;
- Neither source indicated any wetlands of special state concern to be present anywhere in the vicinity of the site;
- Neither source indicated any natural heritage areas, agricultural preservation lands, or forest legacy lands to be present anywhere in the vicinity of the site; and
- These sources indicated the presence of sensitive species near the site, as well as habitat suitable for FIDS, green infrastructure, and SAV.

In addition to MERLIN, the Applicant queried the USFWS IPaC tool for records of species and other resources, such as critical habitat, under the USFWS's jurisdiction that are known or expected to be within a 1-mile radius of the CP Crane site. The IPaC report (USFWS, 2018a) identified no federally threatened or endangered species under the Endangered Species Act of 1973. The Migratory Bird Treaty Act of 1981 listed 31 avian species as birds of conservation concern by USFWS; these are species that are of concern throughout their range anywhere within the United States. Additionally, the IPaC identified bald eagle and golden eagle occurring within one mile of the Project site. Eagles receive protection under the Bald and Golden Eagle Protection Act of 1940. The IPaC also identified sixteen additional avian species within a 1-mile radius of the site that are

potentially susceptible in offshore areas to certain types of development or activities (e.g., offshore energy development or longline fishing).

No National Wildlife Refuge lands are within one mile of the site, nor are any fish hatcheries. The Applicant queried critical habitat under the jurisdiction of NOAA Fisheries to identify any anadromous or marine species that may exist near the site. Based on this query, the closest designated critical habitat (for Maryland darter, *Etheostoma sellare*) is approximately 18 miles northeast of the site (USFWS, 2018b).

The CP Crane site is located within the Maryland Piedmont Plateau Province. Characteristically, the landscape in the site region is typified by rolling hills with incised stream valleys. This area of Maryland is included within the Southeastern Mixed Forest Ecological Province as defined by the U.S. Forest Service. Typical vegetation is deciduous and mixed pine oak forests.

5.1.2 Potential Impacts Due to Construction Activities

5.1.2.1 Wetlands and Surface Waters

The Applicant obtained DNR and NWI wetland maps from DNR's Geospatial Data website. Figures 3-3 and 3-4 in Section 3.5 show these maps overlaying an aerial photograph. While there are wetlands located within the site boundary, the approximate 5-acre developed area proposed for the Project will not impact these wetlands.

Prior to the beginning of construction, the Applicant will prepare a grading permit application, stormwater management (SWM) permit, and erosion and sediment control (ESC) plan for submittal to Baltimore County. In addition, the facility will obtain coverage under the MDE General Permit for Construction Activity. These plans will form the basis for providing adequate protection of the surrounding surface waters (Seneca Creek and Saltpeter Creek) during construction.

Given the absence of plans to disturb existing wetlands and the establishment/modification of effective stormwater quantity and quality controls as well as Spill Prevention, Control, and Countermeasures (SPCC) procedures, no significant impacts on surface waters resulting from site construction are expected to occur.

The Applicant identified four potential sources of impacts to surface waters during Project construction and means to avoid or mitigate these impacts as described below.

- Direct Disturbance of Existing Wetlands – none of the areas proposed for the Project development are within any existing wetland areas. Therefore, no direct impacts on any of these areas are expected to occur during Project construction.
- Erosion of Disturbed Areas that May Transport Sediment – the Applicant will develop an ESC plan in accordance with Baltimore County Soil Conservation District requirements. Implementation of the approved ESC plan will prevent discharge of sediment-laden runoff from entering surrounding surface water bodies. The Applicant will modify the ESC plan as needed to account for site changes or if it is determined that sediment discharges are occurring.
- Significant Changes in Stormwater Quantities and/or Qualities Discharged Offsite – the Applicant will design the temporary construction sediment basin according to the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. Therefore, no significant impacts in surrounding surface water quality or quantities are expected to result during construction of Project improvements. The Applicant will modify the existing CP Crane stormwater management systems in association with Project construction. The applicant will also develop and install a combination of a temporary sediment basin and sediment control best management practices (BMPs) to accommodate construction activities. Key construction period controls will include:
    - The Applicant will leave existing vegetation in place wherever possible and will stabilize disturbed soils as necessary to prevent significant erosion;
    - The Applicant will install erosion and sediment controls and a temporary sediment basin as required at the initiation of construction to provide adequate stormwater facilities. The Applicant will modify or expand these facilities as needed during construction; and
    - The Applicant will compact the temporary sediment basin embankments as required and stabilize it with seed and mulch within three days of completion to prevent sediment basin bank erosion.
- Accidental Spills of Onsite Chemicals, Lubricants, or Other Potential Contaminants – the Applicant will develop and strictly follow SPCC procedures during construction activities. The Applicant will design these procedures to minimize the opportunity for accidental spills and provide adequate systems to contain accidental spills.

PPRP concurs that the implementation of the plans, in accordance with the approved erosion and sediment control plans, and the application of BMPs will prevent significant impacts from occurring to any onsite or nearby offsite surface waters or wetlands during Project construction. Further, as no development is proposed within the 100-year floodplain, it will not be impacted as part of the proposed Project.

5.1.2.2 Vegetation and Land Cover

The Applicant states that proposed construction activities will take place within approximately eight acres of developed or previously impacted areas of the CP Crane site. Therefore, few ecological impacts are expected. The proposed Project will involve demolishing several existing structures, but not all structures, and adding new project components at the site. This proposed construction will occur within previously developed portions of the site and none of it will result in permanent ecological impacts. In addition, the Applicant has indicated they will use existing developed areas of the site for construction laydown and parking areas. It is anticipated that the existing paved parking lot can accommodate construction parking. Space required for construction materials laydown will be modest, and the Applicant has determined that the area immediately south of the existing warehouse is adequate for that purpose. Thus, there will be no construction-related impacts to natural vegetation communities on site. No state or federally listed plants are likely to occur onsite due to lack of suitable habitat. PPRP concurs that the proposed Project will not cause significant impacts to the site's ecological resources and features.

5.1.2.3 Wildlife and Rare, Threatened and Endangered Species

The Applicant states there will be no impacts to natural communities on site, as the proposed development will take place within previously disturbed and developed portions of the site. The primary impacts of proposed Project construction activities on local wildlife resources will be temporary in nature and include the displacement of species in the immediate area due to noise, traffic, and human presence during construction. However, these impacts are expected to be relatively minor as the proposed Project site is currently developed and occupied. The current level of wildlife activity is expected to resume once construction is complete, and since there are no natural communities that will be cleared within the main Project location, there will be no permanent displacement of wildlife habitat or species.

There is FIDS habitat on the CP Crane site west of the Project area (refer to Figure 3-5 in Section 3.5), but this part of the site will not be developed as part of the proposed Project. As such, there should be no impacts to FIDS species resulting from Project development, with the possible exception of temporary disturbance (e.g., noise) caused by construction activities.

There is also green infrastructure just inside and surrounding the site boundary as previously shown in Figure 3-6. As these areas will be not disturbed as part of the proposed Project, there are no impacts anticipated in these areas.

Gunpowder River, including Seneca Creek, is an estuary with tidal characteristics. The average tidal range is approximately 1.4 ft with slightly higher spring tides. Estuarine systems consist of deep-water tidal wetlands and adjacent tidal wetlands. As previously shown in Figure 3-7, SAV is also established within this estuarine system. The estuary supports numerous terrestrial and aquatic species. Terrestrial species include birds adapted to urban environments, year-round and migratory fowl, raptors, mammals, reptiles, and amphibians. Aquatic species include zooplankton communities, benthic macroinvertebrates, and fish. For the latter, the Gunpowder River basin supports spawning and nursery areas for sport and commercial fish species.

No construction activity will take place within Seneca Creek or its buffer areas, so no direct impacts will result from construction of Project CTs or related facilities. The Applicant will control to the extent possible potential secondary impacts such as sedimentation and stormwater runoff using a county-approved ESC plan and SWM plan. Therefore, PPRP concludes that there will be no significant impacts to the creek or its aquatic habitats because of Project construction.

According to the USFWS IPaC tool queried on February 27, 2018 (Appendix B-3 of Crane ERD 2018), there are no endangered species under USFWS jurisdiction expected to occur within a 1-mile radius of the Project site. Additionally, there are no refuge lands or fish hatcheries. There are wetland areas (NWI and other) within a 1-mile radius of the site, as discussed previously, as well as the potential for bald and golden eagle and numerous migratory birds to occur. However, project construction will not result in alteration of existing land use, including tree clearing. Thus, no impacts to wetlands, migratory birds, or eagles will result from the Project.

The Applicant also used the DNR data site to obtain the more detailed information regarding sensitive species review areas as delineated by the

WHS. The highlighted areas indicate the presence or possible presence of listed species. The areas closest to the plant site are classified as either Group 2, 3, or 4. Group 2 relates to state-listed species; Group 3 relates to species or natural communities of concern to DNR, but with no official status; and Group 4 indicates buffered locations of bald eagle nests. None of these areas is located on the site. In the event that any RTE habitat or species are encountered during construction, PPRP recommends a licensing condition to consult with WHS to determine appropriate action if any RTE species are identified during planning, construction, or maintenance of this facility.

In summary, the CP Crane Repowering Project will take place primarily on a developed parcel of land that has housed an operational power plant since the early 1960s. No natural communities will be cleared for the Project; therefore, no direct impacts to natural communities will result. Temporary impacts to wildlife species inhabiting adjacent areas may result during the construction process due to human presence and noise. These disturbances will last only during the duration of Project construction and should have no long-term effect on the wildlife community.

5.1.3 Potential Impacts Due to Facility Operation

5.1.3.1 Wetlands and Surface Waters

The proposed Project will occupy approximately five acres following construction. Operational SWM for facilities in Baltimore County must be designed in accordance with the Maryland Stormwater Design Manual. The Applicant will prepare a SWM plan following this guidance to demonstrate how the stormwater from the five acres will be managed.

There are four potential sources of impacts to onsite or nearby surface waters during Project operations:

- Direct Disturbance of Existing Wetlands or Surface Waters—The new CTs will be located in an existing developed area of the site, and the Applicant is proposing no disturbance to existing wetlands.
- Direct Discharge of Process Effluents—Process wastewater generated by Project operation will be discharged to a new OWS and ultimately the municipal waste water system. Since there will be no direct discharge of process wastewater to any surrounding surface waters, there will be no surface water impacts associated with Project operations. Shutting down of the coal-fired units' cooling system has

eliminated impingement and entrainment from the previous facility cooling water intake as well as the thermal load from its the discharge.

- Significant Changes in Stormwater Quantities and/or Qualities Discharged Offsite—The Applicant proposes to include a SWM system designed and installed to ensure water quality volume, groundwater recharge, and channel protection with the Project. The Applicant will also develop and implement operating and maintenance procedures designed to ensure the continued effectiveness of this system. Based on installation of a sound SWM system and proper operations and maintenance of these facilities, no significant impacts to any surrounding surface waters are expected because of Project operations.
- Accidental Spills of Onsite Chemicals, Lubricants, or Other Potential Contaminants— The Applicant will design the project to include spill containment and control features as developed under the overall SPCC plan and chemical/hazardous materials management procedures. The Applicant will design these procedures to minimize the opportunity for accidental spills and identify the appropriate and timely response procedures to be followed in case of an accidental spill.

To ensure that oil spills from the onsite substation will not impact the Gunpowder River, PPRP recommends a license condition requiring CP Crane to implement secondary containment for the substation. PPRP concurs that the implementation of these plans and procedures will prevent significant impacts from occurring to any onsite or nearby offsite surface waters or wetlands during Project operation.

5.1.3.2 Vegetation and Land Cover

No vegetation or land cover, beyond what was impacted during construction, will be impacted during the Project operation.

5.1.3.3 Wildlife

CP Crane maintains that the operation of the proposed Project will not cause impacts to wildlife for the following reasons:

- The existing CP Crane property is currently developed and occupied;
- RTE plant and wildlife species are not located at the site;
- The implementation of Project systems and operating procedures will be designed to minimize impacts to the site and surrounding natural environment; and
- Shutting down the existing coal-fired units will be environmentally beneficial.

As mentioned previously, Project impacts on ecological resources would be positive, overall, resulting from the shutting down of the cooling water intake and discharge. The presence of humans and noise are indirect effects of Project operation that could potentially affect surrounding wildlife. There will be less human presence at the CP Crane site following construction, as the number of employees will decrease relative to current levels. In addition, there will be no more coal deliveries to the site as Units 1 and 2 have been shut down. According to the noise modeling results (discussed in Section 5.5), noise levels will remain within the state noise regulation and should have little effect on the surrounding wildlife communities. Mammal and bird species would be expected to experience the most effects, since their auditory systems are the most developed. However, the mobility of these species and the fact that there is a substantial amount of similar habitats in the area should enable these species to relocate to more desirable locations, if necessary. Species typically onsite are well adapted to human presence and noise and will continue to coexist with the Project, just as they have done for many years with the existing CP Crane Generating Station.

5.2 IMPACTS TO GROUNDWATER

Construction of the Project will involve excavation to pour concrete foundations for significant facility structures. These excavations may encounter groundwater, and therefore the excavations may require pumping to remove groundwater and allow for proper placement of foundation materials. There will be no ongoing use of groundwater for water supply during Project operation.

Operations at CP Crane will entail storage and handling of fuel oil and other hazardous liquids. Spills or leaks of these substances could adversely impact groundwater resources at the site. The Project will be designed to include spill containment and control features, which will be described in the required SPCC Plan. The Applicant will establish chemical/hazardous materials management procedures designed to minimize the risk of accidental spills and to identify appropriate and timely response measures to be taken if a spill occurs. With the implementation of best practices and compliance with regulatory requirements, the risk of groundwater impacts during operation will be minimal.

5.2.1 Construction Dewatering Requirement

Dewatering of groundwater during construction of footers, foundations, and subgrade structures will require a groundwater appropriation permit if dewatering, including any intermittent periods of non-pumping, exceeds 30 days or an annual average of 10,000 gpd, in accordance with COMAR 267.17.06.03.B(3). The withdrawal of groundwater for dewatering requires a new appropriation issued by the Maryland PSC through this CPCN proceeding. MDE does provide an exemption for groundwater uses that average less than 5,000 gpd annually (Annotated Code of Maryland Environment Title 5 Subtitle 5-502). Projects that fall below 5,000 gpd (regardless of duration) may file a Notice of Exemption with the Maryland Department of the Environment Water Supply Program (MDE-WSP) at least 30 days prior to beginning dewatering, in lieu of obtaining an appropriation permit.

5.2.2 Dewatering Volume and Impacts

This section describes the estimated amount of groundwater that will be withdrawn for dewatering, and evaluates the potential impacts from dewatering to the Quaternary Lowland Deposits.

According to the June 2018 Geotechnical Engineering Services Report prepared by Professional Service Industries, Inc. (PSI) on behalf of CP Crane (provided as Attachment 1 in Response to PPRP Data Request No. 4-1), groundwater was observed in onsite borings at depths ranging from six to ten feet bgs and it was estimated that seasonally, the depth to groundwater may be as shallow as 4 feet bgs. As indicated by the excavation dimensions provided in CP Crane's Response to PPRP Data Request No. 3-2 Attachment 1, shallow foundations will extend 5-6 feet bgs and driven piles will extend 36 to 41 feet bgs, creating the need to dewater to support construction. According to CP Crane's Response to PPRP Data Request No. 3-2 Attachment 1, the current design will require dewatering to facilitate construction of 21 individual structures, as follows:

- Three shallow foundations associated with the CT. These three subgrade structures will require excavation to a depth of five feet and dewatering to one foot below the water table;
- Three shallow foundations associated with stack structures. These three subgrade structures will require excavation to a depth of six feet and dewatering to two feet below the water table;

- The shallow foundation associated with the Fuel Gas Compressors. This subgrade structure will require excavation to a depth of five feet and dewatering to a depth of one foot below the water table;
- The shallow foundation associated with the demineralized water tank. This subgrade structure will require excavation to a depth of five feet and dewatering to a depth of one foot below the water table;
- Three shallow foundations associated with the ULSD tanks and liquid fuel unloading station. This subgrade structure will require excavation to a depth of five feet and dewatering to a depth of one foot below the water table;
- Three shallow foundations associated with the generator step-up transformers. This subgrade structure will require excavation to a depth of five feet and dewatering to a depth of one foot below the water table.
- Five piles to support the demineralized water tank. These piles will be 2.5-feet in diameter and will be driven to a depth of 41 feet, which is 37 feet below the water table;
- Sixteen piles to support the two ULSD tanks. These piles will be 2.5-feet in diameter and will be driven to a depth of 41 feet, which is 37 feet below the water table;
- Six piles to support the H-Frame. These piles will be 2.5-feet in diameter and will be driven to a depth of 36 feet, which is 32 feet below the water table; and
- Fifteen piles to support three stacks. These piles will be 2.5-feet in diameter and will be driven to a depth of 40 feet, which is 36 feet below the water table.

In CP Crane's Response to PPRP Data Request No. 3-2 Attachment 1, the estimated amount of dewatering that will occur during construction was calculated based on the dimensions of the excavation, with no factor included for groundwater recharge into the excavations. CP Crane clarified during a conference call with PPRP and MDE-WSP on 25 October 2018 that mud mats would be placed in each excavation once it was dewatered and that this was expected to prevent further infiltration of formation water. The Applicant further indicated in its response to PPRP Data Request No. 6-1 that the mud mats would consist of lean concrete, placed in a layer four to twelve inches thick. The lean concrete would be installed into the excavation using concrete pumps within 24 hours of initial dewatering. In cases where the local groundwater level is higher than the practical level of the mud mat, lean concrete walls will be poured or sheet pilings driven to seal off the sides of the excavation.

PPRP and MDE-WSP note that even with the assumption that mud mats will prevent further infiltration where they are applied, initial dewatering will create a flow of water from the aquifer toward the excavation. Furthermore, as a conservative assumption, some groundwater may continue to seep through the sidewalls into the excavation despite the construction of barriers to infiltration. For these reasons, PPRP and MDE-WSP considered recharge of groundwater from the formation to the excavation as a worst-case scenario when evaluating whether an appropriation permit would be required.

PPRP performed independent calculations of potential dewatering needs for the proposed excavations. The calculations are presented in Table 5-2. The initial volume of water expected to be removed from the excavation prior to placement of the mud mat is calculated as the length times width times the saturated thickness of the excavation, equivalent to one volume of water. Once the mud mat is placed, preventing further infiltration of formation water through the excavation floor, seepage of groundwater into the excavation through the sidewalls is calculated using the basic groundwater flow equation below where Q is the rate of groundwater flow; K is the hydraulic conductivity of the soil; i is the hydraulic gradient across the area, and A is the cross-sectional area of a plane oriented perpendicular to the flow direction.

$$Q=KiA$$

Values for these components were determined as follows:

- Q - The June 2018 Geotechnical Engineering Services Report (PSI, 2018) indicates that the surficial aquifer at the site is the Quaternary Lowland Deposits. Bennett and Meyer, 1952, reported that the characteristics of the Lowland Deposits vary widely and reported hydraulic conductivity measurements ranging from 72 to 1,780 feet per day (ft/day). The majority of these values were from laboratory tests of samples. However, one well pumping test was reported yielding a hydraulic conductivity of 120 ft/day. This was the hydraulic conductivity assumed for the site.
- i – As no groundwater contour maps were available for the site, a hydraulic gradient of 0.01 was assumed. This is believed to be a relatively high and therefore conservative value because, as the site is situated along the bank of the river in an area with very little topographic relief, the hydraulic gradient across the site is expected to be low.
- A – the length and width of each excavation, as well as the depth to which each excavation is anticipated to penetrate the water table, was

used to calculate a cross sectional area for the saturated portion of the four sidewalls of each excavation for shallow foundations.

In order to translate the groundwater flow rate into a volume of anticipated dewatering, the duration of dewatering is also needed. The Applicant indicated in is response to PPRP Data Request No. 1-4a that dewatering for any single structure could last from one to five days. As a conservative measure, a dewatering duration of five days was assumed for each foundation structure.

PPRP understands that piles will be installed in such a manner that grouting will be performed simultaneously with dewatering, thus there will be very little time for additional water to enter the pile borings. The maximum amount of dewatering for these structures is assumed to be the total volume of the borehole and this volumetric calculation is not affected by duration.

Table 5-1 below presents a summary of the dewatering amount determined by PPRP using excavation dimensions provided by CP Crane in response to PPRP Data Request No. 3-2 Attachment 1 and aquifer characteristics as determined from PPRP Data Request No. 4-1 Attachment 1 and the above-referenced literature values. PPRP's calculations also include a contingency factor of 50%, as included by the Applicant, to account for uncertainties as well as precipitation that may fall into the excavation.

Table 5-1 Construction Dewatering Calculations

No.	Excavation	Excavation Length - L (ft)	Excavation Width - W (ft)	Avg Depth to Water Table (ft)	Excavation Depth - D (ft)	Seepage Face Thickness - H (ft)	Saturated Area of Long Wall (ft^2)	Saturated Area of Short Wall (ft^2)	Hydraulic Conductivity - K (ft/d)	Average Hydraulic Gradient - i	Q (gpd)	Duration (days)	Total withdrawn design (gal)	Peak Month Total Withdrawn (gal)
1	CTG 1	61.25	19	4	5	1	61.25	19.00	120	0.01	10,145	5	51,891	51,891
2	CTG 2	61.25	19	4	5	1	61.25	19.00	120	0.01	10,145	5	51,891	51,891
3	CTG 3	61.25	19	4	5	1	61.25	19.00	120	0.01	10,145	5	51,891	51,891
4	Stack 1	14	14	4	6	2	28.00	28.00	120	0.01	3,937	5	20,079	20,079
5	Stack 2	14	14	4	6	2	28.00	28.00	120	0.01	3,937	5	20,079	20,079
6	Stack 3	14	14	4	6	2	28.00	28.00	120	0.01	3,937	5	20,079	20,079
7	Fuel Gas Compressrs	40.5	26	4	5	1	40.50	26.00	120	0.01	9,070	5	46,404	46,404
8	Demin Water Tank	42	36.375	4	5	1	42.00	36.38	120	0.01	12,835	5	65,701	65,701
9	Liquid Fuel Tank 1	42	36.375	4	5	1	42.00	36.38	120	0.01	12,835	5	65,701	65,701
10	Liquid Fuel Tank 2	42	36.375	4	5	1	42.00	36.38	120	0.01	12,835	5	65,701	65,701
11	Liquid Fuel Unloading Station	23	11	4	5	1	23.00	11.00	120	0.01	2,503	5	12,767	12,767
12	GSU 1	15	11.5	4	5	1	15.00	11.50	120	0.01	1,766	5	9,003	9,003
13	GSU 2	15	11.5	4	5	1	15.00	11.50	120	0.01	1,766	5	9,003	9,003
14	GSU 3	15	11.5	4	5	1	15.00	11.50	120	0.01	1,766	5	9,003	9,003

Annual Total (gal)	499,193	
Annual Avg (gpd)	1,368	
Peak Month Total (gal)		499,193
Peak Monthy Daily Rate (gpd)		16,640

Notes:
Cells highlighted yellow indicate literature values obtained by PPRP. All other cells represent data provided by Crane
Q=KiA (where A is the saturated sidewall area of the excavation: (L*H*2 +W*H*2)
Peak monthly withdrawal assumes pumping at rate Q consistently for 30 days.
Assumptions
1. Water table does not draw down at seepage face during pumping
2. Hydraulic gradient is based on site average regardless of direction
3. Floor is sealed instantaneously with mud mat to prevent upwelling of water

No.	Piles	# of Piles	Pile Diameter (ft)	Depth - D (ft)	Avg Depth to WT	Single Borehole Volume (ft3)	Total Dewatering Volume for all Piles (ft3)	Total Dewatering Volume for all Piles (gal)	Peak Month Total Withdrawn (gal)
1	Demin Tank	5	2.5	30	4	147	736	5,505	5,505
2	LF Tanks	8	2.5	30	4	147	1178	8,808	8,808
3	LF Tanks	8	2.5	30	4	147	1178	8,808	8,808
4	H-Frame	6	2.5	30	4	147	883	6,606	6,606
5	Stack	5	2.5	30	4	147	736	5,505	5,505
6	Stack	5	2.5	30	4	147	736	5,505	5,505
7	Stack	5	2.5	30	4	147	736	5,505	5,505
6									

Annual total (gal)	-	46,244	
Annual Avg (gpd)	-	127	
Peak Month Total (gal)		-	46,244
Peak Month Pumping Rate (gpd)		-	1,541

Notes
Assumptions
1. The borehole initially fills with 1 volume of water
2. Water is removed as concrete is placed in the borehole.
3. Borehole Volume = Pi * $(1/2*D)^2$ * h * 7.48 gal/ft^3
4. Borehole Volume is multiplied by the number of piles.

TOTALS			
Annual total (gal)	-	545,436	-
Annual Avg (gpd)	-	1,494	-
50% Contingency	-	747	-
Annual Average with Contingency (gpd)	-	2,242	-
Peak Month Total (gal)		-	545,436
Peak Month Pumping Rate (gpd)		-	18,181

Table 5-1 shows 545,436 gallons as the total estimated volume of groundwater to be removed during construction dewatering from 21 subgrade structures (499,193 gallons from the structures with shallow foundations and 46,244 gallons from the structures to be supported by piles). The annual average daily dewatering rate of approximately 1,494 gpd (545,436 gallons/365 days and rounded) is calculated based on the need to dewater all 21 subgrade structures and normalizing the dewatering amount over an entire year in accordance with MDE-WSP methods to calculate the average annual amount of the appropriation. The 50% contingency factor brings the total estimated dewatering to 2,242 gpd.

The 50% contingency value is further supported when the amount of precipitation that falls on the excavations is considered. Annual rainfall in Baltimore City is 41.88 inches per year (NOAA, 2018). There is uncertainty associated with the amount of rainfall that will evaporate versus the amount that will be captured in the excavation. Assuming two-thirds of the rainfall evaporates and one-third is captured in the excavated areas, the 14 inches spread over the estimated 10,500 square feet of proposed excavations will generate about 12,250 gallons per year or 34 gpd over a 365-day period. The 34 gpd is much less than the 747 gpd added by the 50% contingency, demonstrating the level of conservancy added by the contingency because there is low probability that all 21 excavations will be dewatered simultaneously.

The month of maximum use value of 4,376 gpd is based on the conservative assumption that all 21 excavations listed in Table 5-1 need to be dewatered for five days within a single 30 day period (545,436 gallons/30 days, rounded). This value does not include the 50% contingency factor.

PPRP's calculations confirm CP Crane's assertion in its response to Data Request 3-2 Attachment 1 that the estimated volume of dewatering will not exceed the 10,000 gpd threshold that would require a groundwater appropriation permit. CP Crane indicated in its response to PPRP Data Request No. 1-4a that, depending upon the construction schedule and dewatering needs, the period to complete all excavations and dewatering could exceed 30 days. However, because the total anticipated usage will be less than 5,000 gpd, in accordance with the stipulations of the Annotated Code of Maryland Environment Title 5 Subtitle 5-502, CP Crane will not require a groundwater appropriation permit, but will need to file a Notice of Exemption with MDE-WSP at least 30 days before the proposed dewatering will begin.

5.2.3 Management of Construction Dewatering Discharge

Dewatering may take place in areas of the site where groundwater is contaminated from past site activities (CP Crane Response to PPRP Data Request No. 1-4). MDE's Oil Control Program oversees an ongoing remediation effort at the site. Four of the subsurface support structures associated with the currently proposed Project will be constructed in the vicinity of the remediation well network: pile supports for the two ULSDs, shallow foundation for the liquid fuel unloading station, and the shallow foundation for the fuel gas compressor (CP Crane Response to PPRP Data Request No. 1-4 Exhibits A and C). The LPH-containing wells located closest to these excavations are GM-02 (LPH sheen), MW-5 (0.37 feet of LPH), PRW-5 (0.37 feet of LPH), and MW-2 (0.06 feet of LPH). The proposed excavations lie to the north and west of these wells at distances ranging from approximately 50 to 150 feet. The well containing the highest reported thickness of LPH is well PRW-6 at 0.85 feet of LPH. This well lies about 150 feet from the nearest pile support that will be drilled for the currently proposed repowering Project.

In the event that groundwater removed during construction is contaminated, CP Crane states that they will ensure it is handled and disposed in accordance with legal and regulatory requirements. If the groundwater is of acceptable quality, CP Crane may be able to discharge it directly to the sanitary sewer system; contaminated water may need to be hauled by truck to an appropriate treatment facility.

CP Crane will be required to obtain MDE approval for discharge of the groundwater, which will entail sampling and monitoring to detect any contamination. The reviewing State agencies recommend a license condition requiring CP Crane to obtain all necessary permits and approvals from MDE for discharging removed groundwater.

It should be further noted that dewatering at the site could have a temporary effect on the remediation system by drawing contaminated water away from the recovery wells for a short period of time. The reviewing State agencies' recommended license condition would also require CP Crane to coordinate with the MDE Oil Control Program regarding any impacts to ongoing remediation activities at the site. The Applicant shall provide documentation to the PSC and PPRP of its coordination with MDE and any permits or approvals obtained.

5.3 SOCIOECONOMIC IMPACTS

5.3.1 Employment and Income

Modification of the facility will create temporary construction jobs, most drawn from the Baltimore metropolitan labor force. The Applicant estimates that the project will employ approximately 60 construction workers over a 10-12 month period, with employment peaking at about 75 workers. The Project site is proximate to a large labor pool within the Baltimore metropolitan area, and most jobs will be sourced locally. Additional benefits are expected from expenditures of goods and services, although not all equipment will be sourced within Maryland.

Construction will generate a mild fiscal benefit for the State and Baltimore County from taxes on direct and indirect income, personal consumption expenditures, and sales of goods and services by Maryland firms. No State or county expenditures will be required for infrastructure improvements, and the project will have no effect on public services or facilities. As such, the net economic benefit to the State and Baltimore County will be positive.

Post-construction, the Project will benefit the Baltimore metropolitan area through property taxes, employment and purchases of goods, and services for maintenance. PPRP has concluded economic benefits from Project operation will be positive, even though plant staffing will be significantly less than when the facility was operated as a coal-fired generator. Local contractors will periodically be on site for maintenance. CP Crane estimates annual purchases of goods and services will be in the range of $400-500 thousand, much of which may be sourced from local suppliers.

5.3.2 Population and Housing

With construction workers commuting to the Project site on a daily basis, the project will have no effect upon population or housing. Post-construction, the Applicant states the project will require only a few employees that will be drawn from the Baltimore metropolitan labor market. PPRP has concluded no population, housing, fiscal, or traffic impacts are anticipated from project operations.

5.3.3 Land Use

Since development activities will be confined to previously developed areas of the site, no adverse effects on land use are anticipated during the

construction period. Post-construction, use of the land will not be significantly different from the facility as it existed previously.

As noted earlier, the original CP Crane Generating Station was permitted as a special exception to the site's then-current zoning, subject to a number of conditions that included a provision limiting the number of power producing units on the subject property to four. In its review of the project's ERD, PPRP noted the Applicant's plans to install three simple-cycle gas-fired CTs at the existing site, and retire two coal-fired units, although some Unit 1 & 2 ancillary buildings would be demolished to make room for the CTs. The project site also houses a 14 MW oil fired combustion turbine.

From the information provided, PPRP concluded there will be either four or six power producing units at the site, depending on how a retired unit is classified. The Project could therefore be in violation of its special exception condition for use of the parcel. In its response to PPRP Data Request No. 2-2, the Applicant provided evidence showing the Baltimore County Zoning Review Office has confirmed that site plan improvements and changes to the operation of the power plant use are within the spirit and intent of prior zoning cases applicable to the Project property and that no additional zoning relief is required.

5.3.4 Transportation

CP Crane has stated the number of construction workers onsite will be roughly the same as the retired coal-fired units' operation and maintenance employment. PPRP has thus concluded existing roads are capable of handling the modest increment in traffic generated during construction. Trucks will deliver materials and equipment to the project site over the construction period. To the extent that any loads of materials or equipment for the project are oversized or overweight, the Maryland State Highway Administration requires hauling permits. Title 24, Subtitle 1 of the Transportation Article of the Annotated Code of Maryland defines an oversize or overweight vehicle, which are adopted by reference in Baltimore County regulations relating to maximum weights and sizes of vehicles.[7] To address any roadway permit requirements, PPRP has recommended a license condition requiring CP Crane to comply with all permit requirements for transport of oversize or overweight loads on State and county roads and obtain appropriate approvals as necessary.

[7] §18-3-108

Post-construction traffic will be limited to an estimated four employee vehicles and periodic contractor visits. USLD fuel oil will be delivered via truck, although only when natural gas is not available in sufficient quantities. Natural gas will be delivered via an existing pipeline. No rail traffic is anticipated.

5.3.5 Visual Impacts

During construction, cranes may be visible from some perspectives, and local residents may notice an increase in the number of trucks entering or exiting the site. However, truck traffic is part of normal plant operations, and only a minor increase in the volume of truck traffic is anticipated.

Views of the CP Crane Generating Station will not change significantly. The CT power block will be west of the existing power plant, and much of the onsite infrastructure associated with the coal-fired units will remain, including the two 400-foot boiler stacks. The new CTs will have a low visual profile, as will other Project components. The tallest newly proposed structures will be the three CT stacks, which will be 160 feet above ground level.

Available views toward the CP Crane site from accessible vantage points are industrial, characterized by boiler buildings and tall stacks. Most structures associated with the proposed facility will not be visible. PPRP has concluded the project will have a minimal adverse effect on views from surrounding areas.

5.3.6 Fiscal Impacts

Public service demand is expected to be unaffected by the project. PPRP has concluded the project will produce mild fiscal benefits for Baltimore County and Maryland.

5.4 CULTURAL RESOURCES IMPACTS

PPRP has concluded construction will have no adverse effect on archeological or historic sites. No archeological or historic sites are within the boundaries of the CP Crane site, and offsite resources are outside the Project's area of potential effect.

Two properties listed in the MIHP, Scott-Andrew House and Mace-Luthardt House, are within one mile of the facility, but are visually buffered by intervening forested lands. Other MIHP and NR listed

properties are outside the area of potential effect of the CP Crane Generating Station. PPRP has concluded Project impacts on other cultural resources in the area, such as county and state parks, are likely to be minimal since views toward the facility are mitigated by woodlands and will be, for the most part, unchanged.

The CP Crane Station is located in Baltimore County's Coastal Rural Legacy Area, and two Rural Legacy easements to the west are adjacent to CP Crane parcels. Neither parcel is proximate to project components, and both parcels are separated from the nearest project structures by woodlands. With a similar or slightly reduced visual footprint, PPRP has concluded the Project will not affect nearby cultural, scenic, or other programmatic resources. In the event that relics from unforeseen archeological sites are identified during construction, PPRP has recommended a license condition requiring CP Crane, in consultation with the Maryland Historical Trust, to develop a plan for avoidance and protection, data recovery, or destruction without recovery of such relics.

5.5 NOISE IMPACTS

5.5.1 Summary of Regulatory Requirements

Maryland noise regulations specify maximum allowable noise levels, shown in Table 5-2 (COMAR 26.02.03). The maximum allowable noise levels specified in the regulations vary with zoning designation and time of day. The noise limit for residential areas is 55 dBA during nighttime hours and 65 dBA during daytime hours. A noise source may not create noise that exceeds the allowable levels, as measured at the receiving property.

Table 5-2 Maximum Allowable Noise Levels (dBA) for Receiving Land Use Categories

	Zoning Designation		
	Industrial	**Commercial**	**Residential**
Day	75	67	65
Night	75	62	55

Source: COMAR 26.02.03

Note: Day refers to the hours between 7 AM and 10 PM; night refers to the hours between 10 PM and 7 AM.

The State regulations exempt certain noise sources and noise generating activities. For example, motor vehicles on public roads are exempt from Maryland noise regulations; however, while on industrial property, trucks are considered part of the industrial source and are regulated as such. The regulations also allow for construction activity to generate noise levels up to 90 dBA during daytime hours, but the nighttime standard may not be exceeded during construction.

While the State has established target levels for noise, enforcement authority for noise regulations rests with local government (in this case, Baltimore County).

5.5.2 Noise Impacts Due to Construction

Construction activities are likely to generate higher noise levels compared with operational noise associated with the Project. Construction noise is difficult to predict because it results from many different sources moving about the site and operating on different schedules. The Applicant estimated the sound pressure levels associated with major construction phases, using EPA data from 1971 on average sound levels for typical construction phases. The EPA estimated sound levels assume that all equipment in each phase operates concurrently at the acoustic center of the project's footprint. The loudest phase of construction, excavation, is estimated at 89 decibels at a distance 50 feet from the source. The nearest residence is approximately 1,200 feet from the proposed turbines and approximately 1,100 feet away from the nearest planned construction activity at the site. Daytime construction is not expected to exceed 90 dBA limit; the Applicant states that nighttime construction will be limited to low-noise activities.

5.5.3 Noise Impacts Due to Operation

The Applicant stated in their CPCN Application that the turbines would be equipped with exhaust stack silencers that will limit turbine noise levels to 60 dBA at 400 feet. In their response to PPRP Data Request No. 5-1, the Applicant explained that they consulted various stack manufacturers to confirm that this technology would limit the noise to the stated value. The silencer technology is a common design in the industry and it has achieved 60 dBA at 400 feet at over 50 installations worldwide. PPRP compared CP Crane's proposed turbine sound power levels with other simple cycle combustion turbines at similarly sized facilities and literature estimation methods from the Edison Electric Institute's Electric Power Plant Environmental Noise Guide (EEI 1985). Literature estimations and similarly sized simple cycle turbines reviewed had similar sound power levels to the units proposed by CP Crane.

Using the source noise information, PPRP estimated the sound pressure levels that would result at the nearest residential receptor, as shown in Figure 5-1. The objective of this analysis was to verify the results that the Applicant presented in the CPCN Application. Sound pressure levels at varying distances were calculated using the following formula:

$$L_2 = L_1 - 20\ Log_{10}(\frac{R_2}{R_1})$$

where:

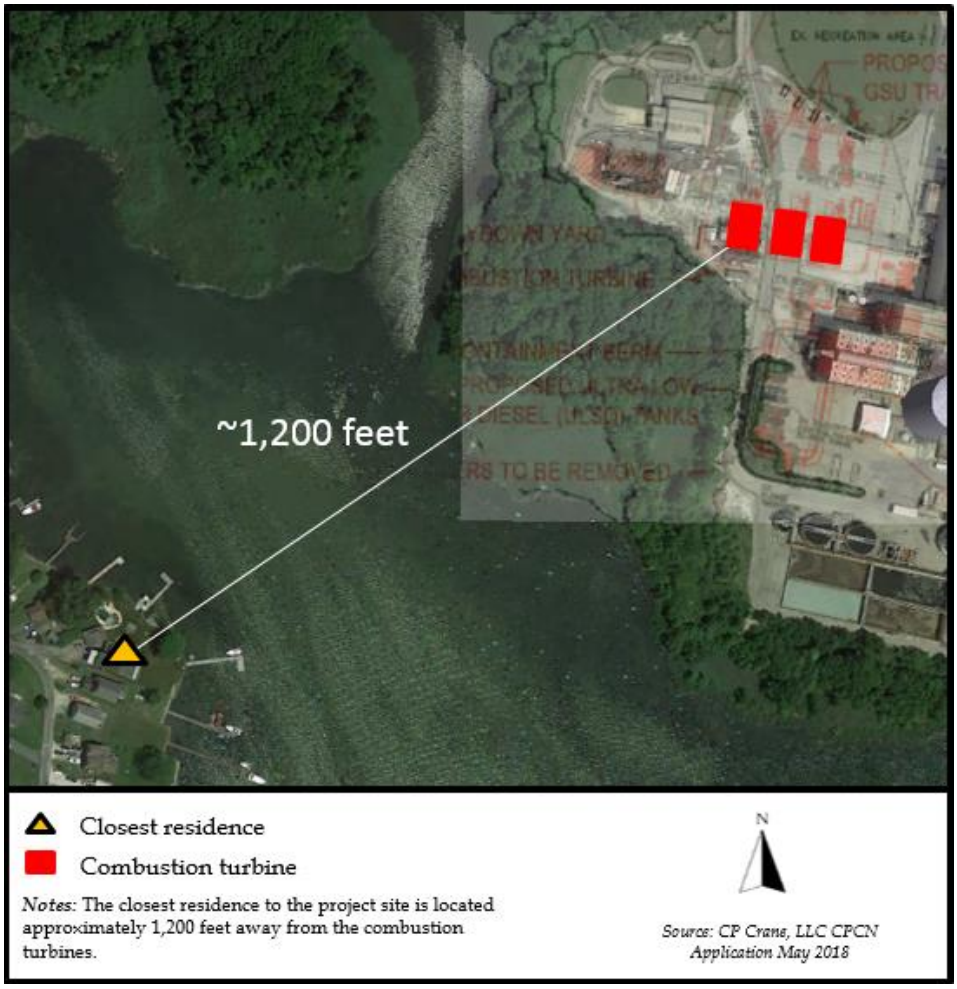
L_2 is the sound pressure level at the residential receptor;

L_1 is the sound pressure level at a known distance;

R_1 is the distance from the source for the known sound pressure level (L_1); and

R_2 is the distance from the source to the residential receptor.

Figure 5-1 Location of Nearby Residences



PPRP aggregated the three proposed combustions turbines into one sound pressure level, assuming full operation of all three turbines at the same time. This aggregation estimated that the sound pressure level from all three turbines at 400 feet would be 64.8 dBA. At the nearest residential receptor, located 1,200 feet to the southwest of the proposed turbine locations, PPRP estimated that the sound pressure level at the residential receptor is not expected to exceed 56 dBA.

These projections of noise from the proposed turbines are conservatively high. The projection methodology only considers distance spreading; the calculations do not take into account the atmospheric absorption of sound energy, or any effect of barriers (facility structures, trees, and other vegetation) between the noise sources and the receptors. Vegetative cover between the plant components and the receptor locations may have some noise reduction benefits, which are not reflected in this analysis. Actual sound pressure levels caused by the facility are expected to be lower.

PPRP's analysis suggest that the closest residents to the site will not experience noise levels exceeding Maryland regulatory standards, after the proposed facility is in full operation.

After the facility begins operation, CP Crane should conduct post-construction noise monitoring to verify that the facility is operating in compliance with applicable noise regulations. PPRP's recommended license condition would require the Applicant to submit a noise monitoring protocol within one year after receiving the CPCN, and to complete the noise monitoring within six months after the facility begins operating.

5.6 ANALYSIS OF OTHER ENGINEERING IMPACTS

5.6.1 Water Supply

CP Crane will use demineralized water for direct injection into the CTs for NO_X emissions control and power augmentation. Evaporative cooling of inlet air will also be used as a secondary power augmentation. Increasing the air density with the use of water injection increases the mass flow through the CT, thus increasing power output. The Applicant provided the following expected flow rates for these water uses:

- NO_X control when firing natural gas: 55 gallons per minute (gpm) per CT
- NO_X control when firing ULSD fuel oil: 70 gpm per CT
- Power augmentation: 17 gpm per CT
- Evaporative cooling: 12 gpm per CT

Thus, the maximum water use for all three CTs would occur when firing fuel oil and using both methods of power augmentation, and would total approximately 300 gpm. The source of water would be the existing CP Crane plant supply, which is purchased from the Baltimore City municipal system (Response to PPRP Data Request No. 1-5). The facility holds a surface water appropriation for cooling water withdrawals that were needed for the coal-fired steam generating operations. While the coal-fired generation is being discontinued, the Applicant states that they intend to maintain the surface water appropriation permit pending future decisions regarding use of the remainder of the CP Crane site.

5.6.2 Solid and Hazardous Waste Handling and Disposal

Nonhazardous solid waste generated at the site will include small quantities of mixed office waste and general plant refuse, as well as used inlet air filters that are occasionally changed out. Such waste will be trucked offsite for disposal at a licensed landfill.

The facility will also produce maintenance and other wastes typical of power generation operations, including oil-contaminated waste. Small quantities of hazardous wastes will be generated periodically, resulting from plant maintenance, turbine cleaning, and similar processes. The Applicant will manage and dispose of all materials in accordance with regulatory requirements, including use of properly licensed transport and disposal services.

5.6.3 Stormwater Management

As described in the Applicant's ERD (pages 3-20 through 3-25), the Project will incorporate a comprehensive SWM system designed to manage onsite drainage and stormwater flows from within the Project footprint. Currently, stormwater runoff from the approximately 5-acre Project area is conveyed via sheet flow across the existing paved parking area to several inlets north of the parking lot area. These inlets are piped to a wooded area north and west of the parking area that drains south to Seneca Creek. The existing site SWM system will need to be modified both to accommodate the new facility footprint and to meet current regulatory requirements. Stormwater will be managed by a proposed bioretention pond. SWM within Baltimore County must conform to the specific design requirements of Article 33, Title 4 of the Baltimore County Code and MDE's Stormwater Design Manual.

During the final design phase, the details of the proposed SWM system and facilities will be completed, to ensure compliance with the requirements for a general permit under COMAR 26.08.04.09B and MDE's Stormwater Design Manual as adopted by Baltimore County. The Applicant will seek coverage for stormwater discharges under the State general permit program, as is the case currently for CP Crane, in accordance with National Pollutant Discharge Elimination System (NPDES) regulations.

Under the conceptual SWM design plans for the proposed Project, all runoff from nonprocess contact areas, such as rooftops, paved and gravel surfaces, and open space, will be collected and routed to generally follow the existing flow directions into the appropriate SWM control areas.

Wherever practical, noncontact stormwater will be conveyed via overland flow to a bioretention pond for physical and biological treatment prior to being discharged at a controlled rate. Where overland flow is not possible, runoff will be directed over the site via a closed stormwater sewer system that discharges into the bioretention pond.

Stormwater runoff from areas where potential oil contamination could occur – such as outdoor transformers or chemical storage or unloading areas – will be directed into an onsite OWS for treatment prior to release to the local municipal wastewater treatment facility. Oil collected will be trucked offsite for recycling or disposal.

The Applicant will prepare modifications to CP Crane's stormwater pollution prevention plan, which outlines procedures to manage stormwater runoff as well as erosion and sediment control. The SPCC Plan will also be updated to include specific containment measures for onsite storage and handling of chemicals, solvents, lubricants, and fuel oil.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 AIR QUALITY

The proposed Project will have the potential to emit several types of air pollutants. The emissions sources evaluated as part of MDE-ARA's environmental review included the following:

(a) The main power generating equipment with a power block consisting of three refurbished GE LM6000 CTs, operating in a simple cycle configuration, each with a nominal generating capacity of 50 MW, fueled primarily with natural gas, which will be backed up with ULSD fuel; and

(b) One Cummins model KTA50G9 Black-Start Generator rated at 1500 kW.

Based on the information provided in the CPCN Application filed in May 2018, a supplemental application filed in August 2018, additional information provided by CP Crane through responses to PPRP Data Requests, and independent analyses conducted by the State, MDE-ARA concluded that emissions from the proposed Repowering Project will not trigger major new source review (PSD or NA-NSR) requirements.

Air quality dispersion modeling evaluations demonstrate that while operating within the restrictions included in the recommended licensing conditions (Appendix A), emissions from the proposed Repowering Project are predicted to result in pollutant concentrations that will demonstrate compliance with all applicable NAAQS.

In conclusion, evaluation of the Project and its potential emissions indicate that, if designed, constructed, and operated in accordance with the recommended licensing conditions, the CP Crane Repowering Project will be able to comply with all applicable State and federal air quality requirements.

6.2 WATER RESOURCES

Based on an analysis of the dewatering during construction, PPRP and MDE estimate that the volume of dewatering will be less than 5,000 gpd. Therefore, the proposed Project will qualify for an exemption for groundwater appropriation requirements. The Applicant will need to file

a Notice of Exemption with MDE at least 30 days before the proposed dewatering begins. Drawdown that may occur due to dewatering will not be significant enough to alter the direction of groundwater flow, and drawdown effects will be temporary and reversible after dewatering is complete. The reviewing State agencies' recommended license conditions will require CP Crane to coordinate with MDE to ensure that pumped groundwater is managed and discharged in compliance with all applicable regulations, and that MDE is aware of how dewatering may affect the ongoing hydrocarbon remediation activities at the CP Crane site.

Operations at CP Crane will entail storage and handling of fuel oil and other hazardous liquids. Spills or leaks of these substances could adversely impact groundwater resources at the site. The Project will be designed to include spill containment and control features, which will be described in the required SPCC Plan. The Applicant will establish chemical/hazardous materials management procedures designed to minimize the risk of accidental spills and to identify appropriate and timely response measures to be taken if a spill occurs. These measures will protect both groundwater and surface water resources from potential impacts during Project operation.

Operations at the CP Crane facility will require water for emission control and power augmentation. The maximum water demand will be approximately 300 gpm, to be supplied from the existing CP Crane plant supply, which is purchased from the Baltimore City municipal system. The facility holds a surface water appropriation for cooling water withdrawals that were needed for the coal-fired steam generating operations. While the coal-fired generation is being discontinued, the Applicant states that they intend to maintain the surface water appropriation permit pending future decisions regarding use of the remainder of the CP Crane site.

6.3 BIOLOGICAL RESOURCES

Environmental impacts of the proposed construction and operation of the Project on biological resources include potential impacts on wetlands; surface waters; rare, threatened, or endangered species; green infrastructure and FIDS habitat; and vegetation. Proposed construction activities will take place within developed or previously impacted areas of the CP Crane site. Therefore, few ecological impacts will potentially result. There will be little to no impacts to natural communities on site, as the proposed development will take place within previously disturbed and developed portions of the site. There will be no changes in the land uses

or vegetation communities on site. The proposed Project will not occur in or near areas designated as green infrastructure or FIDS habitat. No impacts to wetlands, migratory birds, or eagles will result from the Project. There will be no significant impacts to Seneca Creek or its aquatic habitats because of Project construction. Temporary impacts to wildlife species inhabiting adjacent areas may result during the construction process due to human presence and noise. These disturbances will last only during the duration of Project construction and should have no long-term effect on the wildlife community. No significant ecological impacts are expected to occur due to Project operations. Recommendations to the PSC for licensing conditions are included that should be imposed upon the facility to minimize the potential for any adverse impacts.

6.4 SOCIOECONOMIC IMPACTS

Modification of the facility will create temporary construction jobs, most drawn from the Baltimore metropolitan labor force. Construction will generate a mild fiscal benefit for the State and Baltimore County. Post-construction, PPRP has concluded economic benefits from project operation will be positive, even though plant staffing will be significantly less than when operated as a coal-fired generator. The Project will have no discernible effect upon population or housing during construction or operations.

Since development activities will be confined to previously developed areas of the site, no adverse effects on land use are anticipated during the construction period. Post-construction, use of the land will not be significantly different from the facility as it existed previously. The Baltimore County Zoning Review Office has confirmed the site plan improvements and changes to the operation of the power plant use are within the spirit and intent of prior zoning cases applicable to the Project site.

PPRP has concluded existing roads are capable of handling the modest increment in traffic generated during construction. Post-construction traffic will be limited to an estimated four employee vehicles and periodic contractor visits, plus occasional ULSD deliveries.

Views of the CP Crane Generating Station will not change significantly. Most structures associated with the proposed facility will not be visible. PPRP has concluded the Project will have a minimal adverse effect on views from surrounding areas. Public service demand is expected to be unaffected by the Project. PPRP has concluded construction will have no

adverse effect on archeological or historic sites. With a similar or slightly reduced visual footprint, PPRP has concluded the Project will not affect nearby cultural, scenic or other programmatic resources.

6.5 NOISE IMPACTS

PPRP's analysis suggest that the closest residents to the site should not experience noise levels exceeding Maryland regulatory standards, after the proposed facility is in full operation. PPRP's recommended license condition, if imposed as a condition by the PSC, would require that the construction and operation of the proposed facility comply with the State's regulatory standards of 65 dBA (day) and 55 dBA (night), and the 90 dBA level during daytime construction. It is anticipated that noise from the Project, as proposed, will meet these construction and operational noise limits

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