BEFORE THE OHIO POWER SITING BOARD
Application of Carroll County Energy, LLC
Carroll County Energy
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LIST OF ACRONYMS AND ABBREVIATIONS

2x1 Project	project consisting of 2 combustion turbines and 1 steam turbine generator
µg/m^3	micrograms per cubic meters
µg/l	micrograms per liter
%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
Advanced Power	Advanced Power AG
AEP	American Electric Power
AERMOD	A USEPA steady-state air quality dispersion plume model
ANSI	American National Standards Institute
APE	Area of Potential Effect
Application	the Application provided to the Ohio Power Siting Board to support a request for a Certificate of Environmental Compatibility and Public Need to Construct an Electric Generation Facility
ASTM	American Society for Testing and Materials
Background Concentrations	ambient background air quality concentrations based on the most recent full year of measurements at identified locations
BACT	Best Available Control Technology
BAT	Best Available Technology
BkB	Berks shaly silt loam with 3 to 8 percent slopes
BkC	Berks shaly silt loam with 8 to 15 percent slopes
BkD	Berks shaly silt loam with 15 to 25 percent slopes
BMP	Best Management Practice
Btu	British thermal units
Btu/kWh	British thermal units per kilowatt-hour
CAIR	Clean Air Interstate Rule
CBOD	carbonaceous biological oxygen demand
CCE	Carroll County Energy, LLC
CCES	Carroll County Environmental Service
CCGT	combined-cycle gas turbine
CEMS	Continuous Emissions Monitoring System

Certificate	Certificate of Environmental Compatibility and Public Need to Construct an Electric Generation Facility
CF	capacity factor
CFR	Code of Federal Regulations
CH_2O	Formaldehyde
CI	compression ignition
CIC	Community Improvement Commission
CO	carbon monoxide
CO_2	carbon dioxide
CoB	Coshocton-Keene silt loam, 3 to 8 percent slopes
the Construction Laydown Area	An approximately 23-acre property located off of Route 9 and adjacent to the Facility Site that is proposed for temporary use during construction of Carroll County Energy
the Court	U.S. Court of Appeals for the D.C. Circuit
CSAPR	Cross-State Air Pollution Rule
CTG	combustion turbine generator
CuB	Culleoka silt loam, 3 to 8 percent slopes
dB	Decibel
dBA	A-weighted decibel, corresponding to the sensitivity range for human hearing
DLN	dry low NO_x
EIA	Energy Information Administration
EbC2	eroded Elba silty clay loam, 8 to 15 percent slopes
Existing Uses of CIC Economic Development Land	the County-owned Carroll Hills School, Dog Pound, Carroll County Transit and Golden Age Home, located along Route 9 to the north of the Facility within CIC economic development land, as well as private facilities including Countryview Manor and McJunkin Redman
EZ	Enterprise Zone
FAA	Federal Aviation Administration
the Facility	Carroll County Energy project
the Facility Site	the 77-acre property proposed as the location of Carroll County Energy
GE	General Electric
GHG	greenhouse gases
GfC	Glenford silt loam, 8 to 15 percent slopes
g/hp-hr	grams per horsepower-hour

g/kWh	grams per kilowatt-hour
Gpd	gallons per day
Gpm	gallons per minute
GPS	Global Positioning System
GuC2	eroded Guernsey silty clay loam, 8 to 15 percent slopes
GW	gigawatts
HAP	hazardous air pollutant
HHV	higher heating value
Hp	horsepower
HRSG	heat recovery steam generator
H_2SO_4	sulfuric acid mist
Hz	Hertz
JEDD	joint economic development district
Kg	kilogram
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
Lb	pounds
lb/MMBtu	pounds per million British thermal units
lb/MW-hr	pounds per megawatt-hour
L_{eq}	equivalent steady sound level of a noise energy-averaged over time
LT	long-term noise measurements
MACT	Maximum Achievable Control Technology
Mgd	million gallons per day
mg/l	milligrams per liter
Ml	milliliter
MMBtu	million British thermal units
MMBtu/hr	million British thermal units per hour
Mph	miles per hour
MW	megawatts
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association

ng/J	nanograms per Joule
NH_3	ammonia
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NWS	National Weather Service
O_2	oxygen
O_3	ozone
OAC	Ohio Administrative Code
ODOT	Ohio Department of Transportation
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
OHI	Ohio Historic Inventory
OHPO	Ohio Historic Preservation Office
O&M	operation and maintenance
OPSB	Ohio Power Siting Board
OSHA	Occupational Safety and Health Administration
Pb	lead
PJM	the regional electric transmission independent system operator
PM	particulate matter
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
POTW	publicly owned treatment works
Ppm	parts per million
ppm_{vd}	parts per million by volume, dry basis
Project Area	the Facility Site, Construction Laydown Area, and associated easements including for access, natural gas pipeline interconnection and electrical transmission interconnection
PSD	Prevention of Significant Deterioration
Psig	pounds per square inch gauge
PTI	Permit to Install

PVC	polyvinylchloride
RPM	Reliability Pricing Model
SCADA	supervisory control and data acquisition
SCGT	simple cycle gas turbine
School District	the Carroll County Exempted Village School District
SCR	selective catalytic reduction
SCS	Soil Conservation Survey
SIL	Significant Impact Level
Site Option	option agreement executed by CCE for the Facility Site, Construction Laydown Area and associated easements.
SO_2	sulfur dioxide
ST	short-term noise measurements
STG	steam turbine generator
SWPPP	Storm Water Pollution Prevention Plan
Tailoring Rule	USEPA rule issued May 13, 2013 regarding GHG from stationary sources under the Clean Air Act
Tpy	tons per year
UL	Underwriters' Laboratory
ULSD	ultra-low sulfur diesel
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds
WmC	Westmoreland-Coshocton silt loams, 8 to 15 percent slopes
WmD	Westmoreland-Coshocton silt loams, 15 to 25 percent slopes

4906-13-01 Project Summary and Facility Overview

(A) PROJECT SUMMARY AND OVERVIEW

Carroll County Energy, LLC (CCE) is proposing to develop, build, own and operate Carroll County Energy (the Facility), a new natural gas-fired combined-cycle generating facility located in Carroll County, Ohio (Figure 01-1). CCE is within the corporate organizational structure of Advanced Power AG (Advanced Power), an international developer of independent power generation projects. The management of Advanced Power has led the development of over 13,500 megawatts (MW) of power generation projects worldwide. Advanced Power develops and invests in power generation and related infrastructure projects in Europe and North America, and continually assesses market conditions to identify opportunities to bring additional natural gas-fired energy facilities on-line.

(1) General Purpose of the Facility

The Facility will help meet energy demand in the region, particularly in light of the retirement of aging generating capacity, with the retirement of 6.3 gigawatts (GW) of capacity announced for retirement in Ohio before 2016. The Facility will help meet this need by providing additional base load and peaking capacity via its natural gas-fired combined-cycle technology.

(2) Description of the Facility

The Facility is a state-of-the-art combined-cycle natural gas turbine electric generating facility. The Facility will utilize two General Electric (GE) 7F 5-Series natural gas turbines, each with a heat recovery steam generator (HRSG), and a single GE steam turbine generator (STG). The Facility will have a nominal net output of 742 MW (full

duct fired operation with inlet air cooling at 59 degrees Fahrenheit [°F] ambient temperature).

The Facility's combustion turbines will be permitted to operate solely on natural gas. CCE has determined that, due to the high level of reliable natural gas delivery available to the Facility from nearby interstate natural gas pipelines, a back-up fuel such as fuel oil is not required. The Facility will utilize an air-cooled condenser, minimizing water needs and discharge volumes. The Facility has incorporated layout and design features that buffer it from surrounding uses.

The proposed Facility (which includes the power generating facility, switchyard and other ancillary equipment) will be located on an approximately 77-acre property (the Facility Site) that is located entirely within Washington Township, Carroll County, Ohio. Access to the Facility Site is from State Route 9 (Kensington Road NE), located approximately 0.25 mile to the west. Mobile Road NE generally bounds the Facility Site to the east. The Facility Site is approximately 2.5 miles north of the Village of Carrollton and approximately 0.8 mile south of State Route 171.

Within the 77-acre Facility Site, the power generating facility and ancillary equipment will be located on approximately 14 acres and the switchyard will be located on an adjacent 3 acres. Access to the Facility will be off of Route 9, extending across an approximately 23-acre parcel of land located between the Facility Site and Route 9. This 23-acre parcel is available for temporary use during Facility construction (the Construction Laydown Area). Once the Facility is constructed, CCE will retain easements for Facility access as well as for associated natural gas, electrical and utility interconnections. The natural gas and electric transmission interconnections will be the

subject of separate filings with the Ohio Power Siting Board (OPSB). A 75-foot wide natural gas pipeline easement will extend approximately 0.4 mile to the north of the Facility Site to connect the Facility to the existing Tennessee Gas Pipeline, and a 150-foot wide electric transmission easement will extend to the existing American Electric Power [AEP] 345 kilovolt [kV] right-of-way located approximately 0.4 mile west of the Facility. The Facility Site, access corridor and interconnections are collectively referred to as the "Project Area" for the purposes of this Application (see Figure 01-1).

The Project Area is surrounded by suitable infrastructure (e.g., state roads, the natural gas pipeline and electric transmission corridors). The majority of the Project Area is currently in active agricultural and woodland use; an approximately 0.4 mile portion of the proposed natural gas pipeline interconnection extends across undeveloped, vacant land owned by the County and targeted for economic development by the Carroll County Community Improvement Commission (CIC). Elevations within the Project Area range from approximately 1,100 to 1,290 feet above mean sea level. Several small streams extend through low areas within the wooded portions of the rolling terrain, with unnamed tributaries to Pipe Run located in wooded areas west of Route 9 and unnamed tributaries to Pipes Fork surrounding the Facility Site.

Land surrounding the Project Area is also predominated by active agricultural uses and wooded areas. A limited number of residences are scattered throughout the area. The nearest densely populated area is the Village of Carrollton, 2.5 miles to the south. Several existing land uses are located within Carroll County CIC's economic development lands that are located north of the Project Area. The Carroll Hills School,

Dog Pound, Carroll County Transit and Golden Age Home are owned by the County; private uses within the Carroll County CIC area include Countryview Manor, a private intermediate care facility, and McJunkin Redman (MRC Global), which supplies the energy industry with pipes, valves and fittings. The land uses in this area are collectively referred to in this Application as Existing Uses of CIC Economic Development Land. In addition, REX Energy is currently developing natural gas wells at a property just north of the Facility Site. Further north and east, approximately 1 mile from the Facility Site, the Tennessee Gas Pipeline compressor station is located. The Carroll County Veterans Park (a private facility) is located approximately 0.6 mile west of the Facility. A little over 1 mile to the south is the Carroll Meadows Golf Course. Southwest of the golf course is the Carroll County Fairgrounds.

Water and wastewater infrastructure will be available from existing, regulated water suppliers, and will be extended to the Facility Site from a location provided by the selected supplier.

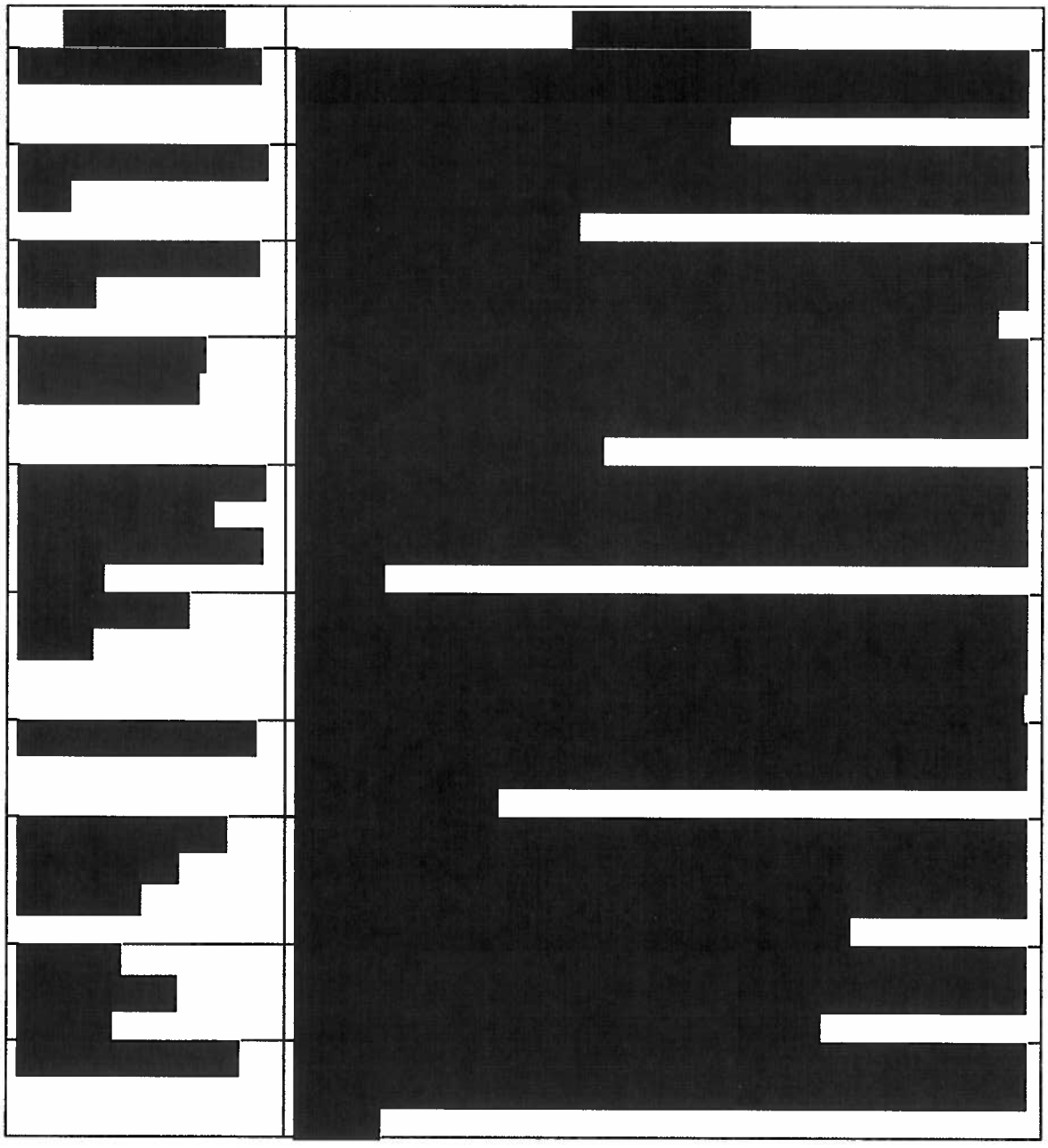
(3) Site Selection Process

The Facility Site selection process is described in greater detail in Section 4906-13-03. As outlined in that section, CCE's market analysis identified this region of Ohio as one where the planned shutdown of existing coal-fired capacity will create the need for new, clean, efficient power generation. The proposed Facility Site was selected based on consideration of a range of key characteristics for an economically viable project, as further discussed in Section 4906-13-03. No alternative sites were formally evaluated for the Facility. Upon identification of this location, additional scrutiny of a range of

evaluation criteria was undertaken prior to initiating the engineering and environmental activities necessary for completion of the OPSB Application.

Key characteristics of the proposed Project Area that make it suitable for Facility development are outlined in Table 01-1.

TABLE 01-1
Proposed Project Area Characteristics



(4) Principal Environmental and Socioeconomic Considerations

This Application addresses the impacts of the proposed Facility's construction and operation on the environment and on the community for the Facility Site and Construction Laydown Area. Because the Facility in this location has been determined to strongly meet CCE's siting requirements, no alternatives were evaluated for environmental and socioeconomic considerations. Topics evaluated include: air quality; water resources; solid waste; demographics; noise; ecology; land use; economics (including employment); cultural resources; and agricultural districts.

(a) Potential Construction Impacts

Construction impacts have been minimized through the selection of a Facility Site that minimizes tree clearing and wetland/waterways impacts, and has no impact to other sensitive environmental resources. In addition, the adjacent Construction Laydown Area allows for internal construction access to reduce the need for construction travel on Route 9. With the compact Project Area, construction effects of the Facility and its related infrastructure will be localized to only the immediate surroundings.

Although the Facility Site is in active agricultural use, it is not within a designated agricultural district; no impact to such area is, therefore, anticipated to occur as a result of the Facility. No impacts to cultural resources are anticipated. An on-site archaeological investigation and historic structures evaluation have been completed for the Facility to confirm that there are no significant on-site artifacts or impacts to historic structures. These evaluations are currently under review by the Ohio Historic Preservation Office (OHPO).

The closest park, Carroll County Veterans Park, is a private facility located approximately 0.6 mile from the Facility. The Existing Uses of CIC Economic Development Land are located approximately 0.5 mile north of the Facility Site along Route 9. Given the separation of these uses from the Facility Site by distance, vegetation and terrain, no significant impact is anticipated. It is anticipated that the existing highway will experience a limited increase in traffic during construction and some locations may experience a temporary increase in daytime noise levels, but impacts during the anticipated 28-month construction period will be reduced by the use of the Construction Laydown Area located within the Project Area. CCE will coordinate with local officials to ensure that shift times and travel routes are optimized to the extent possible.

During construction, air quality impacts will be limited to relatively minor emissions from the construction equipment required for Facility Site preparation and from fugitive dust emissions. Impacts to water quality will also be extremely limited, with only 450 square feet of direct impact to wetlands proposed and no direct impact to surface waters. The Facility will obtain general permit coverage for construction under the National Pollutant Discharge Elimination System (NPDES) program and will implement Best Management Practices (BMPs) to maintain water quality standards and minimize erosion and sediment control. Solid waste generated by construction activities will be minimized and removed by licensed haulers and disposed of at local or regional approved facilities.

(b) Potential Operational Impacts

Operational impacts will be minimal. Operational impacts on air quality will be minimized through the use of efficient new natural gas turbine technology, and incorporating dry-low nitrogen oxide (DLN) combustors, oxidation catalysts and selective catalytic reduction (SCR). The Facility will not be equipped to burn liquid fuel in its combustion turbines. Air quality impacts will be significantly below United States Environmental Protection Agency (USEPA) National Ambient Air Quality Standards (NAAQS) standards (see Table 06-5). The Facility layout has been designed to incorporate noise-attenuating features to mitigate noise at neighboring residences (see Table 07-6). The minimal solid waste generated during Facility operation will be removed by licensed haulers and disposed of at local or regional approved facilities. Facility-related operational traffic will be minimal, with 25-30 employees working three shifts and Facility-related deliveries traveling to and from the Facility on a regular basis.

The Facility is expected to have a significant positive impact on the local economy since it will pay for the use of local services, as well as significantly increase municipal revenues. The Facility has incorporated water-conserving measures, particularly through CCE's selection of air cooling which significantly minimizes the water needs for a project of this type. Comparable generation using conventional wet-cooled technologies would likely require approximately 6 million gallons per day (mgd); the use of air cooling reduces water by up to 93 percent.

No new source of water will be developed on-site; rather, the Facility will contract with an existing, regulated water supplier for both its potable and process

water needs. A number of options are available as potential sources to supply groundwater to the Facility. Two primary sources under consideration are the water resources of the Village of Malvern and/or the Village of Carrollton. Wastewaters generated by the Facility (sanitary and process discharges) will also be directed to a local existing publicly owned treatment works (POTW) and discharged consistent with existing NPDES requirements that are protective of water quality. Water and wastewater providers are anticipated to supply piping directly to the Facility Site.

(5) Project Schedule

The Facility schedule is based on commencement of commercial operation by May 2017 in order to meet the anticipated summer peak load demands within the PJM[1] marketplace. In order to meet this schedule, we are requesting issuance of the OPSB certificate by April 2014 to support commencement of construction in February 2015.

Delay in the issuance of the OPSB certificate would have a significant negative commercial impact on the Facility's planned 2017 operations and would jeopardize the Facility's ability to meet contractual PJM capacity commitments, as well as reducing the available capacity during critical summertime periods of peak load.

[1] PJM is the regional independent transmission organization that coordinates the movement of wholesale electricity in all or parts of 13 states (including Ohio) and the District of Columbia. Its name results from its origin serving Pennsylvania (P), New Jersey (J) and Maryland (M).

(A) DETAILED DESCRIPTION OF PROPOSED GENERATION AND ASSOCIATED FACILITIES

Figures 02-1a through 02-1i identify the proposed Facility; major population centers and administrative boundaries; major transportation routes and utility corridors; named rivers, streams and other bodies of water; and major institutions, parks, and recreational areas within a 5-mile radius of the Facility. Figure 02-2 shows the proposed Facility and vicinity on an aerial photograph overlay, showing surrounding road names and major features of the proposed Facility. Additional detail is provided in Figure 02-3, a plot plan which focuses on the primary Facility footprint and labels the various Facility components, and in Appendix A where Facility grading is reflected on the Preliminary Plot Plan. Computer generated color renderings of the Facility are included as Figure 02-4.

(1) Project Details

(a) Generating Units

The Facility will be permitted to operate as a nominal net 742 MW (duct fired, with inlet air evaporative cooling, at 59°F) air-cooled 2x1 combined-cycle natural gas-fired electric generating facility and will consist of two GE 7F 5-Series combustion turbine generators (CTG), each capable of generating a nominal 209 MW. The Facility will also include two triple-pressure HRSGs with duct burners and a single STG capable of generating a nominal 342 MW.

The higher heating value (HHV) Facility heat rate is 6,659 British thermal units per kilowatt-hour (Btu/kWhr) (unfired with inlet air evaporative cooling at

59°F). The Facility will be permitted to operate up to 8,760 hours per year, although its actual hours of operation will be dependent upon energy needs in the region. Availability will be on the order of 97 percent, however, it is anticipated that the annual capacity factor will vary due to market conditions between 40 and 80 percent. The Facility will be dispatched as needed by PJM. Operations will also include downtime for planned and unplanned maintenance events.

(b) Land Area Requirements

The Facility Site is approximately 77 acres, of which approximately 14 acres will be required for the power generating facility and an additional 3 acres for the adjacent switchyard. An adjacent Construction Laydown Area provides an additional 23-acre parcel for temporary construction laydown and construction parking. The permanent access driveway will extend across the Construction Laydown Area to Route 9 (see Figure 02-2).

(c) Fuel Quantity and Quality

The Facility's fuel will be natural gas supplied from the existing Tennessee Gas Pipeline pipeline system, owned by Kinder Morgan Energy Partners, at an approximate pressure of 680 pounds per square inch gauge (psig). The anticipated HHV fuel usage per hour is 5,224 million British thermal units per hour (MMBtu/hr). The natural gas transportation provider will deliver natural gas to the Facility. Downstream of the metering station, a 10-inch pipeline will deliver natural gas to the Facility Site. The natural gas interconnection and related components will be the subject of a separate filing with the OPSB.

Table 02-1 provides a summary of the Facility's natural gas characteristics.

TABLE 02-1
Natural Gas Characteristics

Characteristic	Natural Gas
Ash (%)	--
Sulfur content (grains per 100 standard cubic feet)	1.0
British thermal unit (Btu) Value (Btu/cubic foot, HHV)	1,030

(d) Plant Emissions

The Facility's impacts on air quality during construction and operation are addressed in this section.

Emissions from construction will consist mainly of relatively minor emissions from the construction equipment required for site preparation and Facility erection and construction and from fugitive dust emissions. General construction vehicles (both gasoline- and diesel-powered) and other diesel-powered engines will emit insignificant amounts of volatile organic compounds (VOC), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM) and greenhouse gases (GHG). These emissions are not expected to cause any significant adverse impacts on the Facility Site or beyond the Project Area.

Atmospheric dispersion modeling has been performed to predict maximum concentrations of air emissions as a result of operating the Facility over a range of operating conditions, and has confirmed that Facility impacts will be lower than all NAAQS and Prevention of Significant Deterioration (PSD) Increments imposed by the Federal Clean Air Act and the USEPA. The air quality

dispersion model accounts for emission rates, stack heights, exhaust parameters, meteorological conditions (wind speed, direction, atmospheric stability, and temperature), the topography around the Facility Site, and proposed building dimensions.

The following are the Federal criteria pollutants that will be emitted from the Facility: SO_2, particulate matter with a diameter of less than 10 microns (PM_{10}), particulate matter with a diameter of less than 2.5 microns ($PM_{2.5}$), NO_x, and CO. Several non-criteria pollutants will be emitted, including VOC, GHG, sulfuric acid mist (H_2SO_4), ammonia (NH_3), and formaldehyde (CH_2O).

The air pollution controls proposed for this Facility are proven technologies that are considered Best Available Control Technologies (BACT) as defined by the 1990 Amendments to the Clean Air Act and Best Available Technology (BAT) by the Ohio Environmental Protection Agency (Ohio EPA) (Ohio Administrative Code [OAC] Rule 3745-31-01[T]). The primary control devices include DLN burners in each of the two CTGs, SCR systems, and oxidation catalysts in each of the two HRSGs. The SCRs and oxidation catalysts will reduce emissions of NO_x and CO to 2 parts per million by volume, dry basis (ppm_{vd}) under all conditions, and VOC to 2 ppm_{vd} with duct burning and 1 ppm_{vd} without duct burning.

In addition, emissions from the Facility will be continuously tracked using a Continuous Emissions Monitoring System (CEMS). In the unlikely event of a control equipment failure, it would be immediately detected by the distributed

control system and corrective actions would be initiated to avoid the potential for significant impact.

(e) Water Requirements

The Facility incorporates air cooled condensers, a cooling system where steam is condensed inside air-cooled finned tubes, eliminating the need for a wet evaporative cooling tower – to minimize water demand and conserve water to the greatest extent possible. The Facility's maximum daily water use will be on the order of 400,000 gallons, and an average daily water use on the order of 300,000 gallons. A detailed water balance, including flow rates and treatment equipment, for the Facility is provided in Figures 02-5a and 02-5b. The use of air cooling reduces water consumption by up to 93 percent, as compared to a conventional wet-cooled combined-cycle generating facility.

The water needs of the Facility (including process water, fire protection and domestic uses) will be met through a contract with an existing regulated water supplier in the region. Two parties are currently in negotiation with CCE to potentially provide water for the Facility, Carroll County Environmental Service (CCES) and the Village of Carrollton. The agreement with CCES would be to provide Village of Malvern water via the proposed CCES Northern Corridor pipeline, a local project intended to support economic development. Other potential regulated suppliers of water may also be explored.

Water from these suppliers will be treated on-site with a reverse osmosis system to supply demineralized water in the HRSG and as other process water (as shown in Figure 02-5).The approximately 400,000 gallon maximum daily water

use shown on Figure 02-5a reflects operating the Facility at full load with full utilization of evaporative coolers on the two CTGs and 100 percent duct firing of the HRSG at an average ambient temperature of 92°F for a 24-hour period. The Facility's average daily water use (shown on Figure 02-5b) is estimated based on operating the Facility at full load with full utilization of evaporative cooling on the two CTGs and partial duct firing of the HRSG at an average ambient temperature of 59°F. Water, except for domestic needs, will only be required when the Facility is operational, although storage tanks may be filled during non-operational periods.

Each of the potential water supply sources currently negotiating with CCE has indicated the ability to reliably provide adequate water for the Facility, and the willingness to implement any potential upgrades or infrastructure to bring water services to the Facility Site where the Facility tie-in can be made; the Facility may connect to one or more of the available water supplies.

(f) Water Discharge Requirements

Wastewater discharge will also vary seasonally (as shown in Figures 02-5a and 02-5b), with a peak daily discharge during the summer season of on the order of 280,000 gallons (for temperatures at 92°F) and an average daily discharge on the order of 212, 000 gallons (for temperatures at 59°F). When the Facility is not operating, wastewater discharge will be primarily limited to sanitary uses.

Discharge of Facility wastewater is planned to either the existing BTM Sewer District POTW (located in and serving the Village of Malvern, and operated by CCES) or the existing Village of Carrollton POTW. Both CCES and

the Village of Carrollton have indicated that they have available capacity for Facility wastewaters. Facility discharge will be in accordance with existing NPDES permit discharge requirements for the POTW. Discharge piping will be provided to the Facility Site by either CCES (for discharge to the BTM/Malvern POTW) as a part of their Northern Corridor project or by the Village of Carrollton (for discharge to the Carrollton POTW).

(g) Stormwater Management

Stormwater flows from the developed Facility Site will be controlled through measures including the use of stormwater collection ponds. The stormwater collection ponds will allow stormwater runoff from Facility Site to settle and recharge local groundwater without impacting nearby streams. Stormwater features and detailed calculations are provided in the Stormwater Management Plan provided in Appendix B.

(2) Description of Major Equipment

The Facility will be permitted as a 742 MW 2x1 combined-cycle natural gas-fired dry-cooled facility utilizing two CTGs and single STG (2x1 Project). Details of the major equipment are provided below.

- *Combustion Turbine Generators* – The CTGs will be GE 7F 5-Series natural gas turbines rated at 2,046 MMBtu/hr, HHV, and 209 MW at 59°F with pipeline natural gas as the exclusive fuel and integrated DLN burners. The CTGs will utilize inlet air evaporative coolers to maximize output and increase efficiency at ambient temperatures greater than 59°F.

- *Heat Recovery Steam Generator* – The Facility will utilize two triple pressure reheat HRSGs to capture the exhaust gas heat from the CTGs. Each HRSG will be equipped with duct burners to provide additional peaking generation capacity. The HRSGs will also incorporate SCR and oxidation catalysts as BACT/BAT emission control technologies.
- *Steam Turbine Generator* – The Facility will utilize a GE STG, with reheat and the capability to generate 342 MW at 59°F. The STG will be housed in a building.
- *Air Cooled Condenser* – The air cooled condenser will condense the exhaust steam from the STG and return the condensate to the HRSGs in a closed loop system. Cooling is achieved by moving air over the condenser tubes by utilizing a bank of fans.
- *Step up Transformers* – The two CTGs and the STG will each be connected to a transformer that will step up generator output from 18 kV to 345 kV for connection to the existing AEP transmission system.
- *Auxiliary Boiler* – An auxiliary steam boiler, rated at 99 MMBtu/hr will be used as needed to keep the HRSGs warm during periods of Facility shutdown and provide steam to the STG during start-ups.
- *Air Cooled Heat Exchanger* – The air cooled heat exchanger provides cooling for auxiliary equipment. The working fluid for the system will be demineralized water with corrosion inhibitor and freeze protection or a glycol-based solution.

- *Fire Protection System* – A complete fire protection/detection system will be provided for the Facility. The system will include fixed water fire suppression systems, fire hose stations, hydrants, portable fire extinguishers, detection and control systems. The system will include an electric motor driven fire water pump and a backup diesel engine driven fire water pump (an approximately 50-gallon double containment oil storage tank will be integrated into the unit). The diesel driven fire water pump will use ultra-low sulfur diesel (ULSD). It will be designed and installed in accordance with National Fire Protection Association (NFPA) standards and insurer's recommendations. All fire protection equipment and systems will be Underwriters' Laboratory (UL) approved and comply with requirements of the local fire protection authority and CCE's insurance carrier.
- *Stand-by Diesel Generator* – A 1,491 horsepower (hp) diesel engine driven generator capable of producing 1,112 kilowatts (kW) of electricity will be provided and designed to safely shut the Facility down in the event of a forced outage. The generator will provide power to essential services necessary to protect the equipment. ULSD will be utilized, stored in an approximately 500-gallon double containment tank integrated into the equipment skid.
- *Demineralizer* – Demineralized water will be created by on-site water treatment. Demineralized water will be used in the CTG inlet air evaporative cooler and as makeup water to the water/steam cycle. Water

will be processed by the demineralizer system through a reverse osmosis process, which will remove the dissolved solids to the level required by the HRSG and STG manufacturer's requirements. The effluent from the demineralized system will be sent to the demineralized water storage tank. The demineralized water storage tank will provide demineralized water for condenser hot-well makeup and be of sufficient size so as to allow normal Facility operations without excessive cycling of the demineralized water system. Demineralizer regeneration waste will be discharged to the wastewater system and treated to meet the specifications of the POTW that will receive the discharge.

- *Wastewater System* – Wastewater at the Facility will be generated by sanitary sources, equipment drains, evaporative cooler blowdown, HRSG blowdown and reverse osmosis reject. Wastewater, except for sanitary sources, will be collected in a wastewater collection tank and treated before discharge to the existing POTW. Treatment will ensure the discharge will be in accordance with existing NPDES discharge requirements for the POTWs in Malvern or Carrollton and other local requirements.
- *Ammonia Storage Tanks* – Aqueous ammonia will be stored at the Facility Site for use in reducing NO_x emissions from the Facility. The preliminary design includes two ammonia storage tanks, each a 22.5-foot high, 11-foot diameter double-walled tank having a capacity to store 15,000 gallons of 19 percent aqueous ammonia. A containment area

around the tanks will be designed to hold the full volume of an accidental release of one tank plus a 25-year storm event, with additional freeboard. Tank alarms will immediately notify Facility personnel in the event of an accidental release, and plastic balls will be stored on-site and deployed within the containment area in order to further reduce the potential exposed surface area. An emergency shower/eyewash designed to meet American National Standards Institute (ANSI) Z358.1-2009 standards will be located in proximity to the tank, but outside the containment area. Proper training in emergency procedures will be provided to staff and emergency respirators will be available at the Facility for use by trained personnel. Curbing and containment will be used in the ammonia delivery area, as well, to prevent accidental release to the environment during ammonia deliveries.

(3) Transmission Line Interconnect

The Facility will interconnect with the existing AEP 345 kV transmission lines located approximately 0.4 mile west of the Facility Site, as shown in Figure 02-2.

Electrical power will be generated by the Facility at a voltage level of 18 kV and then stepped-up to a voltage level of 345 kV by newly installed transformers to be located adjacent to the power block. From the switchyard located within the Facility Site, an approximately 0.4-mile new 345 kV electric transmission easement (150-feet wide) will extend across the Project Area, cross Route 9 and intersect with the existing AEP right-of-way. The power will then move through available transmission paths to wholesale electric customers.

The proposed electric transmission line interconnection will be the subject of a separate filing with the OPSB. The new switchyard will be located on the Facility Site, and is included in this Application.

Figure 02-2 illustrates the location of the proposed transmission line interconnection, as well as on-site electrical equipment associated with the Facility including the Facility switchyard. A preliminary electrical one-line diagram is provided as Figure 02-6.

PJM has assigned the Facility queue position Y2-050. The PJM Feasibility Study (Appendix C) was completed in March 2013, and the System Impact Study (Appendix D) was initiated in June 2013 and received by CCE on November 4, 2013.

(4) New Natural Gas Transmission Line

The Facility will interconnect with the existing Tennessee Gas Pipeline interstate natural gas pipeline located approximately 0.4-mile north of the Facility Site via a proposed 10-inch diameter pipeline located within a 75-foot easement. The proposed interconnection corridor is illustrated in Figure 01-1. This interconnection pipeline will be the subject of a separate filing with the OPSB.

(B) DETAILED PROJECT SCHEDULE

(1) Schedule

Figure 02-7 provides the proposed Facility schedule covering all major activities and milestones. This schedule is based on the submission of this Application in November 2013, and placing the Facility into commercial operation by May 2017.

CCE plans an in-service date of May 2017 in order to meet the anticipated summer 2017 PJM peak load demand, including potentially entering the PJM Reliability

Pricing Model (RPM) Base Residual Auction to be held in May 2014 for delivery of capacity from June 1, 2017 to May 31, 2018.

The schedule for the proposed Facility includes a requested date for the issuance of a Certificate of Environmental Compatibility and Public Need to Construct an Electric Generation Facility (Certificate) in April 2014, prior to CCE making a commitment to PJM to participate in the capacity auction in May 2014.

(2) Necessity to Maintain Schedule

Delays could jeopardize CCE's ability to participate in the May 2017/2018 PJM RPM Base Residual Auction and delay the Facility's projected in-service date of May 1, 2017. Delays of this nature would result in significant costs including losses in projected energy revenue, losses in capacity revenues, performance penalties associated with PJM RPM market participation and potential additional costs to ratepayers.

A significant portion of the Facility's annual energy revenues are associated with summer operation, including the months of June, July, August and September. This is due to the fact that electricity consumption and the value of energy is highest during these months. Lost energy revenues during these months would be on the order of $15 million per month.

Another significant portion of the Facility's annual revenues are a result of participation in the PJM capacity market. Based on capacity prices for 2016/17 PJM RPM base residual auction, lost capacity revenues would be on the order of $1,250,000 per month. Further, if CCE participated in the 2017/18 PJM RPM Base Residual Auction as planned and was not able to achieve the in-service date, CCE would be assessed a 20 percent penalty (equating to approximately $1,500,000 per month).

Finally, a delay in the in-service date would jeopardize the Facility's ability to meet peak summer demand and provide capacity that may be necessary due to planned retirements. A total of 6.3 GW of generation has announced retirement in Ohio. These units include Ashtabula (244 MW), Avon Lake, (721 MW), Bay Shore (495 MW), Eastlake (1,233 MW), Miami Fort 1-4 (163 MW), Muskingum River 1-5 (1,375 MW), Niles (216 MW), O.H. Hutchings (365 MW), Picway (100 MW), and Walter C. Beckjord (1,180 MW). CCE is proposing a significant generation Facility that will begin to replace some of the loss of generation capacity. Without adequate replacement, reliability issues and higher PJM capacity and energy pricing may occur and impact Ohio ratepayers.

(A) SITE SELECTION STUDY

CCE has requested a waiver from the requirement to conduct a site selection study designed to evaluate all practicable sites for the proposed Facility area. CCE did conduct a site selection process that evaluated the ability to site the Facility in other counties. After identifying Carroll County as the preferred region, CCE proceeded with a site selection process that further refined Facility siting to the preferred Project Area. This process did include evaluation of quantitative and qualitative factors within Carroll County, but did not involve a formal evaluation of alternative sites. As a result, the focus on this section is on the process utilized that resulted in the selection of the Facility Site.

(1) Site Selection Process

(a) Description of Study Area

Advanced Power continually assesses market conditions to identify opportunities to bring additional natural gas-fired energy facilities on-line. In 2011, Advanced Power's internal analysis focused on U.S. electricity generation capacity at risk due to forced retirements related to aging generation capacity and evolving regulatory requirements. This analysis identified Ohio as the state having the greatest number of potential retirements relative to the market size. Advanced Power's internal analysis identified that a total of 7 GW of capacity was at risk of retirement before 2016.[2] As a result, in late 2011, Advanced Power began identifying viable development sites in Ohio.

[2] As of the date of this Application, 6.3 GW of Ohio capacity has announced retirement before 2016.

Advanced Power determined that the facility would be a 2x1 Project. Given that design target, Advanced Power assessed regions within Ohio based on three preliminary goals: (1) proximity to electrical transmission system greater or equal to 115 kV; (2) proximity to high pressure gas pipeline infrastructure with available capacity; (3) proximity to markets being affected by the retiring coal-fired generation facilities; and (4) forecast energy and capacity pricing.

High voltage (115 kV or greater) transmission lines were identified and detailed transmission interconnection studies were conducted by independent transmission consultants to confirm the ability to inject electrical generation at potential points of interconnection throughout Ohio. Discussions were held with gas pipeline operators to confirm favorable locations for deliverability of adequate firm gas transportation capacity, gas pressures and gas quality. The location of existing generation facilities announced for retirement was identified to gauge the potential for energy capacity deficiencies; Advanced Power engaged consultants to perform independent nodal dispatch analysis to evaluate the electricity and capacity pricing impacts of these retirements in PJM and Ohio.

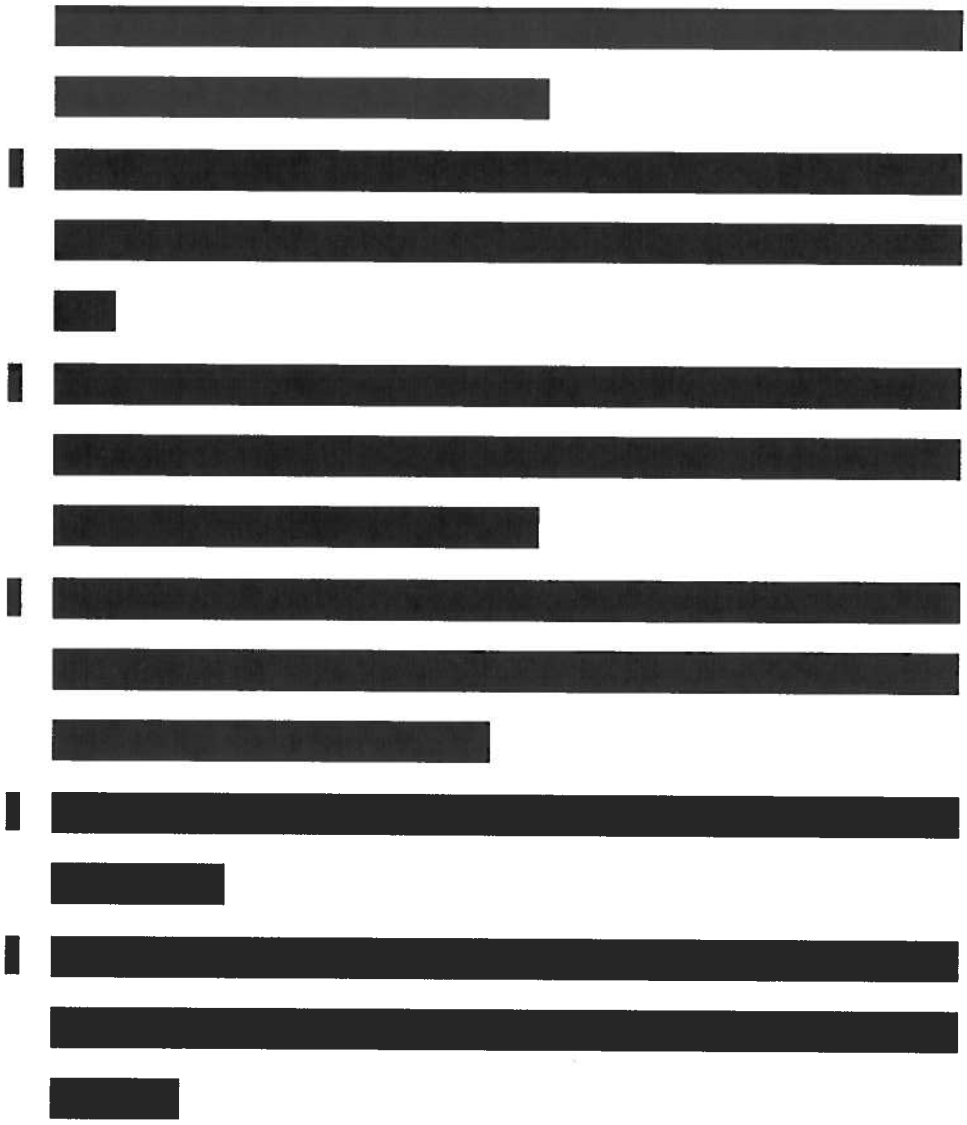
Through this evaluation process, Advanced Power identified several counties with attributes that met the site selection goals. Ultimately, additional projects may be located in other Ohio locations evaluated; however, Carroll County was identified as a preferred region for development of a 2x1 Project, particularly due to its proximity to facility retirements and its robust electric and natural gas infrastructure.

(b) Study Area and Site Map

The study area for a 2x1 Project within Carroll County extended throughout the County. As shown in Figure 03-1, Carroll County has high-voltage transmission available from both AEP and FirstEnergy, as well as a Tennessee Gas Pipeline natural gas pipeline network that was confirmed by the owner to have adequate transportation capacity and gas pressures and quality.

(c) Siting Criteria

Advanced Power utilized a multi-phased evaluation process, evaluating potential parcels using the following site selection criteria for specific parcels of land for the generating facility site:



(d) Process for Identifying the Proposed Site

Advanced Power hired a local realtor to identify parcels of land potentially suitable for the 2x1 Project. Advanced Power met with the realtor to review the criteria discussed above, and conducted a preliminary reconnaissance with the realtor along key infrastructure corridors to identify potential sites.

In parallel with the search for project sites, Advanced Power initiated a study to evaluate the viability of local water sources and locations for discharge of

wastewater. The study identified multiple viable water sources within Carroll County and multiple discharge locations for wastewater. As part of the site selection evaluation process, Advanced Power considered the infrastructure required to connect to these water sources and wastewater discharge points.

As described in more detail below, the Facility Site was identified in April 2012. CCE executed an option agreement for approximately 77 acres of land in July 2012 (Site Option). As part of the Site Option, the landowner also granted an option to use 23 acres of land along the east side of Route 9 for construction laydown and easements for the electrical transmission lines, gas transmission, access roads, and utilities.

Upon execution of the Site Option, CCE submitted a PJM interconnection request and was assigned the queue position Y2-50. CCE also initiated additional studies, through independent environmental and engineering consultants, to evaluate wetlands, other natural resources and topography of the Facility Site to support design and grading plans.

Throughout this process CCE has been in contact with Carroll County officials including Commissioners, the School Board Superintendent and the Economic Development Director, as well as with representatives of local municipalities, to obtain inputs on potential conflicts or community concerns regarding the Facility.

(e) Factors in Selecting the Proposed Site

Based on the selection criteria outlined above, the Facility Site (Figure 03-2) was identified as an optimum location within Carroll County for the proposed Facility. Each of the key factors in its selection is outlined below.

The Facility Site size of approximately 77 acres met the threshold selection criteria. In addition, the Facility Site is comprised of a combination of open fields and wooded areas that could be used to both minimize the need for clearing and allow for vegetated buffer. Preliminary wetland screening indicated the potential to avoid or minimize impacts. An independent engineering firm was contracted by CCE to develop initial general arrangement and grading plans to confirm that the limits of required grading would work within the Facility Site boundaries. Through this process, the layout was able to primarily utilize existing, open area, and the Facility Site size is sufficient to allow for undeveloped buffer to remain around the Facility footprint.

In addition to the buffer area, the availability of the adjacent 23-acre parcel for use during construction provided additional benefit. The adjacent Construction Laydown Area increases construction efficiency and reduces the need for off-site traffic.

The Facility Site is proximate to existing natural gas pipeline infrastructure. The existing Tennessee Gas Pipeline corridor extends north of the Facility Site, requiring an interconnection that is less than one mile in length. During the Facility Site selection process, the pipeline owner confirmed that this pipeline has adequate transportation capacity, natural gas pressure and natural gas quality to supply fuel to the Facility.

The Facility Site is also adjacent to existing transmission lines. Both the AEP 345 kV Central Canton – Tidd transmission line to the west of the Facility Site and the FirstEnergy 345 kV Sammis – South Canton transmission line to the north of the Facility Site were options for interconnection within 3 miles. CCE has opted to connect to the AEP 345 kV system, which has been confirmed through independent electrical interconnection studies to have adequate injection capacity. This existing transmission line intersects with property also owned by the Facility Site landowner; easement agreements have been incorporated into the Site Option to allow for a new electric transmission lateral, approximately 0.4 mile from the Facility switchyard.

CCE commissioned a feasibility analysis of water supply and wastewater discharge alternatives, which identified a number of potentially feasible options to support the Facility's water and discharge needs, including: (1) water and sewer service from the nearby Village of Carrollton for water and sewer services; (2) nearby surface water (for discharge); and (3) more distant water sources from the Villages of Malvern or Minerva. As Facility work has continued, these options have been refined or eliminated and additional sources of water have been identified; however, initial Facility Site selection was based on the strength of the range of options available.

Potential Facility visibility is minimized by several factors. First, no public recreational areas were identified in the immediate area. Second, the location of the Facility Site allows the Facility to be substantially set back from Route 9. The Facility Site is surrounded by wooded terrain in other directions, providing a good

visual buffer. In addition, the rolling terrain limits line-of-sight, further limiting the potential for views of the Facility in this location.

Carroll County has no formal zoning districts or use requirements. However, the Facility Site is located within an area of Carroll County that includes non-residential uses and is advertised and is currently undergoing development by the CIC as a commercial and industrial park. Utility infrastructure and easements extending through the area include the 345 kV AEP transmission line that extends in a northwesterly direction just south and west of the Facility Site; the 138 kV FirstEnergy transmission line that extends in a northerly direction to the east of the Facility Site; and the Tennessee Gas Pipeline corridor that extends in a northeasterly direction just north of the Facility Site. Active agricultural properties and scattered residences exist in the around surrounding the Facility Site. Existing Uses of CIC Economic Development Land are located along Route 9, more than 0.5-mile from the proposed Facility; additional land in this area is being actively marketed as a commercial and industrial development park. Land contiguous to the Facility Site to the north includes property on which REX Energy had plans for and is currently drilling gas wells. A Tennessee Gas Pipeline compressor station is located approximately 1 mile north of the Facility Site.

No environmental constraints were identified that indicated the potential for significant environmental impact associated the Facility at this location. CCE reviewed secondary data sources to identify features such as mapped wetlands during the initial screening process. An independent environmental feasibility

assessment to evaluate potential constraints associated with wetlands, protected species and cultural resources was undertaken. The attributes of the Facility Site, as well as the broader setting, which is in attainment for air quality standards, indicated the Facility could be located at this site while minimizing environmental impact.

The Facility Site is able to be accessed from Route 9, which is a major highway in Carroll County that supports the region's heavy semi-truck traffic. Wheeling & Lake Erie Railway rail lines are available to support heavy haul activities and, although they do not directly deliver to the Facility Site, can potentially minimize over-road heavy hauls.

CCE also received positive preliminary feedback regarding community and political support for the development of a generating facility in the County. Introductory meetings held during the Facility feasibility review stage were viewed by CCE as constructive and supportive of the proposed development.

The Facility Site meets all of the above site selection criteria. CCE has continued to gather information and refine its Facility design to undertake the more detailed environmental studies, engineering design and other studies necessary to support the OPSB Application for the Facility.

(2) Constraint Map

Figures 03-1 and 03-2 illustrate features considered in evaluating opportunities and constraints during the Facility site selection process.

(B) SUMMARY TABLE OF EVALUATED SITES

No additional sites were formally evaluated. A summary of key characteristics of the selected Facility Site is provided in Table 01-1.

(C) ADDITIONAL SITE SELECTION STUDIES

No additional site selection studies have been completed for the Facility.

(A) SITE

(1) Geography and Topography

Figures 02-1a through 02-1i present nine maps at 1:24,000 scale exhibiting the area within a 5-mile radius of the Facility Site, and is a compilation of the area shown on the following six United States Geological Survey (USGS) 7.5-minute series topographic maps: Malvern, Minerva, Kensington, Dellroy, Carrollton and Bergholz; topographic contours are reflected on Figures 07-6a through 07-6i. Figures 02-1a through 02-1i show the following: the proposed Facility; major population centers and administrative boundaries; residential, commercial, and industrial buildings and installations; major transportation routes and utility corridors; named rivers, streams, and other bodies of water; and major institutions, parks, and recreational areas.

As can be seen in Figures 02-1a through 02-1i, the Facility is located entirely within Washington Township in Carroll County, approximately 2.5 miles north of the Village of Carrollton, Ohio. It is between Mobile Road NE on the east and Route 9 (Kensington Road NE) on the west; it is north of the township line between Washington and Center Townships, and approximately 0.9 mile south of Route 171 (Cobbler Road NE). The Facility Site is irregular in shape and encompasses an area of approximately 77 acres. As shown on Figures 02-1a through 02-1i, the Facility Site is located in the southern half of Section 28, Township 14N, Range 5W of the First Principal Meridian at a latitude of 40.605^{o}N and a longitude of 81.06^{o}W. An adjacent 23-acre parcel to the west will be used as temporary Construction Laydown Area, and for permanent access to the Facility Site.

The Project Area consists of active agricultural and forested uses, and is characterized by hilly rolling topography with elevations that range between approximately 1,100 feet and 1,290 feet above mean sea level. Pipe Run is located approximately 7 miles to the west of the Facility Site, with unnamed tributaries extending into wooded, lower elevation portions of the Project Area that are west of Route 9. Pipes Fork flows approximately 3.75 miles to the northeast of the Facility Site to its confluence with Still Fork, which generally flows northwest to its confluence with Sandy Creek. Unnamed tributaries of Pipes Fork extend through wooded, lower elevation areas of the Project Area to the east of Route 9. In addition to the above tributaries, a small impounded lake, Tennessee Gas Lake, is located just north of Cobbler Road NE, approximately 1.4 miles north of the Facility Site.

The land surface of the surrounding area is also gently rolling. The relief of the land surface within a 5-mile radius of the Facility Site is approximately 1,200 feet, with a high of approximately 1,372.90 feet to the southeast and a low of approximately 939.57 feet to the southwest.

As shown in Figures 02-1a through 02-1i, land use in the area is a mixture of agricultural fields and woodlots, with scattered residential land uses along Mobile Road NE and Andora Road NE – which parallels Mobile Road NE approximately 2,000 feet to the southeast – as well as Cobbler Road, which runs east-west, 0.9 mile north of the Facility Site. Just north of Cobbler Road, directly north of the Facility Site, is the Tennessee Gas Pipeline compressor station. Land uses along Route 9, which runs north-south, are Existing Uses of CIC Economic Development Land, approximately 0.5 mile

from the Facility Site. The Carroll County CIC is advertising the undeveloped land in this area of Route 9 as a commercial and industrial park.

The Village of Carrollton, located approximately 2.5 miles to the south of the Facility Site, is the closest more densely settled location. South of the Facility Site, land uses become more densely residential in character, with mixed commercial uses as Route 9 approaches the Village of Carrollton.

The Carroll County Veterans Park, a private recreational facility, is located approximately 0.6 mile west of the Facility Site. A little over 1 mile to the south is the Carroll Meadows Golf Course. Southwest of the golf course is the Carroll County Fairgrounds.

(2) Aerial Photograph

Figure 02-2 provides an aerial photograph showing the location of the proposed Facility in relation to surface features. As can be seen, the proposed Facility Site is comprised of rolling agricultural fields and forested area. Its surroundings are similar in character, with gently rolling topography and a patchwork mixture of agricultural fields and woodlots with associated residences, the closest of which (approximately 350 feet to the east of the Facility) is located along Mobile Road NE, which extends along the eastern edge of the Facility Site. Existing infrastructure corridors traverse the area, including the AEP 345 kV transmission corridor, the FirstEnergy 138 kV transmission corridor, several lower-voltage electrical lines, and the existing Tennessee Gas Pipeline natural gas pipeline corridor. A Tennessee Gas Pipeline compressor station is located approximately 1 mile northeast of the Facility Site. County-owned CIC land is located to the north of the Project Area, along Route 9, including land available for commercial and

industrial development as well as Existing Uses of CIC Economic Development Land. Additional economic development in the area includes the REX gas well drilling currently underway just north of the Facility Site.

(3) Site Mapping

Figure 04-1 presents a map showing topographic contours, including water features and existing structures; additional detail regarding vegetation and anticipated vegetation clearing can be found on the Preliminary Plot Plan (Appendix A). No zoning exists within Carroll County, and therefore no land use classifications are shown on Figure 04-1. The Facility takes advantage of existing, open areas currently in agricultural use in order to minimize the need for tree cutting; approximately 7 acres of currently wooded area will remain permanently cleared following Facility construction.

As can be seen in Figure 04-1, no existing structures are located within the Project Area. The Facility Site and Construction Laydown Area are characterized by open agricultural fields and wooded areas, with agricultural uses generally taking advantage of more open, flat terrain. Terrain is rolling and steeper slopes extend into the wooded areas of the Facility Site and Construction Laydown Area, where small unnamed tributaries are located at the base of the slopes.

(4) Geology and Seismology

(a) Geological Issues

A preliminary geotechnical investigation has been completed for the Facility. A copy of the report is provided as Appendix E, with information summarized in this section of the Application.

Regional geologic maps from the Ohio Department of Natural Resources (ODNR) indicate that the Facility Site is located in the Muskingum-Pittsburgh Plateau of the Appalachian Highlands Physiographic Region. This region is defined by moderately to high relief plateau having broad major valleys that are dissected by smaller streams. Bedrock at the Facility Site is comprised of the Conemaugh group of Pennsylvanian age. The Conemaugh group is defined at the top by the bottom of Pittsburgh coal seam, and at the bottom by the Upper Freeport coal seam; it is primarily composed of alternating sequences of sandstone, siltstone, claystone, limestone, and minor coals. Bedrock at the Facility Site was encountered during test borings approximately 5 to 13 feet below ground surface.

According to available published geologic information, there are no underground coal mines present under or in the immediate vicinity of the Facility Site.

The overall potential for seismic activity resulting in significant damage at the Facility Site is very low. Based on information provided in a publication entitled “Earthquakes in Ohio” (ODNR Educational Leaflet No. 9, M.C. Hansen, 2000), Ohio is on the edge of what is referred to as the New Madrid Seismic Zone, an area centered in Missouri and extending into adjacent states. While at least 120 earthquakes with epicenters in Ohio have been reported since 1776, the areas of Ohio that are found to be most susceptible to seismic activity are Shelby County and surrounding counties in western Ohio, northeastern Ohio proximate to Lake Erie, and southeastern Ohio. Carroll County lies outside these locations,

approximately 25 miles from the northeastern area boundary, which is near the Portage-Stark County line.

Based on the review of geological and seismic information, geological issues are not expected to restrict Facility development in this location. The Facility will be constructed in accordance with seismic design parameters of the 2011 Ohio Building Code.

(b) Soils and Soil Suitability

Carroll County soils include Wisconsin-age sand gravel and lacustrine silt; silt loam colluvium. Based on review of the Soil Survey database for Carroll County, Ohio and the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey of Carroll County, Ohio (1981), the soil units on the Facility Site and Construction Laydown Area are mapped as: Berks shaly silt loam (BkB, BkC, and BkD, with 3 to 8 percent slopes, 8 to 15 percent slopes, and 15 to 25 percent slopes, respectively); Coshocton-Keene silt loam, 3 to 8 percent slopes (CoB); Culleoka silt loam, 3 to 8 percent slopes (CuB); eroded Elba silty clay loam, 8 to 15 percent slopes (EbC2); Glenford silt loam, 8 to 15 percent slopes (GfC); eroded Guernsey silty clay loam, 8 to 15 percent slopes (GuC2); and Westmoreland-Coshocton silt loams, 8 to 15 percent slopes (WmC) and 15 to 25 percent slopes (WmD). Each of these soil units is briefly discussed below, based on information available from the Soil Survey of Carroll County, Ohio (USDA SCS 1981), with characteristics summarized in Table 04-1. Figure 04-2 provides mapping of soils on the Facility Site and Construction Laydown Area.

TABLE 04-1
Soil Properties and Characteristics

Soil Series	Depth Below Surface (inches)	Permeability (inches per hour)	Soil pH	Potential Frost Action	Shrink-Swell Potential
BkB, BkC, and BkD	0-3	0.6-6.0	3.6-6.5	Low	Low
	3-19	0.6-6.0	3.6-6.5		Low
	19-25	2.0-6.0	3.6-6.5		Low
	25-27	--	--		--
CoB					
Coshocton	0-8	0.6-2.0	4.5-7.3		Low
	8-20	0.2-2.0	3.6-5.5		Moderate
	20-31	0.06-0.6	3.6-5.5		Moderate
	31-60	0.06-0.6	3.6-6.0		Moderate
	60-62	--	--		--
Keene	0-8	0.6-2.0	4.5-7.3	High	Low
	8-22	0.2-2.0	4.5-6.0		Moderate
	22-38	0.06-0.6	4.5-5.5		Moderate
	38-60	0.06-0.6	4.5-6.5		Moderate
	60-62	--	--		--
CuB	0-8	0.6-6.0	5.1-6.0	Moderate	Low
	8-31	0.6-6.0	5.1-6.0		Low
	31-35	0.6-6.0	5.1-6.5		Low
	35-37	--	--		--
Ebc2	0-6	0.2-0.6	5.6-7.3	Moderate	Moderate
	6-29	0.06-0.2	5.6-8.4		High
	29-71	0.06-0.2	7.4-8.4		High
	71-73	--	--		--
GfC	0.8	0.6-2.0	4.5-7.3	High	Low
	8-24	0.2-2.0	4.5-6.0		Moderate
	24-44	0.2-0.6	4.5-7.3		Low
	44-60	0.2-2.0	5.1-7.8		Low
GuC2	0-6	0.2-0.6	4.5-6.0	High	Low
	6-14	0.2-2.0	4.5-6.0		Moderate
	14-40	0.06-0.6	5.1-7.8		High
	40-69	0.06-0.6	5.1-7.8		High
	69-71	--	--		--
WmC					
Westmoreland	0-6	0.6-2.0	4.5-6.0		Low
	6-32	0.6-2.0	4.5-6.0		Low
	32-60	0.6-2.0	5.1-6.0		Low
	60-62	--	--		--

Soil Series	Depth Below Surface (inches)	Permeability (inches per hour)	Soil pH	Potential Frost Action	Shrink-Swell Potential
Coshocton	0-8	0.6-2.0	4.5-7.3		Low
	8-18	0.2-2.0	3.6-5.5		Moderate
	18-31	0.06-0.6	3.6-5.5		Moderate
	31-66	0.06-0.6	3.6-6.0		Moderate
	66-68	--	--		--
WmC					
Westmoreland	0-5	0.6-2.0	4.5-6.0		Low
	5-37	0.6-2.0	4.5-6.0		Low
	37-65	0.6-2.0	5.1-6.0		Low
	65-67	--	--		--
Coshocton	0-3	0.6-2.0	4.5-7.3	High	Low
	3-14	0.2-2.0	3.6-5.5		Moderate
	14-38	0.06-0.6	3.6-5.5		Moderate
	72-74	0.06-0.6	3.6-6.0		Moderate

Source: Tables 17 and 18 of the Carroll County Soil Survey (1981).

WmC, which covers approximately 27 percent of the Facility Site and Construction Laydown Area, is a deep, strongly sloping soil that occurs on uplands. The well drained Westmoreland soil is generally in smooth or convex areas at the summit of ridges and on the upper part of hillsides. The moderately well drained Coshocton soil is generally in smooth or concave areas at the edge of ridge tops and on the lower part of side slopes. In some areas on hillsides, the soils occur as alternating parallel bands, which are associated with different bedrock strata. Runoff is medium or rapid, permeability is moderate in Westmoreland soil and slow or moderately slow in Coshocton soil, and available water capacity is moderate in both soils. The Coshocton soil has a perched seasonal high water table found at a depth of 18 to 42 inches in winter and in spring, as well as in other extended wet periods. The root zone is deep in both soils.

BkD, which covers approximately 24 percent of the Facility Site and Construction Laydown Area, is a moderately steep, moderately deep, well-drained soil generally that occurs on hillsides. Runoff is rapid, permeability is moderate or moderately rapid, and available water capacity is very low. The root zone generally is restricted by the moderate depth to bedrock.

WmD, which covers approximately 17 percent of the Facility Site and Construction Laydown Area, is a deep, moderately steep soil that occurs on uplands. The well-drained Westmoreland soil is generally on the middle and upper parts of smooth or convex side slopes and on convex shoulder slopes on hillsides. The moderately well-drained Coshocton soil is in small seepy areas on side slopes. In some areas on hillsides, the soils occur as alternating bands, which are associated with different bedrock strata. Runoff is rapid, permeability is moderate in Westmoreland soil and slow or moderately slow in Coshocton soil, and available water capacity is moderate in both soils. The Coshocton soil has a perched seasonal high water table found at a depth of 15 to 42 inches in winter and in spring, as well as in other extended wet periods. The root zone is deep in both soils.

BkC, which covers approximately 11 percent of the Facility Site and Construction Laydown Area, is a strongly sloping, moderately deep, well-drained soil that occurs on rounded ridge tops and the upper parts of side slopes in the uplands. Areas generally are long and narrow, permeability is moderate or moderately rapid, and available water capacity is very low. Runoff is medium or rapid. The root zone generally is restricted by the moderate depth to bedrock.

GfC, which covers approximately 6 percent of the Facility Site and Construction Laydown Area, is a strongly sloping, deep, moderately well-drained soil that occurs on slack water terraces along streams. Most areas are at the base of moderately steep or steep upland side slopes. Runoff is medium or rapid, permeability is moderately slow, and available water capacity is moderate or high. A perched seasonal high water table is found at a depth of 24 to 42 inches during extended wet periods, and the root zone is deep.

CuB, which covers approximately 5 percent of the Facility Site and Construction Laydown Area, is a gently sloping, moderately deep, well-drained soil that occurs on upland ridge tops. Runoff is medium, permeability is moderate or moderately rapid, and available water capacity is low. The root zone is moderately deep.

GuC2, which covers approximately 5 percent of the Facility Site and Construction Laydown Area, is a strongly sloping, deep, moderately well-drained soil that predominantly occurs on the upper sides and convex tops of upland ridges and on saddles between ridge tops. Runoff is rapid, permeability is slow or moderately slow, and available water capacity is moderate. A perched seasonal high water table is found at a depth of 24 to 42 inches in winter and in spring and other extended wet periods, and the root zone is deep.

CoB, which covers approximately 2 percent of the Facility Site and Construction Laydown Area, is a gently sloping, deep, moderately well-drained soil that occurs on upland ridge tops as wide as 1 mile. The Coshocton soil is on the more convex slopes. These soil areas are comprised of 50 to 65 percent

Coshocton silt loam and 25 to 35 percent Keene silt loam. Runoff is medium, permeability is slow or moderately slow, and available water capacity is moderate in these soils. Both soils have a perched seasonal high water table in the middle and lower parts of the subsoil in winter and in spring and other extended wet periods, and a deep root zone.

EbC2, which covers approximately 2 percent of the Facility Site and Construction Laydown Area, is a strongly sloping, deep, well-drained soil that occurs on the upper part of side slopes and on narrow ridge tops in the uplands. Runoff is rapid, permeability is slow, and available water capacity is moderate. The soil tends to dry out slowly and to crack at the surface. The root zone is deep, but root growth is restricted somewhat by the clayey subsoil.

BkB, which covers less than 1 percent of the Facility Site and Construction Laydown Area, is a gently sloping, moderately deep, well-drained soil that occurs on the tops of ridges in uplands. Areas of this soil are typically long and narrow. Permeability is moderate or moderately rapid, runoff is considered medium, and available water capacity is very low. The root zone generally is restricted by the moderate depth to bedrock.

A preliminary geotechnical investigation has been completed at the Facility Site to determine the suitability of the subsurface soil for construction of the proposed Facility. The preliminary subsurface exploration consisted of drilling a total of 9 standard test borings (Figure 04-3). All borings were drilled within the proposed generating facility "footprint" and at the planned location of key structures within the Facility, represented as follows:

- Test Boring 1 and 1-offset – air cooled condenser
- Test Boring 2 – steam turbine generator
- Test Boring 3 – east of Test Boring 2
- Test Borings 4, 5, 6 and 7 – CTGs and HRSGs
- Test Boring 8 – water storage tank

The test borings were advanced in soils using recommended American Society for Testing and Materials (ASTM) procedures. The Standard Penetration Test soil samples were obtained in all test borings at 1.5-foot continuous samplings. A 2-inch outer diameter split spoon sampler was used to obtain the soil samples. The soil samples were visually classified and their properties evaluated. The spoon sampler was first seated for 6 inches to penetrate any loose soil, and then was driven an additional foot with blows from a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler for each 6-inch interval was recorded.

Bedrock was sampled continuously in three of the preliminary test borings (Test Boring 1-offset, 5 and 8) using a diamond bit with an NX double-tube, rigid-type core barrel, which provides a 2-inch diameter core (ASTM Designation D 2113-83). The rock core samples were visually identified in the field. The rock description, the core recovery for each interval and the Rock Quality Designation values for each lithologic unit are recorded on the test borings logs and also shown on the geologic cross-sections shown in Figures 04-4a through 04-4d that have been developed as a result of the test borings and laboratory testing.

Bedrock was encountered in all of the preliminary test borings. Estimated top of bedrock was at a depth of 5.2 to 13.5 feet below ground surface (elevations from 1,199.3 to 1,228.8 feet). Average elevation of bedrock was 1,211.1 feet.

Groundwater levels were measured in each test boring, after the boring was completed. Temporary monitoring wells consisting of 1-inch diameter polyvinylchloride (PVC) piping with a 10-foot sensing section were placed in one boring (Test Boring 5) to monitor groundwater elevations during and after the geotechnical investigation. The remainder of the borings were backfilled upon completion with bentonite chips and soil cuttings for safety reasons.

Groundwater was not encountered in Test Borings 1, 2, 3, 4, 6 or 7. Groundwater readings were recorded in Test Borings 1-offset, 5 and 8 at the termination of the drilling into bedrock. Near surface water levels in Test Borings 1-offset and 8 (taken immediately after rock coring) are most likely attributable to water used during rock coring; levels tested at Test Boring 5, which included measurement of groundwater levels 24 hours following boring completion, are considered more representative. The boring log from this location indicated water-stained fractures at 24 feet below ground surface. Water levels measured in the temporary piezometer and the stained fractures indicate that groundwater levels at the Facility Site are likely at elevations of 1,190.5 or deeper. Given the topography and geologic characteristics of the Facility Site, localized perched water tables have the potential to develop intermittently based on seasonal fluctuations in precipitation.

Due to on-site topography, cut and fill will be required for the Facility. Bedrock was encountered at a fairly shallow depth in many of the preliminary borings so it is anticipated that soil removal, rock excavation (including potential blasting), and fill placement will be necessary to prepare for the Facility.

Based on the results of the preliminary geotechnical program, geological issues are not expected to restrict Facility development. A more detailed geotechnical program will be undertaken to support final design and construction of the Facility given the potential for variability within any given site.

(5) Hydrology and Wind

(a) Characteristics of Directly Affected Waterbodies

Several unnamed tributaries to Pipes Fork extend into the Facility Site and Construction Laydown Area (see Figure 02-2). Pipes Fork and its tributaries are designated as Warmwater Habitat, Agricultural Water Source, Industrial Water Source, and Primary Contact Recreation under OAC 3745-1-07.

As shown in Figure 02-2, the majority of these tributaries extend along the boundary of the Facility Site and Construction Laydown Area, and none are located near proposed work areas. Layout and design of the Facility has established a buffer of at least 25 feet from intermittent streams and their associated wetland features; in most locations, buffering is significantly greater. Additional details characterizing wetland and streams in the Project Area can be found in the Wetland Delineation and Stream Identification Report provided in Appendix F.

No direct surface water discharges or permanent impacts to streams are proposed to result from the Facility. Accordingly, natural and the man-affected budgets for each body of water likely to be directly affected by the proposed Facility are not applicable and not included in the Application. Facility wastewater will be discharged to existing POTWs, and will comply with quality standards to support the applicable POTW's NPDES permit requirements; therefore, no impact to surface waters will result from the discharge of Facility wastewater.

Stormwater will be discharged from the Facility Site and Construction Laydown via stormwater collection ponds and utilizing BMPs to ensure that water quality standards are met and that erosion and sedimentation will be minimized and will not impact adjacent properties.

(b) Potential for Flooding or High Wind Conditions

No mapped 100-year flood hazard zones exist within the Facility Site, as shown in Figure 04-2. Stormwater will be managed on-site using appropriate BMPs, including stormwater collection ponds, such that the potential for off-site flooding will not be increased.

Figure 04-05 presents the distribution of wind speeds and directions for historic data collected at the National Weather Service (NWS) station at the Pittsburgh International Airport in Coraopolis, Pennsylvania for the years 2008 through 2012, in the form of a wind rose. This station was selected by the Ohio EPA as the NWS station most representative of the Facility Site. The prevailing wind direction, occurring approximately 14 percent of the time, is from the west;

winds from the west, west-southwest and southwest comprise nearly 40 percent of the winds observed annually. The average prevailing wind speed is 6.64 knots (7.64 miles per hour [mph]). High winds (greater than 25 mph) have occasionally been recorded at the Pittsburgh NWS station from virtually any direction, with south-southeast and south being the most prevalent.

Given the lack of 100-year flood hazard zones within the Facility Site and the average prevailing wind speed, no adverse consequences are likely from flooding or high wind conditions.

(c) Aquifer Mapping

Figure 04-6 presents a portion of a map entitled "Ground-Water Resources of Carroll County" (ODNR 1991). This map illustrates the groundwater resources throughout the entire County as well as in the immediate vicinity of the Facility Site. As Figure 04-6 shows, the Facility Site is situated in an area where groundwater yields of 3 to 10 gallons per minute (gpm) are anticipated. Higher yield areas are anticipated to be located in the northerly extent of the Project Area. The five most proximate mapped wells all indicate that they have been developed in sandstone formations. Depth to bedrock for those wells ranges from 2 to 30 feet, with well depths ranging from 170 to 269 feet and yields ranging from 8 to 20 gpm. Figure 04-7 further illustrates private water wells identified by ODNR in the area surrounding the Facility. The Facility intends to utilize water from existing providers in the area, and CCE has no plans to develop an on-site groundwater well.

(B) LAYOUT AND CONSTRUCTION

Erosion and sediment control will be established to demarcate the limit of work prior to Facility Site preparation activities. CCE has minimized the need for tree clearing by generally limiting Facility features to portions of the Facility Site currently in active agricultural use; a total of 7 acres will be required to be permanently cleared for the Facility. However, due to the sloping terrain on the Facility Site and Construction Laydown Area, an additional 7 acres of clearing will be necessary to accommodate grading for temporary purposes during construction. Clearing, installation of BMPs for erosion and sediment control, and rough grading will be completed prior to the start of major construction activity. The top approximately 1 foot of soil with significant organic matter will be removed within the Facility boundary. This material will be stockpiled and may be used later for final grading and seeding.

The access drive and the stormwater system and erosion and sedimentation controls will be installed during the initial construction phase, and the Facility Site will be graded to an elevation of approximately 1,220 feet within the power block and 1,280 feet within the switchyard.

Spoil materials from the equipment foundation will be spread within the property. Due to anticipated shallow depth to bedrock, it is anticipated that ripping or blasting of bedrock material will be required for grading and foundations. Achieving an on-site cut and fill balance is anticipated for Facility construction; however, depending on the stability of some soils encountered on-site during earthwork activities, materials may be imported and/or disposed of off-site. Construction debris will be routinely collected in containers and hauled off-site to a landfill by a licensed waste hauler.

Information regarding anticipated construction travel to the Facility Site is described in the Transportation Management Plan provided in Appendix G.

(1) Site Activities

(a) Test Borings

Preliminary test borings have been conducted at the Facility Site, as further discussed in Section 4906-13-04(A)(4), and with details provided in Appendix E. Additional geotechnical borings will be completed to support the Facility's final design and construction.

(b) Removal of Vegetation

As previously described, the areas of the Facility Site proposed for development are located in an agricultural production area that has been most recently planted with corn and soybean. Planting and harvesting of crops will be coordinated to allow Facility construction to commence.

Approximately 20 acres of forest will be altered in some way within the Facility Site and Construction Laydown Area. Of the total acreage of woods to be altered, approximately 7 acres reflects permanent footprint clearing (including for the access road and natural gas transmission corridor which must remain cleared); approximately 6 acres reflects the proposed electric transmission corridor, which will be allowed to revegetate with low-growing species; and approximately 7 acres reflects temporary work areas where vegetation will be allowed to reestablish. Note that CCE will ultimately have permanent control over only the 77-acre Facility Site and can commit only to preservation of forest on that parcel.

(c) Grading and Drainage

The Facility Site will be graded and properly sloped to facilitate drainage. Ditches, swales, and drainage structures will be provided to capture stormwater and direct it by gravity flow to on-site stormwater collection ponds. Appendix B provides additional information regarding the Stormwater Management Plan, including a preliminary grading and drainage plan.

(d) Access Roads

An access road located off Route 9 will provide ingress and egress to the Facility, as shown in Figure 02-2. The road will be designed to support construction activities. The road will be paved for Facility operations after construction is complete.

No additional roads will be needed.

(e) Removal and Disposal of Debris

Excess soil materials will be used as backfill where possible throughout the Facility Site. Debris generated during Facility construction will be collected in containers and hauled offsite to a landfill by a licensed waste hauler.

(f) Post-Construction Reclamation

Areas around the Facility not covered with concrete foundations, concrete paving, or asphalt will receive a 6-inch thick course of crushed stone or be loamed, seeded and landscaped. The unoccupied areas disrupted around the Facility during construction will be graded and seeded with native grass or stabilized in another appropriate manner immediately after construction activities are complete.

(2) Layout

The overall layout of the proposed Facility is provided on the Proposed Facility and Vicinity (Figure 02-2) and the Facility Plot Plan (Figure 02-3); additional details regarding Facility grading can be found on the Preliminary Plot Plan (Appendix A). Renderings illustrating the Facility layout are provided in Figure 02-4. A Preliminary Electrical One-Line Diagram (Figure 02-6) is also provided.

(3) Structures

(a) Dimensions

The dimensions of major structures can be seen on Figure 02-3 and are:

- STG building (approximately 85 feet wide by 158 feet long by 92 feet high);
- Two CTG enclosures (each 44 feet wide by 117 feet long by 75 feet high);
- Two HRSGs (each 50 feet wide by 140 feet long by 110 feet high), with associated 275-foot stacks;
- An air cooled condenser (approximately 211 feet wide by 300 feet long by 110 feet high);
- An air cooled heat exchanger (60 feet wide by 120 feet long by 22 feet high);
- An administration and control building (approximately 70 feet wide by 120 feet long by 20 feet high);
- An auxiliary boiler building (approximately 50 feet wide by 60 feet long by 45 feet high);

- A warehouse for spare parts and miscellaneous equipment storage (approximately 70 feet wide by 120 feet long by 30 feet high);
- A water treatment building (approximately 72 feet wide by 130 feet long by 32 feet high);
- A 1.2 million gallon fire and raw water tank (approximately 65 feet in diameter and 48 feet high);
- A 500,000 gallon demineralized water tank (approximately 44 feet in diameter and 44 feet high);
- A 100,000 gallon wastewater storage tank (approximately 26 feet in diameter and 25 feet high); and
- Two ammonia storage tanks, each with a capacity to hold 15,000 gallons of 19 percent aqueous ammonia (11 feet in diameter and 22.5 feet high).

(b) Construction Materials

The CTGs, HRSGs and STG will all be installed on reinforced concrete foundations. Enclosures and buildings utilized for the Facility will be of weatherproof metal. All materials and construction practices used will meet or exceed safe and reliable power plant engineering and design standards.

(c) Color and Texture

Final design colors and textures have not been selected, however, neutral-colored coatings will be used on exposed surfaces for aesthetic appeal, and ribbed siding materials will be used for metal enclosures.

(d) Pictorial Sketches

Computer generated color renderings of the Facility are included as Figure 02-4.

(e) Unusual Features

No unusual characteristics are incorporated into the design and final appearance of the proposed Facility.

(4) Plans for Construction

Initial construction activities will commence following certification by the OPSB and receipt of other environmental permits and required approvals. Facility Site preparation and demolition, grading, Facility Site access, stormwater management, and underground utilities will be completed, followed by equipment foundations.

As equipment foundations are completed, CTGs, tanks, pumps and electric equipment will be installed. During this same period, electrical cable, piping, and pre-engineered metal buildings will be installed. As the various equipment components are installed, system checkout and testing activities will be performed to ensure the Facility conforms to design specifications. After completing checkout, inspection and testing activities, the Facility will be started up for operation.

In conjunction with initial start-up and testing of the Facility, finish coatings, insulation, paving and landscaping activities will be completed.

(5) Future Plans

There are no plans for future addition of generating units at this location.

(C) EQUIPMENT

(1) Description of Major Generating Equipment

The major equipment at the Facility will include two CTGs, rated at 2,046 MMBtu/hr at 59°F,[3] with natural gas as the exclusive fuel; evaporative coolers for inlet air cooling; two three-pressure-level HRSGs; two 566 MMBtu/hr natural gas-fired duct burners; and one multi-stage reheat-capable, condensing STG. The STG will be located within a building. An auxiliary steam boiler, rated at 99 MMBtu/hr will be used as needed to keep the HRSGs warm during periods of Facility shutdown and provide steam to the STG during start-ups. The Facility will also include three transformers that will step up generator output from 18 kV to 345 kV for connection to the AEP transmission system.

The Facility will utilize an air cooled condenser for condensing steam from the STG and an air cooled heat exchanger for cooling auxiliary equipment.

(a) Combustion Turbine Generators

Two advanced technology GE 7F 5-Series CTGs will be provided. The CTGs will be capable of delivering electric power in continuous operation and include all associated auxiliary systems and accessory equipment. Evaporative coolers will be supplied for cooling inlet air. The CTGs will be equipped with a DLN combustor for turbine exhaust emission control. The HRSGs will be equipped with SCR to minimize NO_x and an oxidation catalyst to minimize CO and VOC emissions. Facility emissions under all operating conditions will comply with permit requirements.

[3] All values in the Application are HHV unless otherwise noted.

(b) Steam Turbine Generator

The STG will be a multi-stage, reheat capable, condensing steam turbine. The unit will include all of the associated auxiliary systems and accessory equipment. The STG's maximum rated output is approximately 342 MW at 59°F.

(c) Heat Recovery Steam Generators

One HRSG will be provided for each CTG to recover the waste heat from gas turbine exhaust and then generate steam. The HRSG will be a duct-fired three-pressure level, natural circulation design with steam reheat and superheater sections, complete with steam attemperators. SCR will be installed for NO_x control in each HRSG. Each HRSG will be equipped with an ammonia injection grid and associated 15,000-gallon aqueous ammonia storage tank. Additionally, an oxidation catalyst shall be provided for CO and VOC control. All associated auxiliary systems and accessory equipment, as well as a 275-foot exhaust stack for each unit, will be provided.

(d) Natural Gas System

The metering station will not be located on-site, but will be proximate to the natural gas pipeline tap. Electric dew point heaters and a knock-out drum will be provided to remove any liquids that may be present in the gas. Filter/separators will further treat the natural gas by removing any debris or liquids prior to entering the turbines. The auxiliary steam boiler and duct burners will use low-pressure natural gas.

(e) Steam System

The steam system will consist of steam drums, super-heaters and economizers, steam piping to and from the steam turbine, steam turbine bypass piping, steam piping to gland seal and steam jet air ejector systems, and solids and chemistry control. No export steam will be produced at this Facility. Steam generated by the auxiliary boiler will be used as needed to keep the HRSGs warm during periods of Facility shutdown and provide steam to the STG during start-ups.

(f) Condensate System

The condensate system will be designed to provide water sufficiently deaerated and with the proper water chemistry to meet HRSG and steam turbine requirements. The system will provide sufficient capacity for operation over the entire ambient range, and also supply water to the auxiliary boiler.

(g) Feedwater System

Boiler feedwater will be supplied by a three-element feedwater control system for each section of the HRSG. Chemical treatment of the boiler feedwater will be accomplished using chemical feed equipment. Although the particular treatment program for this Facility has not yet been determined, a typical program could include corrosion inhibitor injected to the HRSG steam drums; oxygen scavenger injected into the HRSG; and pH control amine injected into the boiler feedwater pump suction piping.

(h) Air Cooled Condenser

An air cooled condenser will be used to condense steam from the STG. Discharged steam will enter a steam distribution manifold located on top of the air cooled condenser structure. The steam will be distributed into heat exchangers. Flowing down inside the heat exchanger tubes, steam will condense back into water by the cooling effect of ambient air being drawn over the heat exchanger surface by the fans.

(i) Closed Loop Auxiliary/Cooling Water System

The air-cooled closed loop auxiliary cooling water system provides cooling for auxiliary equipment. The system will utilize demineralized water with corrosion inhibitor and freeze protection or a glycol-based solution.

(j) Fire Protection System

A complete fire protection/detection system will be provided for the Facility. The system will include fixed water fire suppression systems, fire hose stations, hydrants, portable fire extinguishers, detection and control systems. The system will include an electric motor driven fire water pump and a backup diesel engine driven fire water pump (an approximately 50-gallon double containment oil storage tank will be integrated into the unit). The diesel driven fire water pump will use ULSD. It will be designed and installed in accordance with NFPA standards and insurer's recommendations. All fire protection equipment and systems will be UL approved, and will comply with requirements of the local fire protection authority and CCE's insurance carrier.

(k) Water System

Water for the Facility will be provided by existing water sources in the area, such as the Village of Malvern, the Village of Carrollton, or other entities in the business of supplying water. Water will be piped the Facility, where CCE will tie into the supplier's piping system. Water balances depicting the Facility uses and flows are shown in Figures 02-5a and 02-5b.

(l) Demineralizer

Demineralized water is supplied for use as makeup water to the steam cycle to replace water lost as a result of boiler blowdown. Water will be processed by the demineralizer system through a reverse osmosis process, which will remove the dissolved solids to the level required by the HRSG and steam turbine manufacturer's requirements. The product from the demineralizer system will be sent to the demineralized water storage tank. The demineralized water storage tank will provide demineralized water for condenser hot-well makeup, and will be of sufficient size so as to allow normal Facility operations without excessive cycling of the demineralized water system. Demineralizer regeneration waste will be equalized and neutralized in a fiberglass tank before being removed for off-site disposal. Demineralizer reject water will be included in Facility wastewater discharged to the POTW.

(m) Wastewater System

A regeneration waste neutralization system will receive the regeneration wastes from the demineralized waste system and the chemical waste sump. This system will equalize and adjust the pH through the addition of acid and caustic

before off-site removal to an approved disposal location. Process wastewater from equipment drains will be routed through an oil/water separator, then recycled through the water system to conserve water to the greatest extent possible. Any oils remaining in the oil/water separator will be removed by qualified contractors. Boiler blowdown and reverse osmosis wastewater discharge will also be recycled through the water system to the extent possible. Sanitary waste and process wastewaters will be discharged to a pipeline provided by the selected wastewater treatment service provider. It is anticipated that either the BTM Sewer District POTW (CCES/Malvern) or the Village of Carrollton POTW will supply the pipe and service to the Facility. The Facility's wastewater will be treated to comply with applicable POTW NPDES discharge standards.

Stormwater will be routed to on-site stormwater collection ponds to maintain acceptable rates of runoff from the Facility Site (Appendix B).

(n) Backup Generator

A 1,491 hp diesel engine driven generator capable of producing 1,112 kW of electricity will be provided and designed to safely shut the Facility down in the event of a disruption of power delivery. The generator will provide power to essential services necessary to protect the equipment. ULSD will be utilized, which will be stored in an approximately 500-gallon double containment tank integrated into the equipment skid.

(o) Transformers and Switchyard

Electrical power will be generated by the Facility at a voltage level of 18 kV and then stepped-up to a voltage level of 345 kV by transformers to be

located adjacent to the power block. Each step-up transformer will be oil-filled with low voltage windings sized for the maximum output of each generator. The transformers will be provided with no load tap changers and surge arresters. In addition to the main step-up transformers, two auxiliary transformers will provide power for Facility loads.

The on-site switchyard will be configured in a breaker and one half bus arrangement operated as a ring-bus, and include 345 kV metering, supervisory control and data acquisition (SCADA) systems, and associated equipment.

(2) Emissions Control and Safety Equipment

(a) Flue Gas Emissions Control

The DLN combustors in the CTGs, coupled with SCR in the HRSGs, will limit Facility NO_x emissions to a level that meets those specified in the Facility air permit that has been issued by the Ohio EPA. The exclusive use of natural gas in the CTGs, combined with state-of-the-art combustion control/optimization, will minimize emissions of other pollutants. Power consumption and operating costs associated with major flue gas emission control equipment are integrated into the overall Facility costs.

SCR is an air pollution control technology that is used to remove NO_x from the flue gases that are produced during combustion of fossil fuels in turbines or boilers. SCR removes NO_x through a catalyzed chemical reduction of NO_x and ammonia that is introduced as a reactant in the flue gas in the presence of excess oxygen (O_2). This reaction generates nitrogen gas and water as the reduced

end-products that are ultimately emitted from the stacks to the atmosphere. The resulting NO_x emissions will be controlled to 2 ppm_{vd} corrected to 15 percent O_2.

The HRSG will also be equipped with an oxidation catalyst for control of CO, which will be controlled to 2 ppm_{vd} and VOC which will be controlled to 1 ppm_{vd} without duct firing and 2 ppm_{vd} during duct firing.

A CEMS will be provided for each HRSG with sample porting located on the corresponding HRSG stacks. The CEMS will continuously extract flue gas samples from both units near the HRSG exhaust and measure flue gas parameters. The parameters subject to CEMS measurement are specified in the Ohio EPA air permit, and will include NO_x, CO and O_2.

(b) Equipment Reliability and Efficiency Reduction

The reliability of the DLN system, because it is an integral combustion turbine component, exceeds combustion turbine reliability. A failure of a DLN combustor would require that the respective turbine be shut down. The oxidation catalyst is similarly integral to overall Facility operation. The SCR system is of high reliability. Ceramic block life span varies by manufacturer, with replacement normally completed during a regularly scheduled preventative maintenance outage lasting a couple of days. The CEMS will detect a deterioration of performance well before a failure of the catalyst occurs. At no time will a unit operate if its respective SCR is not functioning properly.

(c) Effluent Control Equipment

The Facility will not have a direct discharge of wastewater to a surface water body. The Facility will be designed with appropriate treatment and

equipment to ensure that no indirect impact will occur and that all applicable pretreatment standards are met when discharging to existing POTWs.

A regeneration waste neutralization system will receive the regeneration waste from the demineralizer system. This system equalizes and adjusts the pH by the addition of acid or caustic to comply with discharge limits.

Equipment drains will be routed through an oil/water separator. Waste oil and equipment wash solutions will be collected and removed by a qualified waste contractor. Process and sanitary wastewater will be directed to a POTW via a sewer line to be provided along Route 9 by either CCES or the Village of Carrollton. Stormwater will be routed to on-site stormwater collection ponds prior to discharge.

(d) Public Safety Equipment

There will be no uncontrolled public access to the proposed Facility. A security fence will be installed around the Facility with card-activated gates and Facility operator access control. Occupational, Safety and Health Administration (OSHA) requirements will be implemented to ensure worker safety during Facility construction and operation, for example, NFPA 56 (PS) "Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Pipeline System," which requires that only inert gases or compressed air be used for all cleaning of pipes.

Safety is extremely important to CCE, and additional procedures will be put in place prior to initiation of construction in order to anticipate and prepare for potential emergencies. An Emergency Response Plan will be prepared prior to

construction mobilization and will be designed and written to assist the Facility's management, employees and outside responding entities through emergency response actions at the Facility. The plan will be developed in consultation with Carroll County and local emergency responders to address different types of potential emergencies; emergency resources (equipment or personnel); levels of emergency response; principles to be applied during a response; detailed measures for initial response, containment, rescue, first aid and evacuation; termination of an emergency; notification procedures; drills and training; and the process for updating and modifying emergency procedures.

Prior to mobilization for Facility construction, CCE and its construction contractor will conduct the following activities as a component of Emergency Response Plan development:

- Interview occupational medical clinics within the vicinity of the Facility Site to select the one best suited based upon location, quality of care and commitment to injury management principles.
- Work closely with all local providers of emergency medical response to assess response times and capabilities of each responder. The assessment will include capabilities to rescue from heights. Cranes and aerial lifts will be provided during construction if such capabilities are not in place.
- Survey area hospitals to verify services and other details as an occupational health safeguard. The location of the nearest trauma center will also be verified.

- Conduct a site visit with local law enforcement agencies to formally initiate the construction process and familiarize local authorities with the schedule, planned activities, and other relevant details.

During construction, there will be on-site security staff to secure the Facility Site and construction materials. Police service may be needed for limited traffic control during construction, and will be compensated, thereby not incurring additional operating or infrastructure costs. The Emergency Response Plan utilized during construction will be modified to reflect operational conditions, and similar detailed review of procedures and resources will occur to ensure appropriate measures are in place. In addition, the Emergency Response Plan will incorporate fire protection, detection and alarm systems for use throughout the construction process. This will include classification of various hazard areas, and providing adequate fire water and other fire-fighting systems to address various fire situations. Class "A" fires (ordinary combustibles), Class "B" fires (flammable liquid or gas) and Class "C" fires (electrical) will all be addressed.

(3) Other Major Equipment

The major equipment not addressed in Sections 1 and 2 above are described below.

(a) Combustion Turbine Air Inlet Coolers

Combustion air inlet coolers provide evaporative cooling of inlet air by circulating water over a fill material in the inlet housing of the combustion turbine. Cooling the inlet air makes the combustion turbines produce more power

and operate more efficiently. These units will typically be operational at ambient temperatures above approximately 59°F.

(b) Auxiliary Boiler

During initial start-up or during turbine downtime over a short duration (i.e., with no cold reheat or high pressure steam available), auxiliary steam is provided by the auxiliary boiler. The auxiliary boiler is fired by natural gas from the natural gas system and will have a maximum input capacity of 99 MMBtu/hr. Makeup water for the auxiliary boiler is supplied from the demineralized water system, with the water deaerated by the auxiliary boiler de-aerator.

The auxiliary boiler provides steam until the HRSG has sufficient pressure to supply the needs of the auxiliary steam system. At that point, the auxiliary boiler can be shut down.

(c) Natural Gas Heaters

An electric natural gas performance heater will be provided for each CTG and an electric natural gas dewpoint heater will be provided in the natural gas yard.

(d) Oil/Water Separator

An oil/water separator will be provided to remove hydrocarbon materials and sediment from equipment drains.

(D) REGIONAL ELECTRIC POWER SYSTEM

The Facility will interconnect with the existing AEP 345 kV transmission lines located approximately 0.4 mile west of the Facility Site, as shown in Figure 02-2. PJM

has assigned the Facility queue position Y2-050.[4] The PJM Feasibility Study (Appendix C) was completed in March 2013, with the System Impact Study (Appendix D) completed in November 2013

[4] http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx

(A) OWNERSHIP

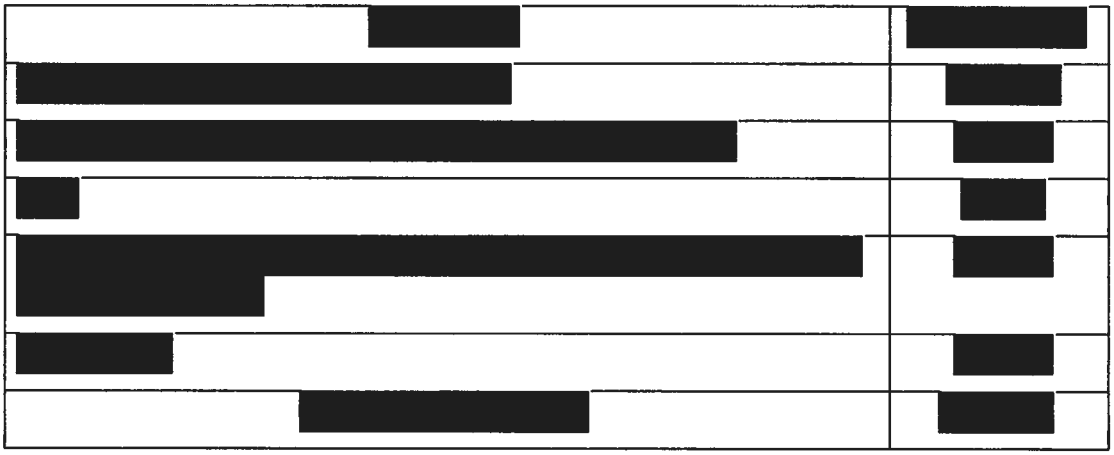
CCE will develop, construct, own and operate the proposed Facility. CCE currently has an option to purchase the 77-acre Facility Site on which it proposes to construct the Facility and use of a 23-acre Construction Laydown Area. Also, CCE has options to purchase electrical transmission, natural gas pipeline, access roads and utility easements. After development, CCE will construct, own and operate all Facility Site equipment and structures. Carroll County Energy LLC is within the corporate organizational structure of Advanced Power. Advanced Power is owned by Advanced Power management and 3i, a London-based investment company.

(B) CAPITAL AND INTANGIBLE COSTS

(1) Estimated Capital and Intangible Costs

Table 05-1 presents estimated capital and intangible cost information for development and construction of the Facility. Information on alternatives to the Facility is not applicable, as no Facility alternatives were considered.

TABLE 05-1
Estimated Capital and Intangible Costs ($1,000 nominal)



(2) Capital Cost Comparison

Neither CCE nor Advanced Power own other operating natural gas-fired combined-cycle power plants built with technologies identical to that of the Facility.

The April 2013 U.S. Energy Information Administration (EIA), "Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants"[5] study of capital costs of similar Conventional Combined Cycle designs reports a cost of $917/kW. These capital cost estimates are based on 2012 dollars. The costs of the proposed Facility are comparable with the EIA study findings when adjusted for inflation and other costs not considered in the report.

The Facility all-in capital cost estimate is also comparable with the cost estimates of other natural gas-fired combined-cycle projects under development in Ohio. For example, the Oregon Clean Energy Center recently reviewed by OPSB was estimated at $1,075/kW.

(3) Present Worth and Annualized Capital Costs of Alternatives

No Facility configuration alternates are presently being considered and, thus, no comparisons can be developed.

(C) OPERATION AND MAINTENANCE EXPENSES

(1) Estimated Annual Operation and Maintenance Expenses

(a) Fixed Operation and Maintenance

CCE estimates the fixed operation and maintenance (O&M) expense for Year 1 and Year 2 of operations to be [redacted] per year.

[5] EIA Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants, April 2013 http://www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf

(b) Variable Operation and Maintenance

CCE estimates the non-fuel variable O&M expense to be [redacted] per megawatt-hour (MWh) in Year 1 and Year 2 of operation. Assuming the estimated variable operating cost of [redacted]/MWh and a [redacted] percent capacity factor (CF) for the Facility (without duct firing), CCE estimates the total non-fuel O&M cost for Year 1 and Year 2 is approximately [redacted].

(c) Fuel Operating Expense

CCE estimates natural gas costs to be [redacted]/MMBtu in Year 1 and Year 2 of operations. Assuming the estimated natural gas cost of [redacted]/MMBtu and a [redacted] percent CF for the Facility (without duct firing), CCE estimates the total fuel costs for Year 1 and Year 2 would be [redacted].

(2) Operation and Maintenance Expenses Comparison

As discussed in Section 4906-13-05(B)(2), neither CCE nor Advanced Power own other operating natural gas-fired combined-cycle power plants built with technologies identical to that of the Facility.

The April 2013 ScottMadden Management Consultants[6] study on non-fuel operations and maintenance expenses of similar Conventional Combined Cycle designs reports a range of costs between $1.70 and $6.40 per MW-hr for a majority of modern combined-cycle natural gas turbines during the last 5 years of operations. These estimates include fixed and variable non-fuel O&M costs. The total fixed and non-fuel operations

[6] ScottMadden Management Consultant, Combined Cycles, Middle Age Myths, April 2013, http://www.scottmadden.com/insight/617/Combined-Cycles.html

and maintenance costs of the proposed Facility are comparable with the Scott Madden study findings.

The Facility fixed and variable cost components are also comparable with the cost estimates of other natural gas-fired combined-cycle projects under development by Advanced Power throughout the United States.

(3) Present Worth and Annualized Operation and Maintenance Expenses for Alternatives

No Facility alternate O&M regimes or technology configurations are presently being considered and, thus, no comparisons can be developed.

(D) DELAYS

Delays in Facility permitting could jeopardize CCE's ability to participate in the May 2017/2018 PJM RPM Base Residual Auction and delay the Facility's projected in-service date of May 1, 2017. Delays of this nature would result in significant costs including losses in projected energy revenue, losses in capacity revenues, performance penalties associated with PJM RPM market participation and potential additional costs to ratepayers.

A significant portion of the Facility's annual energy revenues are associated with summer operation, including the months of June, July, August and September. This is due to the fact that electricity consumption and the value of energy is highest during these months. Lost energy revenues during these months would be on the order of [redacted] per month.

Another significant portion of the Facility's annual revenues are a result of participation in the PJM capacity market. Based on capacity prices for 2016/17 PJM

RPM base residual auction, lost capacity revenues would be on the order of [redacted] per month. Further, if CCE participated in the 2017/18 PJM RPM Base Residual Auction as planned and was not able to achieve the in-service date due, CCE would be assessed a 20 percent penalty (equating to approximately [redacted] per month).

Finally, a delay in the in-service date would jeopardize the Facility's ability to meet peak summer demand and provide capacity that may be necessary due to planned retirements. A total of 6.3 GW of generation has announced retirement in Ohio. These units include Ashtabula (244 MW), Avon Lake, (721 MW), Bay Shore (495 MW), Eastlake (1,233 MW), Miami Fort 1-4 (163 MW), Muskingum River 1-5 (1,375 MW), Niles (216 MW), O.H. Hutchings (365 MW), Picway (100 MW), and Walter C. Beckjord (1,180 MW). CCE is proposing a significant generation Facility that will begin to replace some of the loss of generation capacity. Without adequate replacement reliability issues and higher PJM capacity and energy pricing may occur and impact Ohio ratepayers.

(A) GENERAL

This section provides an assessment of the environmental effects specifically relating to air quality, water quality, and waste generation/disposal associated with the proposed Facility. Instances where existing data have been substituted for physical measurements are indicated, as applicable, below.

(B) AIR

(1) Preconstruction

(a) Description of Ambient Air Quality

The Ohio EPA collects air quality data (ambient air pollutant concentrations) at a number of monitoring locations throughout the state of Ohio. Data collected from air quality monitoring sites are used, in part, to verify attainment of the NAAQS. NAAQS exist for the following criteria air pollutants: ozone (O_3), SO_2, PM_{10}, $PM_{2.5}$, nitrogen dioxide (NO_2), CO, and lead (Pb). The Facility Site is within an area classified as "attainment" (of the NAAQS) for all criteria pollutants pursuant to 40 Code of Federal Regulations (CFR) Part 81.

The most representative air quality monitoring locations and the ambient background concentrations for the Facility based on the most recent full year of measurements at those locations (Background Concentrations) were provided by the Ohio EPA for the criteria pollutants addressed in the air permit application. The Background Concentrations for O_3 and Pb were obtained from the Ohio Annual Air Quality Report for 2011. Table 06-1 summarizes the Background Concentrations by criteria pollutant, and Table 06-2 compares the Background

Concentrations to the NAAQS. The Background Concentrations are based on measurements taken at monitoring station locations determined by Ohio EPA to be the most representative of air quality in the Facility area. The monitoring station locations are discussed in Section (B)(1)(e) below. Figure 06-1 shows the location of each monitoring station with respect to the Facility Site.

TABLE 06-2
Background Air Quality Monitoring Stations

Pollutant	Station Location	Station ID
O_3	618 Logan Street, Steubenville, Jefferson County	39-081-0017
SO_2	527 Crescent Street, Sugarcreek, Tuscarawas County	39-157-0006
PM_{10}	2220 Michigan Avenue, East Liverpool, Columbiana County	39-029-0020
$PM_{2.5}$	420 Market Avenue, Canton, Stark County	39-151-0020
NO_2	7760 Blackburn Road, Athens, Athens County	39-009-0004
CO	420 Market Avenue, Canton, Stark County	39-151-0020
Pb	1330 Dueber Avenue, Canton, Stark County	39-051-0017

TABLE 06-3
Background Air Quality Data

Pollutant	Averaging Period	Background Concentration	NAAQS
O_3	8-hour	0.068 ppm	0.075 ppm
SO_2	3-hour	144.1 $\mu g/m^3$	1,309 $\mu g/m^3$
	1-hour	144.1 $\mu g/m^3$	196 $\mu g/m^3$
PM_{10}	24-hour	19.3 $\mu g/m^3$	150 $\mu g/m^3$
$PM_{2.5}$	24-hour	23.1 $\mu g/m^3$	35 $\mu g/m^3$
	Annual	11.28 $\mu g/m^3$	12 $\mu g/m^3$
NO_2	Annual	5.9 $\mu g/m^3$	99.7 $\mu g/m^3$
	1-hour	44.9 $\mu g/m^3$	188 $\mu g/m^3$
CO	1-hour	2,398 $\mu g/m^3$	40,000 $\mu g/m^3$
	8-hour	1,827 $\mu g/m^3$	10,000 $\mu g/m^3$
Pb	Rolling 3 month avg	0.015 $\mu g/m^3$	0.15 $\mu g/m^3$

$\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million

The following subsections summarize background air quality by pollutant.

Ozone – Ozone differs from the other criteria air pollutants in that it is not directly emitted into the atmosphere. Instead, O_3 is produced photochemically in the lower atmosphere from the reaction of NO_x and VOC in the presence of sunlight. Emissions of NO_x and VOC participate in a series of photochemical reactions to form O_3 and other photochemical oxidants in the lower atmosphere. Ohio EPA selected a monitoring location in Steubenville as most representative of background O_3 concentrations at the Facility Site.

Sulfur Dioxide – Sulfur dioxide is formed by the oxidation of sulfur in fuel during combustion. Ohio EPA selected a monitoring location in Sugarcreek, Tuscarawas County, as being most representative of background SO_2 concentrations at the Facility Site.

Particulates – PM_{10} is defined as any liquid (aerosol) or solid substance found in the atmosphere with a diameter less than 10 micrometers (microns). Common forms of suspended particulate matter are fly ash, process dusts, soot, and oil aerosols. Industrial processes, electric power generation, industrial fuel combustion, and dust from plowed fields, roadways, or construction sites are examples of major sources of PM_{10}. Ohio EPA selected a background monitor in East Liverpool, Columbiana County as being most representative of PM_{10} levels at the Facility Site.

$PM_{2.5}$ is defined as any aerosol or solid substance found in the atmosphere with a diameter less than 2.5 microns. Sources and forms of $PM_{2.5}$ are similar to PM_{10}, but the particle sizes are smaller. The Ohio EPA selected a background monitor in Canton, Stark County, as providing a conservative estimate of background $PM_{2.5}$ levels expected at the Facility Site.

Nitrogen Dioxide – Oxides of nitrogen are formed in a high temperature combustion process when nitrogen in the air is oxidized to nitric oxide (NO) or NO_2. Because the predominant form of NO_x is NO_2, the NAAQS are expressed in terms of NO_2. Major sources of NO_2 are high temperature fuel combustion, motor vehicles, and certain chemical processes. Currently only three NO_2 monitors are operated in Ohio. The Ohio EPA selected a monitor located in Athens, Ohio as being most representative of background NO_2 levels at the Facility Site.

Carbon Monoxide – CO is produced by the incomplete combustion of carbon-containing fuels, primarily in the internal combustion engine. CO is a general urban pollutant that is produced mainly from transportation vehicles. Ohio

EPA selected a monitoring location in Canton, Stark County, as providing a conservative estimate of CO concentrations at the Facility Site.

Lead – Sources of airborne lead include lead smelting facilities, lead-acid storage battery manufacturing plants, and other manufacturing operations. The Pb monitoring stations in Ohio are generally located in the vicinity of lead emission sources. Ohio EPA selected a monitoring station in Canton, Stark County, as a conservative estimate of Pb concentrations at the Facility Site.

(b) Description of Pollution Control Equipment

A review of the air emissions and controls for the proposed Facility is presented below for each of the PSD-regulated pollutants (SO_2/H_2SO_4, $PM_{10}/PM_{2.5}$, NO_x, CO, VOC, and GHG). The maximum exhaust temperature was modeled at 206.15°F.

Sulfur Dioxide/H_2SO_4 – Sulfur dioxide and H_2SO_4 are formed by the reaction of sulfur found in fuel with oxygen from the combustion air. A small amount of the sulfur in fuel may be converted to sulfate, which together with SO_2 is referred to as sulfur oxides; a small portion of the sulfur oxides can, in turn, react with water to form H_2SO_4. Clean-burning natural gas has only trace quantities of sulfur. An SO_2 emission limit of 0.0029 pounds per million British thermal units (lb/MMBtu),[7] both with and without duct burning, is proposed as BACT for the CTGs; an H_2SO_4 emission limit of 0.0016 lb/MMBtu with duct firing and 0.0012 lb/MMbtu without duct firing is proposed as BACT for the CTGs. This level of emissions will be achieved by combusting natural gas with a

[7] All emission rates are expressed as HHV and at 59°F conditions unless otherwise stated.

maximum sulfur content of 1.0 grain per 100 standard cubic foot by weight in the CTGs. This emission level is consistent with the limits and control technologies in BACT determinations for previously licensed similar facilities.

An SO_2 emission limit of 0.0029 lb/MMBtu and an H_2SO_4 emission limit of 0.00022 lb/MMBtu are proposed as BACT for the auxiliary boilers. This limit is consistent with other BACT determinations for this type of equipment. The use of pipeline quality natural gas is BACT for SO_2 and H_2SO_4.

Particulate Matter – Particulate matter emissions result from trace quantities of ash (non-combustibles) in the fuel and formation of ammonium sulfate salts from unreacted ammonia from the SCR system. Particulate emissions for the CTGs, duct burners, and the auxiliary boiler are minimized by exclusive use of clean-burning natural gas as the sole fuel in conjunction with good combustion practices. A $PM_{10}/PM_{2.5}$ emission limit of 0.0061 lb/MMBtu without duct burning and 0.0076 lb/MMBtu with duct burning is BACT. This level of emissions will be achieved by combusting only natural gas in the CTGs.

A $PM_{10}/PM_{2.5}$ emission limit of 0.008 lb/MMBtu is proposed for the auxiliary boiler. The use of clean-burning natural gas, in conjunction with good combustion practices, is BACT for $PM_{10}/PM_{2.5}$.

Nitrogen Oxides – Nitrogen oxides are formed in the turbine combustion chamber during high temperature natural gas firing primarily as a result of the reaction between nitrogen and oxygen present in the combustion air (thermal NO_x). The combustion turbine and duct burner utilize DLN combustors which are integrated within the CTGs. The DLN combustion controls NO_x formation by pre-

mixing natural gas and air immediately prior to combustion. Pre-mixing inhibits NO_x formation by minimizing both the flame temperature and the concentration of oxygen at the flame front.

SCR, a post-combustion chemical process, will be installed in the HRSGs to treat exhaust gases downstream of the CTGs. The SCR process will use 19 percent aqueous ammonia as a reagent. Aqueous ammonia will be injected into the flue gas stream, upstream of the SCR catalyst, where it will mix with NO_x. The catalyst bed will be located in a temperature zone of the HRSG where the catalyst is most effective. The mixture will pass over the catalyst and the NO_x will be reduced to nitrogen gas and water. The SCR system will reduce NO_x concentrations to 2.0 ppm_{vd} at 15 percent O_2 with or without duct firing at all load conditions and ambient temperatures. A small amount of ammonia will remain un-reacted through the catalyst, which is called the "ammonia slip." The ammonia slip will be limited to 5.0 ppm_{vd} at all load conditions and ambient temperatures.

NO_x emissions will increase during limited periods of start-up and shutdown due to less efficient combustion at these loads. Additionally, the SCR unit is not operational during start-up and shutdown until the turbine exhaust reaches the operating temperature window required by the SCR. The use of DLN and SCR reflects BACT for NO_x.

The proposed auxiliary boiler will also minimize NO_x emissions to 0.02 lb/MMBtu using low NO_x burners and clean-burning natural gas as the sole fuel. This meets BACT for NO_x.

Carbon Monoxide – Carbon monoxide emitted from combustion turbines is a product of incomplete combustion of the natural gas. An oxidation catalyst system will be located within each HRSG to control emissions of CO. Exhaust gases from the CTGs will be passed over a catalyst bed where excess air will oxidize the CO. The oxidation catalyst system will reduce CO concentrations to 2.0 ppm_{vd} (at 15% O_2) in the exhaust gas under all dispatch conditions. The use of oxidation catalyst meets BACT for CO.

BACT for the auxiliary boiler, proposed as an emission limit of 0.055 lb/MMBtu, will be met using good combustion practices.

Volatile Organic Compounds – Volatile organic compounds emitted from the combustion turbines, duct burners, and auxiliary boiler are products of incomplete combustion of the natural gas. The use of an oxidation catalyst system within each HRSG will control VOC emissions. Exhaust gases from the combustion turbines will be passed over a catalyst bed where excess air will oxidize the VOCs. The oxidation catalyst will reduce VOC emissions to 1.0 ppm_{vd} without duct firing and 2.0 ppm_{vd} with supplemental duct firing. The use of an oxidation catalyst system is BACT for combustion turbines.

For the auxiliary boiler, VOC emissions will be limited to 0.006 lb/MMBtu. Use of clean-burning natural gas as the sole fuel is BACT for auxiliary boiler.

Greenhouse Gases – When considering emissions of GHG, the focus is on CO_2 emissions, as other GHGs form a negligible percentage of associated emissions. The Facility will utilize combined-cycle technology, which provides

greater power output per fuel input, and will burn natural gas exclusively. BACT for GHG has been determined to be a heat rate of 7,350 Btu/kWh (full load conditions at 59°F without duct firing) and 859 pounds (lb) CO_2 per MWh gross output (at 59°F).

GHG BACT for the auxiliary boilers is efficient combustion and use of a low-carbon fuel, natural gas. The natural gas fired boiler proposed for the Facility will be state-of-the-art and, thus, have a combustion efficiency reflective of new equipment.

(c) Description of Regulatory Applicability

Prevention of Significant Deterioration Review and New Source Review – New major stationary sources of air pollution and major modifications to major stationary sources of air pollution are required by the Clean Air Act to obtain an air pollution permit before commencing construction. This process is called New Source Review (NSR) and is required whether the major source or modification is planned for an area where the NAAQS are exceeded (i.e., nonattainment area) or an area where air quality is better than the NAAQS or cannot be classified (i.e., attainment and unclassifiable areas). Air construction permits for sources in attainment areas are referred to as PSD permits; air construction permits for sources in nonattainment areas are referred to as nonattainment NSR permits. The entire program, including both PSD and nonattainment NSR permits, is referred to as the NSR program. The USEPA has delegated full authority to issue PSD and nonattainment NSR permits to Ohio EPA.

Regulations adopted and administered by Ohio EPA for PSD and nonattainment NSR are codified in the OAC Chapter 3745-31, Permit to Install New Sources of Pollution. OAC Chapter 3745-31 provides requirements for obtaining a Permit-to-Install (PTI) for industrial processes. The requirements in this chapter incorporate the provisions of the federal PSD and nonattainment NSR programs as defined in 40 CFR Parts 51 and 52.

The NSR requirements are pollutant-specific. Even though a source may emit many types of air pollutants, only specific pollutants may be governed by the NSR, depending on the magnitude of the emissions of each pollutant. Moreover, a source may have to obtain both PSD and nonattainment NSR permits if it is located in an area that is designated attainment for one or more pollutants and nonattainment for other pollutants. Carroll County, Ohio has been designated or is treated as attainment for all criteria air pollutants. Because the area is attainment for all air pollutants, only PSD review applies to the Facility.

The NSR program requires that an applicability determination be conducted for any proposed source (either new source or modification of an existing source) to see if it will be subject to PSD pre-construction review. Three basic criteria must be evaluated when making a PSD applicability determination. These criteria are the magnitude of the emissions for a new or modified source, location in an attainment or nonattainment area, and the pollutants released.

A combined-cycle power generating facility is listed as one of USEPA's 28 named source categories and is considered a major new source under PSD regulations if it has the potential to emit 100 tons per year (tpy) or more

(including fugitive emissions) of a regulated air pollutant. The Facility has the potential to emit more than 100 tpy of the regulated pollutants NO_x, $PM_{2.5}$, PM_{10}, and CO and is, therefore, subject to review for these pollutants under PSD regulations.

Once a facility is subject to review under the PSD regulations by exceeding the major source threshold for at least one pollutant, PSD review encompasses each attainment air pollutant that can be emitted at rates greater than the Significant Emission Rates listed in 40 CFR 52.21 and OAC Rule 3745-31-01(MMMMM). Based on potential emission estimates, the Facility is subject to PSD review for several regulated air pollutants. The air pollutants subject to PSD review and their significant emissions rates include NO_x (40 tpy); CO (100 tpy); PM_{10} (15 tpy); $PM_{2.5}$ (10 tpy); SO_2 (40 tpy); VOC (40 tpy); and the regulated non-criteria pollutant H_2SO_4 (7 tpy).

On April 2, 2007, the U.S. Supreme Court found that GHG, including carbon dioxide (CO_2), are air pollutants covered by the Clean Air Act. On May 13, 2010, the USEPA issued a final rule (called the "Tailoring Rule") that establishes an approach to GHG emissions from stationary sources under the Clean Air Act. This final rule "tailors" the requirements of the Clean Air Act permitting program to limit which facilities will be required to obtain PSD permits. Under this rule, effective July 1, 2011, PSD permitting requirements will cover new construction projects that exceed 100,000 tpy of GHG emissions. The Facility has the potential to emit more than 100,000 tpy of GHG emissions and,

therefore, is subject to PSD review for GHG in addition to the pollutants discussed above.

The other significant aspects of OAC Chapter 3745-31 are outlined in the following paragraphs.

OAC Rule 3745-31-06 - Completeness determinations, processing requirements, public participation, public notice, and issuance – This section mandates that a completeness determination be rendered within 60 days of application receipt by Ohio EPA and within 30 days of receiving a written request from the applicant. The director must rule on a permit application within 180 days after the date that the application is deemed complete. The director must notify the public, by advertisement in a local newspaper, of the draft decision to grant or deny the permit and offer an opportunity for the public to comment or request a hearing.

OAC Rule 3745-31-11 - Ambient Air Ceilings and Increments – The emissions increases due to the proposed new source or modification must not cause an ambient air quality impact that exceeds the maximum allowable increment in the area, nor can they cause an exceedance of any NAAQS, which represent the ambient air quality ceilings.

OAC Rule 3745-31-13/OAC Rule 3745-31-14 - Ambient Monitoring Requirements – The director may determine that pre-construction ambient monitoring data is needed for the purposes of determining whether emission of an air pollutant would cause or contribute to a violation of any NAAQS or applicable PSD increment. The director may exempt a source or modification from this

monitoring requirement if the emission increases produce an ambient impact that is less than significant (*de minimis*) air quality levels and adequate monitoring data exist to reasonably estimate existing background levels.

OAC Rule 3745-31-15 - Control Technology Review – The owner or operator of a new source must employ BACT for each pollutant subject to major source review.

OAC Rule 3734-31-16 - Impact Analysis – The owner or operator of a new source must conduct an impact analysis to demonstrate that the increase in emissions, in conjunction with all other applicable emission increases and decreases, will not cause an exceedance of any NAAQS or applicable PSD increment.

OAC Rule 3745-31-17 - Additional Impact Analysis – The owner or operator of a new source must provide an analysis of the impairment to visibility, soils and vegetation that would occur as a result of the emission increases and an analysis of the ambient air quality impact of expected secondary growth in the area.

Other Regulatory Requirements – In addition to the NSR program, other federal and state air quality standards also apply during operation of an air pollutant source. They include federal New Source Performance Standards (NSPS), federal National Emission Standards for Hazardous Air Pollutants (NESHAP), and the Ohio EPA rules codified under the various chapters of OAC Chapter 3745.

40 CFR 60 Subpart KKKK applies to stationary combustion turbines and places emission limits on NO_x and SO_2 from new combustion turbines. The CTGs and duct burners are subject to this standard. For new CTGs firing natural gas with a rated heat input greater than 850 MMBtu/hr, NO_x emissions are limited to:

- 15 ppm_{vd} at 15 percent O_2; or
- 54 nanograms per Joule (ng/J) of useful output (0.43 pounds per megawatt-hour [lb/MW-hr]).

Additionally, SO_2 emissions must meet one of the following:

- Emissions limited to 110 ng/J (0.90 lb/MW-hr) gross output; or
- Emissions limited to 26 ng/J (0.060 lb/MMBtu).

The Facility will use an SCR system to reduce NO_x emissions to 2 ppm_{vd} at 15 percent O_2 and natural gas to limit SO_2 emissions to 0.0029 lb/MMBtu. As such, the Facility will meet the emission limits under Subpart KKKK.

Additionally, the provisions of this Subpart require continuous monitoring of water-to-fuel ratio, but allow for the use of either a 40 CFR Part 60 or Part 75 certified NO_x CEMS in lieu of this requirement. The Facility will use a 40 CFR Part 75 certified NO_x CEMS, which will satisfy this requirement.

40 CFR 60 Subpart Dc applies to steam generating units with a maximum input capacity greater than 10 MMBtu/hr and less than 100 MMBtu/hr. The auxiliary boiler has a maximum input capacity of 99 MMBtu/hr, and is, therefore, subject to the standard. For units combusting natural gas, the standard requires initial notifications at the start of construction and at start-up. In addition, records must be maintained regarding the amount of fuel burned on a monthly basis;

however, since natural gas is the only fuel burned in the boiler, there are no specific reporting requirements to the USEPA under Subpart Dc.

40 CFR 60 Subpart IIII is applicable to owners and operators of stationary compression ignition (CI) internal combustion engines that commence operation after July 11, 2005. Relative to the Facility, this rule applies to the emergency generator and emergency fire pump. For model year 2009 and later, fire pump engines with a displacement less than 30 liters per cylinder and an energy rating between 300 and 600 hp, Subpart IIII provides the following emission limits:

- 4.0 grams per kilowatt-hour (g/kWh) (3.0 grams per hp-hour [g/hp-hr]) of VOC + NO_x
- 3.5 g/kWh (2.6 g/hp-hr) of CO
- 0.2 g/kWh (0.15 g/hp-hr) of particulate matter

The Facility will install a fire pump meeting these emission standards.

To comply with Subpart IIII, the emergency generator must meet the emission standards for new non-road CI engines (Tier 2 or 3). Engines with a model year 2006 or later with a power rating of 560 kW (750 hp) or greater must meet the following limits:

- 6.4 g/kWh (4.8 g/hp-hr) of VOC + NO_x
- 3.5 g/kWh (2.6 g/hp-hr) of CO
- 0.2 g/kWh (0.15 g/hp-hr) of particulate matter

The emergency generator associated with the Facility will be certified to meet non-road emission standards.

There are no NESHAP regulations under 40 CFR Part 61 that are applicable to the Facility's operations. The NESHAP regulations under 40 CFR 63 will require the facility to meet Maximum Available Control Technology (MACT) for Hazardous Air Pollutant (HAP) emissions. The USEPA has promulgated a variety of standards for each category or subcategory of major sources and area sources of HAPs. For the Facility, the potential emissions of a single HAP will not exceed the major source threshold of 10 tpy. In addition, potential emissions of combined HAPs will be less than the major source threshold of 25 tpy. Therefore, the major source NESHAP standards under 40 CFR Part 63 are not applicable to this Facility. An area source of HAPs is a source that is not major, i.e., emits or has the potential to emit below the major source thresholds. Area source NESHAP, 40 CFR 63, Subpart ZZZZ for Stationary Reciprocating Internal Combustion Engines, is applicable to the emergency generator and the emergency fire pump at the Facility. The requirements under Subpart ZZZZ for new sources are to comply with the NSPS Subpart IIII standard. Therefore, the Facility will comply with both NESHAP Subpart ZZZZ and NSPS Subpart IIII standards.

The SCR system will use aqueous ammonia with a less than 19 percent weight solution; therefore, the Facility will not be subject to the requirements of USEPA's Accidental Release Prevention Program.

The Facility will be subject to the Acid Rain Program based on the provisions of 40 CFR 72.6(a)(3) because the turbines are considered utility units under the program definition and they do not meet the exemptions listed under

paragraph (b) of this Section. As required under this rule, the Facility will submit an acid rain permit application at least 24 months prior to the date on which the affected unit commences operation.

On March 10, 2005, USEPA issued the Clean Air Interstate Rule (CAIR) which requires reductions in emissions of NO_x and SO_2 from large fossil fuel-fired electric generating units using a cap-and-trade system. The rule provides both annual emissions budgets and an ozone season emission budget for each state. On July 6, 2011, the USEPA issued the Cross-State Air Pollution Rule (CSAPR) which replaced CAIR. Ohio power generation sources of 25 MW or greater would be subject to this rule. CSAPR was to go into effect January 1, 2012 and would have imposed new cap-and-trade programs for ozone season NO_x, annual NO_x, and annual SO_2 emissions. On August 21, 2012, the U.S. Court of Appeals for the D.C. Circuit (the Court) vacated CSPAR and ruled that the former CAIR remain in effect until a viable replacement to CSAPR is made. The Facility will comply with the rules currently in effect at the time of operational start.

Applicable Ohio EPA rules include: OAC Rule 3745-17-07(A)(1), which limits visible particulate emission limitations for stack emissions to 20 percent opacity as a six-minute average; OAC Rule 3745-17-10(B)(1), which limits particulate matter from gaseous fuel-burning equipment to 0.20 lb/MMBtu; OAC Rule 3745-18-06(F), which limits SO_2 emissions; OAC Rule 3745-21-09, which limits VOC emissions; OAC Chapter 3745-31, which requires a PTI and use of

BAT for emissions abatement; OAC Chapter 3745-77, which requires a Title V permit; and OAC Chapter 3745-103, which requires an acid rain permit.

The Carroll County-Tolson Airport, a County-owned public-use airport, is located approximately 2.7 miles south of the proposed Facility stacks. Filings with the Federal Aviation Administration (FAA) and with the Ohio Department of Transportation (ODOT) Division of Aviation have been made to confirm that the Facility stacks will not pose a hazard to air navigation and to determine the need for navigational lighting. The FAA and ODOT have made a "no hazard" determination for the two proposed 275-foot stacks, assigned Aeronautical Study Number 2013-AGL-5225-OE/2013-DOT-2150-OE and 2013-AGL-5226-OE/2013-DOT-2151-OE (as shown in Appendix H).

(d) Required Permits to Install and Operate Air Pollution Sources

Federal authority is fully delegated to the state of Ohio, and all air permit applications must be submitted to Ohio EPA. The air construction permit, known as the PTI, will serve as the air construction permit and initial operating permit. Since the Facility qualifies as a "Part 70" major source under Title V rules, the Facility will be required to apply for a Title V air operating permit within 12 months after initial start-up.

The following list of air permits is applicable to the proposed Facility:

- *Ohio EPA PTI*: OAC Chapter 3745-31 – Permit to Install New Source of Pollution: OAC Rules 3745-31-01 through -27. The PTI serves as the application for the PSD preconstruction review and construction permit.

- *Title V Permits*: OAC Chapter 3745-77 – Title V Permits: OAC 3745-77-01 through -10. The Title V permit will serve as the federally enforceable operating permit for the Facility.
- *Title IV*: Phase II Acid Rain Permit Program (40 CFR Part 72).

(e) Air Monitoring Stations and Major Source Mapping

Existing ambient air quality data are available for the Facility area or from other representative locations within the state. Figure 06-1 provides a section of a USGS map (1:100,000 scale) showing the location of the Facility in relation to the monitoring stations selected by Ohio EPA to identify background levels for the Facility, along with other identified major point sources in the area.

(f) Demonstration of Regulatory Compliance

The PTI for the Facility was submitted to Ohio EPA in April 2013. This document addressed compliance with the requirements identified in Section (B)(1)(c) and (B)(1)(d). Demonstration that the Facility will meet the range of applicable standards, identified above, including demonstrating that modeled impacts fully comply with all applicable NAAQS and PSD increments, was addressed in that application. On November 5, 2013, a final permit was issued for the Facility, following technical review and opportunity for public comment, which details emission levels and compliance requirements (Appendix I). A variety of compliance demonstration procedures, in the form of testing, monitoring (both CEMS and stack testing), recordkeeping, and reporting, will be conducted to ensure operational compliance with all applicable air rules, standards, and permit conditions.

(2) Construction

Construction impacts on air quality will consist mainly of the relatively minor emissions from the construction equipment and from fugitive dust emissions. General construction vehicles (both gasoline- and diesel-powered) and other diesel-powered engines will emit minor amounts of VOC, SO_2, CO, NO_x, and PM. These contaminants are not expected to cause any significant impacts on-site or beyond the Facility boundary.

(3) Operation

(a) Description of Air Quality Monitoring Plans

There are no plans to perform any ambient air quality monitoring during operation. However, as noted above, a variety of compliance monitoring procedures in accordance with the federal NSPS for combustion turbines will be implemented to ensure compliance with all applicable rules, standards and permit conditions.

(b) Estimated Air Concentration Isopleths

The ambient air quality impacts of the Facility were assessed by dispersion modeling, using the USEPA model AERMOD, in accordance with Ohio EPA guidance as summarized in *Engineering Guide #69, Air Dispersion Modeling Guidance*. Modeling was performed using five years of hourly meteorological data (2008 through 2012) consisting of surface data and mixing heights from the National Weather Service Station at the Pittsburgh International Airport. This data set was provided by the Ohio EPA, Division of Air Pollution Control for use in dispersion modeling for the Facility. The Facility's emissions

were modeled for a series of ambient temperatures and operating loads spanning the range of anticipated operating conditions.

The Facility's calculated maximum air quality impacts are summarized in Table 06-3. The maximum impacts are below the PSD increments for all criteria pollutants, and are below Significant Impact Levels (SILs) for all averaging times for CO, SO_2, PM_{10} and $PM_{2.5}$. The maximum-impact scenario for 1-hour NO_2, conservatively considering that the simultaneous start-up of both turbines would occur continuously every hour over the five years modeled, results in impacts above the SIL. Demonstration that maximum impacts are less than SILs for a given pollutant indicates that the Facility will not contribute significantly to any violation of the corresponding NAAQS or PSD increment. Per Ohio EPA guidance to demonstrate compliance with the NAAQS, maximum predicted impacts were added to monitored background concentrations. These results are summarized in Table 06-4 and show that the sum of modeled maximum impacts and existing ambient background concentrations are less than the NAAQS. For the 1-hour NO_2 standard, for which maximum Facility impacts exceed the SIL, the sum of maximum impacts plus conservative background is less than 37 percent of the NAAQS, which ensures compliance with a large margin for potential impacts form other emission sources. Isopleth plots showing the spatial pattern of calculated concentrations by pollutant and averaging time are provided in Figures 06-2 through 06-10.

TABLE 06-4
Maximum Calculated Facility Impacts for Criteria Pollutants

Pollutant	Averaging Time	Maximum Calculated Impact (µg/m^3)	Significant Impact Level (µg/m^3)	Class II PSD Increment (µg/m^3)
NO_2	Annual	0.08	1.0	25
	1-hour	24.6	7.52	N/A
CO	1-hour	360.4	2,000	N/A
	8-hour	92.5	500	N/A
$PM_{2.5}$	24-hour	0.82	1.2	9
	Annual	0.07	0.3	4
PM_{10}	24-hour	0.94	5	30
SO_2	1-hour	1.73	7.8	N/A
	3-hour	1.36	25	512

TABLE 06-5
Maximum Calculated Facility Impacts Added to Background Concentrations

Pollutant	Averaging Time	Predicted Impact (µg/m^3)	Background Concentration (µg/m^3)	Predicted Impact plus Background (µg/m^3)	NAAQS (µg/m^3)
NO_2	Annual	0.08	5.9	5.98	99.7
	1-hour	24.6	44.9	69.5	188
CO	1-hour	360.4	2,398.2	2,758.6	40,000
	8-hour	92.5	1,827.2	1,919.7	10,000
$PM_{2.5}$	24-hour	0.82	23.1	23.92	35
	Annual	0.07	11.28	11.35	12
PM_{10}	24-hour	0.94	19.3	20.24	150
SO_2	1-hour	1.73	144.1	145.83	196
	3-hour	1.36	144.1[a]	145.46	1,300[b]

[a]1-hour background concentration
[b]Secondary standard

(c) Potential Failure of Air Pollution Control Equipment

The pollution control equipment consists primarily of the DLN combustors, the SCR and the oxidation catalyst system. This equipment has been proven to be reliable, safe, and effective. The DLN control is built into the combustion chamber of the combustion turbine. If a DLN combustor fails, there are detection systems that will notice the failure and automatically initiate

shutdown, informing the operator to initiate corrective action. The typical life span of a combustor is based upon number of equipment starts and hours of operation. The turbine manufacturer recommends periodic maintenance, including inspection of the combustors, at specific intervals which will minimize the risk of in-service failure of any of the components.

Performance of the combustors is also monitored in the Facility computer system, which will detect degradation in a combustor prior to failure. The CEMS will also detect changes in emissions.

The SCR and oxidation catalyst systems are integral parts of the HRSG. A steel structure is erected in the combustion turbine exhaust gas path along with the HRSG boiler tubes. This structure holds ceramic catalyst blocks for both systems. Aqueous ammonia is distributed into the exhaust gas stream ahead of the ceramic blocks to achieve the chemical reaction for NO_x reduction. The oxidation catalyst is a "passive" system, in that no chemical reagent is involved in the oxidation process, much like the catalytic converter on an automobile. The ceramic blocks must be periodically replaced. Their life span varies by manufacturer; however, the replacement would be completed during a regularly scheduled preventative maintenance outage. The CEMS will detect a deterioration of performance well before a failure of the catalyst could occur. In addition, the Facility will have a sophisticated computer control system that has the ability to automatically shut down the unit quickly, if necessary.

(C) WATER

CCE will not develop a new on-site source of water to support the Facility's limited water requirements. Rather, the water needs of the Facility (including process water, fire protection and domestic uses) will be met through a contract with an existing water supplier in the region. Two parties (CCES, which would supply Village of Malvern water through its "Northern Corridor" project, intended to support the County's economic development initiative, and the Village of Carrollton) are currently in negotiations with CCE to provide water for the Facility. Other existing, regulated water suppliers that are planning regional expansion may also be considered as they are available.

The proposed Facility design incorporates significant water conservation measures. The Facility's maximum daily water use will be on the order of 400,000 gallons. The maximum daily water use is conservatively estimated based on operating the Facility at full load with full utilization of evaporative cooling on the two CTGs and 100 percent duct firing of the HRSG at an average ambient temperature of 92°F for a 24-hour period. The Facility's average daily water use will be on the order of 300,000 gallons. The average daily water use is estimated based on operating the Facility at full load with full utilization of evaporative cooling on the two CTGs and intermittent duct firing of the HRSG at an average ambient temperature of 59°F for a 24-hour period. The use of air cooling reduces water consumption by up to 93 percent as compared to a conventional wet-cooled combined-cycle generating facility.

Both CCES and the Village of Carrollton have indicated their ability to provide water to the Facility. They have also expressed their willingness to implement any necessary infrastructure upgrades to reliably provide water and tie-in the Facility into their systems.

Discharge of Facility wastewaters will be to an existing POTW, to either the BTM POTW in Malvern operated by CCES or the Village of Carrollton POTW. Both POTWs have available capacity for the Facility's wastewater, and Facility discharges will be in accordance with existing NPDES permit discharge requirements. It is anticipated that the selected entity will implement any necessary infrastructure upgrades to allow the Facility to tie into the system.

A brief description of the water and wastewater systems available from the Village of Malvern and the Village of Carrollton is provided below.

CCES/Village of Malvern Water Supply

CCES has proposed supplying the Facility with water via a new pipeline – the Northern Corridor – that is proposed to connect water and sewer services available from the Village of Malvern along Route 43, Route 171 and Route 9 in order to support the County's economic development objectives. It is anticipated that the Northern Corridor could also connect to the Village of Carrollton water system, providing a more regionalized source of water conveyed along that piping. The County has contracted with an engineer to begin design of the Northern Corridor project, and is in the process of applying for grants and other funding mechanisms to progress this regional improvement project.

The Village of Malvern utilizes two wells in a wellfield located on the eastern edge of the Village, approximately 7 miles northwest of the Facility Site. The capacities of the two wells are listed as 0.58 mgd and 2.16 mgd, respectively. The total capacity of the wellfield is 2.74 mgd. Average annual withdrawal rates ranged from 0.16 to 0.30

mgd, with an average of 0.22 mgd. Water from the wellfield is pumped to a nearby water treatment plant prior to distribution.

The Malvern wells withdraw water from the Sandy Creek Buried Valley Aquifer, which consists predominantly of unconsolidated sand and gravel. This aquifer is thick and very productive, with many high-capacity wells reported (ODNR 1991). Well logs and testing records indicate that both wells have the capability to produce similarly large quantities of water. It is anticipated that the current well capacity is limited by factors such as pump size limitations, and that minor upgrades would significant increase capacity. The long-term sustainable yield of the aquifer does not appear to be a limiting factor.

CCES has agreed in principle to reserve capacity to meet the Facility's needs through the Northern Corridor project. Should this source be selected, CCE will work with the County to negotiate rates that would contribute appropriately and support any necessary system or service improvements to maintain reliable service to other users while serving the Facility. Both the wellfield and aquifer at Malvern appear to have sufficient excess capacity. Because of the abundant aquifer, the Facility's water needs can be met without impact to other water users.

BTM CCES/Village of Malvern POTW

The Northern Corridor project would include extending both water and wastewater piping along Route 9. The wastewater piping would return discharge for treatment to the Village of Malvern's existing POTW (known as the BTM Sewer District POTW, operated by CCES). The Village of Malvern POTW had average day/peak flows of 0.32/0.40 mgd from July 2009 through December 2012, and appears to have average

daily capacity to accept the Facility's wastewater discharge. This POTW does not appear to experience high flow during periods of wet weather or elevated groundwater. The current discharge limits included in the NPDES permit for the Village of Malvern facility are provided in Table 06-6.

TABLE 06-6
Village of Malvern POTW NPDES Requirements

Parameter (Unit)	Discharge Limitations						
	Concentration Specified Units				Loading – kg/day		
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly
Water Temperature (°C)	--	--	--	--	--	--	--
Dissolved Oxygen (mg/l)	--	5.0	--	--	--	--	--
pH (Standard Unit)	9.5	6.5	--	--	--	--	--
Total Suspended Solids (mg/l)	--	--	24	16	--	73.6	49
Oil and grease (mg/l)	10	--	--	--	30.3	--	--
Ammonia Nitrogen, Summer (mg/l)	--	--	3.0	2.0	--	9.1	6.1
Ammonia Nitrogen, Winter (mg/l)	--	--	5.0	3.0	--	15.1	9.1
Total Nitrite plus Nitrate (mg/l)	--	--	--	--	--	--	--
Total Phosphorus (mg/l)	--	--	--	--	--	--	--
Free Cyanide (mg/l)	--	--	--	--	--	--	--
Total Recoverable Nickel (µg/l)	--	--	--	--	--	--	--
Total Recoverable Silver (µg/l)	--	--	--	--	--	--	--
Total Recoverable Zinc (µg/l)	--	--	--	--	--	--	--
Total Recoverable Cadmium (µg/l)	--	--	--	--	--	--	--
Total Recoverable Lead (µg/l)	--	--	--	--	--	--	--
Total Recoverable Chromium (µg/l)	--	--	--	--	--	--	--

Parameter (Unit)	Discharge Limitations						
	Concentration Specified Units				Loading – kg/day		
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly
Total Recoverable Copper (µg/l)	--	--	--	--	--	--	--
Dissolved Hexavalent Chromium (µg/l)	--	--	--	--	--	--	--
E. Coli (#/100 ml)	--	--	284	126	--	--	--
Flow Rate (mgd)	--	--	--	--	--	--	--
Total Mercury, Low Level (mg/l)	--	--	--	--	--	--	--
CBOD, 5 day (mg/l)	--	--	19	12	--	57.6	36.4

kg = kilogram; mg/l = milligrams per liter; °C = degrees Celsius; µg/l = microgram per liter; ml = milliliter; CBOD = carbonaceous biological oxygen demand

Village of Carrollton Water System

The Village of Carrollton utilizes a system of 9 wells from a wellfield located approximately 3 miles north of the Village as its primary water source. The capacities of the existing wells are listed as 0.3 mgd. The total capacity of the wells assuming each can operate simultaneously is 2.7 mgd. Average annual pumping rates have ranged from 0.35 mgd to 0.51 mgd, with an average of 0.43 mgd.

ODNR maintains an observation well within the Carrollton wellfield that has been recording water levels in the wellfield since 1951. Water levels in the ODNR observation well have been generally stable, and have been increased slightly over the past 10 years. These data suggest that current pumping rates are sustainable with the potential for increased pumping in the future. The maximum day pumping may have been as high as 0.91 mgd in 2005 (maximum day is estimated for this year) but has declined somewhat in recent years.

The total capacity of the wellfield (2.7 mgd) is well above the capacity of the Village of Carrollton water treatment plant (1.0 mgd). The transmission capacity of the 10-inch raw water main from the wellfield to the water treatment plant is 1.15 mgd.

The Village of Carrollton has agreed in principle to reserve capacity to meet the Facility's needs. Prior to selecting this as the Facility water source, an analysis will be completed to identify any system improvements the Village would make in order to supply the Facility without impact to its other users. Should this source be selected, CCE will work with the Village of Carrollton to negotiate rates that would support any necessary system or service improvements.

Village of Carrollton POTW

The Village of Carrollton POTW had average day/peak flows of 0.43/0.95 mgd from July 2009 through December 2012, and appears to have average daily capacity to accept the Facility's wastewater discharge. The POTW appears to experience high flow during periods of wet weather or elevated groundwater. CCE will work with the POTW to implement the necessary infrastructure upgrades to allow the Facility to tie into the system. The current discharge limits included in the NPDES permit for the Village of Carrollton facility are provided in Table 06-7.

TABLE 06-7
Village of Carrollton POTW NPDES Requirements

Parameter (Unit)	Discharge Limitations						
	Concentration Specified Units				Loading – kg/day		
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly
Water Temperature (°C)	--	--	--	--	--	--	--
Dissolved Oxygen (mg/l)	--	6.0	--	--	--	--	--
pH (SU)	9.5	6.5	--	--	--	--	--
Total Suspended Solids (mg/l)	--	--	13.16	8.77	--	37.4	24.9
Oil and grease (mg/l)	10	--	--	--	--	--	--
Total Nitrogen (mg/l)	--	--	--	--	--	--	--
Ammonia Nitrogen, Summer (mg/l)	--	--	1.64	1.09	--	4.66	3.1
Ammonia Nitrogen, Winter (mg/l)	--	--	4.39	2.92	--	12.5	8.29
Total Nitrite plus Nitrate (mg/l)	--	--	--	--	--	--	--
Total Phosphorus (mg/l)	--	--	1.5	1.0	--	4.26	2.84
Free Cyanide (mg/l)	--	--	--	--	--	--	--
Total Recoverable Nickel (µg/l)	--	--	--	--	--	--	--
Total Recoverable Zinc (µg/l)	415	--	--	415	1.18	--	1.18
Total Recoverable Cadmium (µg/l)	--	--	--	--	--	--	--
Total Recoverable Lead (µg/l)	--	--	--	--	--	--	--
Total Recoverable Chromium (µg/l)	--	--	--	--	--	--	--
Total Recoverable Copper (µg/l)	55	--	--	31	0.157	--	0.0881
Dissolved Hexavalent Chromium (µg/l)	--	--	--	--	--	--	--
Fecal Coliform (#/100 ml)	--	--	2,000	1,000	--	--	--
Flow Rate (mgd)	--	--	--	--	--	--	--

Parameter (Unit)	Discharge Limitations						
	Concentration Specified Units				Loading – kg/day		
	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly
Total Residual Chlorine (mg/l)	--	--	--	--	--	--	--
Total Mercury, Low Level (mg/l)	--	--	--	--	--	--	--
CBOD, 5 day (mg/l)	--	--	10.98	7.32	--	31.2	20.8

(1) Preconstruction

(a) List of Permits

Prior to constructing the Facility, a general NPDES permit and Stormwater Pollution Prevention Plan (SWPPP) for stormwater discharges associated with construction (Ohio EPA's Construction General Permit #OHC000003) will be developed.

(b) Location of Survey Data Sources

No monitoring or gauging stations have been used to collect preconstruction survey data because no new surface or groundwater sources will be utilized by the proposed Facility; therefore, mapping of such stations is not applicable and has not been provided. The Facility intends to utilize water and wastewater services from existing providers. Any incremental impact associated with on-site stormwater or wastewater discharge will be negligible due to the use of standard engineering design, BMPs and pretreatment as appropriate to comply with NPDES and POTW standards. Stormwater and wastewater flows, therefore, will have no discernible effect on surface or groundwater quality.

(c) Description of Data Sampling Stations

As there are no monitoring stations, this section is not applicable.

(d) Water Quality of Receiving Stream

As the wastewater will be directed to an existing POTW in accordance with the POTW's pretreatment requirements and, as discussed in more detail in Appendix B, Facility stormwater discharge will incorporate BMPs and good engineering design practices, water quality impact will not occur as a result of this Facility. In addition, Facility stormwater will be held within on-site stormwater collection ponds, to allow clean stormwater to further settle and to retain peak flows, prior to release. This section is, therefore, not applicable.

(e) Water Discharge Permit Information

Construction and operation of the Facility will result in the discharge of a number of sources of stormwater and wastewater, both during construction and operation. This section is not applicable as Facility stormwaters will be discharged consistent with stormwater and NPDES requirements (as addressed in Appendix B) and industrial and sanitary wastewaters will be discharged to an existing POTW, consistent with pretreatment requirements and in compliance with the POTW's existing NPDES authorization.

(2) Construction

(a) Description of Water Monitoring and Gauging Stations

No water discharges will be associated with the Facility during construction with the exception of stormwater runoff (see Appendix B). Sanitary wastes during construction will be handled using portable units that will be the

responsibility of an independent contractor. Therefore, no monitoring or gauging stations are intended to be utilized during construction.

(b) Quality and Quantity of Aquatic Discharges from the Site

No direct discharge to surface waters will occur during Facility construction. Discharges are not anticipated to occur in association with Facility construction that would influence aquatic resources.

(c) Plans to Mitigate Effects

The use of BMPs in accordance with federal and state requirements will ensure that the potential for erosion and sedimentation will be minimized during construction, and that stormwater from the Facility Site will not cause off-site impact.

(d) Changes in Flow Patterns and Erosion

Existing drainage patterns will be maintained to the extent possible; therefore, no significant changes in flow patterns are anticipated.

(3) Operation

(a) Description of Water Monitoring and Gauging Stations

Because the Facility will discharge to an existing POTW in accordance with its NPDES requirements, BMPs will be utilized as outlined in Appendix B and no significant water-related impact is expected, no water monitoring or gauging stations are proposed.

(b) Water Pollutant Control Equipment and Treatment Processes

Water pollution control equipment to be located at the Facility will include an in-line pH meter, a neutralization tank for demineralizer regenerate waste, oil/water separator for equipment drains, spill containment areas for bulk chemical storage tanks and unloading areas, in-line flow equalization, and three stormwater collection ponds for stormwater management. A waste neutralization tank will receive the regeneration wastes from the water demineralizer system. This neutralization tank equalizes and adjusts the pH of the wastewater by the addition of acid or caustic to comply with pretreatment standards.

The effluent quality of the wastewater discharge from the Facility will comply with NPDES standards and local ordinances to allow discharge to the POTW consistent with existing permit requirements reflected in Tables 06-6 and 06-7 for the Village of Malvern and Village of Carrollton, respectively.

(c) NPDES Requirements and Schedule

The Facility will not require coverage under a NPDES permit for operational stormwater. The Facility will incorporate BMPs and will identify responsibility for tracking changes in stormwater management procedures. No NPDES permit will be required for the Facility's wastewater discharge because it will be conveyed to an existing POTW, consistent with pretreatment requirements.

(d) Quantitative Flow Diagram

Depending on operating conditions and weather conditions, the discharge from the Facility will vary. The Facility water balance, shown in Figures 02-5a

and 02-5b, provides specific information with regard to average and peak water use and discharge associated with the Facility. The following are shown: sewage, blowdown, chemical and additive processing, wastewater processing, oil/water separators, and runoff from other soils/surfaces. No runoff or leachate from fuels and solid wastes is anticipated due to the Facility's exclusive use of natural gas as fuel, the limited solid waste storage planned, and the use of an oil/water separator to ensure collection of any incidental materials on-site. When the Facility is not operating, wastewater discharge will be primarily limited to sanitary uses.

(e) Water Conservation Practices

The proposed Facility design incorporates significant water conservation measures. The use of air cooling, rather than a conventional wet cooling system significantly reduces Facility water intake requirements by up to 93 percent when compared to conventional wet-cooling technologies. In addition, the Facility incorporates recirculation of water to the greatest extent possible in order to maximize water conservation.

(D) SOLID WASTE

(1) Preconstruction

The Facility Site is currently undeveloped and used for agricultural purposes. No significant debris was noted during on-site reconnaissance efforts. As a result, Facility construction will not require disposal of solid waste during the preconstruction phase.

(2) Construction

During Facility construction, solid waste will be generated that is typical of normal construction efforts. This includes packing materials, office waste, scrap lumber,

metals, cables, glass, cardboard containers and debris from lunches and catering/vending machines. In addition, during Facility construction and pre-operational cleaning, some solvents and flushing materials will be used. Solid waste that can be neither recycled nor reused will be stored in on-site containers for disposal.

Programs will be developed to ensure that potentially hazardous wastes are separated from normal waste, including segregation of storage areas and proper labeling of containers. All waste will be removed from the Facility Site by licensed contractors in accordance with applicable regulatory requirements and managed in licensed facilities. Facility construction is estimated to take approximately 28 months. The estimated volume of solid waste generated by construction activities during this time is approximately 1,200 cubic yards.

(3) Operation

During Facility operations, generated solid waste is anticipated to consist of office waste, including paper and miscellaneous trash, as well as plant operations wastes such as spent chemical and lube oil containers, water treatment waste, spare parts, packaging, etc. Any solid waste generated will be removed by a licensed hauler. The estimated volume of solid waste generated during operation of the Facility is 120 cubic yards on an annual basis.

(4) Licenses and Permits

No new solid waste treatment or disposal facility is proposed as a part of this Facility, or will be necessitated as a result of its construction or operation. All solid waste generated will be trucked off-site by an appropriately licensed contractor. SCR catalysts will be removed and returned to a catalyst vendor for regeneration, salvage or disposal.

Therefore, since no hazardous wastes are expected to be generated, no such licenses or permits will be required.

The data presented in this section are intended to provide a basis for assessing the costs and benefits of the Facility with regard to health and safety, ecology, land use, community development, cultural and aesthetic qualities, public responsibility, and agricultural district land.

(A) HEALTH AND SAFETY

(1) Demographic Characteristics

Areas within a 5-mile radius of the Facility Site include the Townships of East, Augusta, Brown, Harrison, Washington, Fox, Center, Union and Lee, all within Carroll County. The estimated 2012 populations and 2020 population projections for Carroll County were obtained from the Ohio Department of Development, Office of Strategic Research, 2013. Table 07-1 presents the population data for each city and/or township within 5 miles of the Facility Site.

TABLE 07-1
Existing and Projected Populations

City/Township	Percent of Community Within the 5-Mile Radius[8]	2012 Estimated Population (Within the 5-Mile Radius)	2022 Projected Population (Within the 5-Mile Radius)[9]
Center Township	100%	4,624	4,592
Washington Township	99.73%	1,225	1,216
Harrison Township	48.94%	1,202	1,193
Augusta Township	36.95%	593	589
Union Township	30.29%	293	291
Lee Township	15.75%	169	168
Fox Township	8.94%	92	92
Brown Township	8.34%	657	652
East Township	3.07%	26	26

[8] Estimate based on a percentage of geographic area, not population density.
[9] The 2020 projected population change of -0.23% for Carroll County was applied to each Township as 2020 projected population data for each Township is not available. No further projections are available. The -0.23% factor was further applied to project beyond the year 2020.

(2) Atmospheric Emissions

No impact to the population is anticipated as a result of atmospheric emissions. Air modeling indicates that Facility impacts will be in full compliance with all applicable ambient air quality standards, which are protective of even the most sensitive individuals in our communities. The air pollution control technologies to be used for the Facility have been proven to be reliable, safe and effective. In addition, CEMS will continuously monitor compliance with applicable air emission standards. In the event of an air permit excursion, Facility personnel will take immediate action, including immediate Facility shutdown, if warranted.

(3) Noise

Metric Descriptions

Sound is a physical disturbance in a medium, such as air, that is capable of being detected by the human ear. Sound waves in air are caused by variations in pressure above and below the static value of atmospheric pressure. Sound is measured in units of decibels (dB) on a logarithmic scale. The "pitch" (high or low) of the sound is a description of frequency, which is measured in Hertz (Hz). Most common environmental sounds are composed of a composite of frequencies. A normal human ear can usually detect sounds within frequencies from 20 Hz to about 20,000 Hz. However, humans are most sensitive to frequencies from 500 Hz to 4000 Hz.

Certain frequencies are given more "weight" during assessment because human hearing is not equally sensitive to all frequencies of sound. The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA.

A sound level is a measurement of noise that occurs during a specified period of time. A continuous source of noise is rare for long periods of time and is typically not a characteristic of community noise. Community noise refers to outdoor noise in the vicinity of a community. A community noise environment varies continuously over time with respect to the contributing sources. Within a community, ambient noise levels gradually change throughout a typical day and the changes can be correlated to the increase and decrease of transportation noise or to the daytime/nighttime operation of stationary mechanical equipment. The variation in community noise throughout a day is also due to the addition of short-duration single-event noise sources, such as aircraft, sirens, and various natural sources.

The metrics for evaluating the community noise environment are based on measurements of the noise levels over a period of time. These metrics are used in order to characterize and evaluate the cumulative noise impacts. These metrics are time-varying and are defined as statistical noise descriptors. The relevant metric for the Facility's noise compliance is the equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, logarithmically averaged over a specified monitoring period, or L_{eq}.

Sound pressure levels and the relative loudness of typical noise sources are provided in Table 07-2.

TABLE 07-2
Common Sound Levels/Sources and Subjective Human Responses

Thresholds/ Noise Sources	Noise Level (dBA)	Subjective Evaluations
Human Threshold of Pain Carrier Jet Takeoff (50 feet)	140	
Siren (100 feet) Loud Rock Band	130	
Jet Takeoff (200 feet) Auto Horn (3 feet)	120	Deafening
Chain Saw Noisy Snowmobile	110	
Lawn Mower (3 feet) Noisy Motorcycle (50 feet)	100	
Heavy Truck (50 feet)	90	Very Loud
Pneumatic Drill (50 feet) Busy Urban Street, Daytime	80	
Normal Automobile at 50 mph Vacuum Cleaner (3 feet)	70	Loud
Large Air Conditioning Unit (20 feet) Conversation (3 feet)	60	
Quiet Residential Area Light Auto Traffic (100 feet)	50	Moderate
Library Quiet Home	40	
Soft Whisper	30	Faint
Slight Rustling of Leaves	20	
Broadcasting Studio	10	Very Faint
Threshold of Human Hearing	0	

Source: Berger, 2004; Harris, 1991; Beranek, 1988.

Applicable Noise Level Regulations

There are no specific numerical decibel limits applicable to the Facility at the local, county, state or federal level.

Ambient Noise Level Survey

To document existing conditions, a wide area baseline sound survey was conducted over a 7-day period from May 8 to May 15, 2013. The measurement locations were selected to be representative of the surroundings of potential receptors nearest to the

Facility Site in the principal geographical directions. The ambient sound survey included both automated unattended long-term measurements that extended over a 7-day period (LT) and short-term measurements with an engineer present that occurred over a minimum duration of 30 minutes (ST). The short-term measurements were made during both daytime (10:00 a.m. to 4:00 p.m.) and nighttime (10:00 p.m. to 2:00 a.m.) periods. Measurements were taken with a Larson Davis 831 real-time sound level analyzer equipped with a PCB model 377B02 1/2" precision condenser microphone. This instrument has an operating range of 5 dB to 140 dB, and an overall frequency range of 8 to 20,000 Hz, and meets or exceeds all requirements set forth in ANSI standards for Type 1 sound level meters for quality and accuracy (precision).

The microphone and windscreen were tripod-mounted at an approximate height of 1.5 to 1.7 meters (4.9 to 5.6 feet) above grade away from effects of ground level noise and reflective surfaces. In addition, the sound level analyzer microphones were protected from wind-induced self-noise effects by a 180-millimeter (7-inch) diameter foam windscreen made of specially prepared open-pored polyurethane. Each sound analyzer was programmed to measure and log broadband A-weighted sound pressure levels in 10- and 1-minute time intervals, including a number of statistical parameters, including the L_{eq}. Data were collected for 1/1 and 1/3 octave bands spanning the frequency range of 8 Hz to 20 kiloHertz. Following the completion of the measurement period, all measured data were downloaded to a computer for the purposes of storage and further analysis.

Ten monitoring locations were identified for baseline sound, which are shown in Figure 07-1. Table 07-3 lists the corresponding map identifier for Figure 07-1, including

the location coordinates, existing land uses, and an address or description of each location surveyed.

TABLE 07-3
Baseline Sound Monitoring Locations

Location	Land Use	Coordinates	Description
ST-1	Residential	40°37.241' N, 81°3.566' W	1175 Cobbler Road
ST-2	Residential	40°35.912' N, 81°2.899' W	1347 Andora Street
ST-3	Residential	40°35.827' N, 81°3.828' W	Near Residence
ST-4	Residential	40°36.028' N, 81°4.387' W	Near Residence
ST-5	Residential	40°36.598' N, 81°4.680' W	2136 Brenner Road
ST-6	Residential	40°36.088' N, 81°4.749' W	Near Residence
ST-7	Civic/Public	40°36.723' N, 81°4.137' W	School and Living Center
LT-1	Residential	40°36.533' N, 81°3.256'W	Near Residence
LT-2	Residential	40°36.387' N, 81°4.133'W	Near Residence
LT-3	Residential	40°36.172' N, 81°3.543'W	Near Residence

Table 07-4 presents baseline monitoring results in terms of sound level metrics for both short and long-term measurement locations. Further details pertaining to the baseline sound survey can be found in the Baseline Sound Survey Report provided in Appendix J.

TABLE 07-4
Ambient Sound Monitoring Results

Monitoring Location				Time Period	Sound Level Metrics (L_{eq}, dBA)
Location	**Land Use**	**Coordinates**			
ST-1	Residential	40°37.241' N	81°3.566' W	Day	64
				Night	53
ST-2	Residential	40°35.912' N	81°2.899' W	Day	45
				Night	46
ST-3	Residential	40°35.827' N	81°3.828' W	Day	45
				Night	32
ST-4	Residential	40°36.028' N	81°4.387' W	Day	59
				Night	52
ST-5	Residential	40°36.598' N	81°4.680' W	Day	48
				Night	48
ST-6	Residential	40°36.088' N	81°4.749' W	Day	50
				Night	39
ST-7	Civic/Public	40°36.723' N	81°4.137' W	Day	56
				Night	52
LT-1 (Composite)	Residential	40°36.533' N	81°3.256'W	Day	42
				Night	36
LT-2 (Composite)	Residential	40°36.308' N	81°4.4152'W	Day	52
				Night	45
LT-3 (Composite)	Residential	40°36.172' N	81°3.543'W	Day	43
				Night	38

(a) Construction Noise Levels

Construction of the Facility is expected to start in February 2015 and extend for approximately 28 months. Facility construction will result in a temporary increase in sound levels near the Facility Site. The construction process will require the use of equipment that will be audible from off-site locations at certain times. Facility construction consists of site clearing, excavation, foundation work, steel erection, and

finishing work; work on these phases may overlap. Pile driving, generally considered the loudest construction activity, may also be required during the excavation work phase to provide proper structural support for the building foundations. Due to the shallow depth to bedrock at the Facility Site, blasting may also be required during Facility construction.

Representative construction sound levels were developed for the Facility based upon typical ranges of energy equivalent noise levels at construction sites, as documented by the USEPA in Technical Document NTID300.1, December 1971. Construction noise is highly variable, because construction equipment typically operates intermittently and the types of construction equipment change with construction phase. The USEPA methodology distinguishes between type of construction and construction phase in order to represent the range of construction conditions.

Using those energy equivalent noise levels as input to a basic noise model, construction noise levels were calculated. The methodology used is anticipated to be a conservative representation, as the model assumes that all pieces of construction equipment associated with an activity would operate simultaneously for the duration of that activity to estimate the average noise levels from the construction equipment over the duration of a given phase. An additional level of conservatism is built into the methodology by excluding the shielding effects due to intervening structures and buildings along the propagation path from the site to noise-sensitive locations in the community.

The results of these calculations are provided in Table 07-5 and show construction sound levels at the closest property boundary/residential location would, in most instances, be between 54 and 66 dBA, depending upon the specific construction phase.

TABLE 07-5
Estimated Facility Construction Sound Levels

Construction Phase	Example Construction Equipment	Equipment Usage Factor (%)	Equipment Noise Level at 50 feet, dBA L_{max}	Composite Nearest-Property Boundary/ Residential Sound Level, dBA, L_{eq}	Composite Sound Level at 50 feet dBA, L_{eq}	Composite Sound Level at 100 feet dBA, L_{eq}	Composite Sound Level at 200 feet dBA, L_{eq}	Composite Sound Level at 500 feet dBA, L_{eq}	Composite Sound Level at 1000 feet dBA, L_{eq}
Site clearing and preparation	Backhoe	4	85	62	86	80	74	66	60
	Dozer	4	80						
	Generator	40	78						
	Grader	5	85						
	Loader	16	79						
	Scraper	14	88						
	Truck (2)	16	91						
Excavation	Air Compressor	100	81	65	89	83	77	69	63
	Backhoe	16	85						
	Dozer	16	80						
	Generator	40	78						
	Jack Hammer	10	88						
	Loader	16	79						
	Pump	40	76						
	Rock Drill	4	98						
	Shovel	20	82						
	Truck (2)	16	91						
Foundation Installation	Concrete Pump	82	40	54	78	72	66	58	52
	Saw (2)	78	4						
Steel Erection	Air Compressor	40	81	60	83	77	71	63	57
	Concrete Mixer	16	85						
	Crane, Derrick	4	88						
	Crane, Mobile	8	83						
	Jack Hammer	4	88						
	Pneumatic Tool (3)	10	85						

Construction Phase	Example Construction Equipment	Equipment Usage Factor (%)	Equipment Noise Level at 50 feet, dBA L_{max}	Composite Nearest-Property Boundary/ Residential Sound Level, dBA, L_{eq}	Composite Sound Level at 50 feet dBA, L_{eq}	Composite Sound Level at 100 feet dBA, L_{eq}	Composite Sound Level at 200 feet dBA, L_{eq}	Composite Sound Level at 500 feet dBA, L_{eq}	Composite Sound Level at 1000 feet dBA, L_{eq}
	Pump	40	76						
	Saw (2)	10	78						
Finishing	Air Compressor	40	81	66	89	83	77	69	63
	Backhoe	4	85						
	Concrete Mixer	16	85						
	Concrete Pump	8	82						
	Crane, Derrick	2	88						
	Crane, Mobile	4	85						
	Grader	2	80						
	Jack Hammer	4	85						
	Loader	4	88						
	Paver	12	79						
	Pneumatic Tool (2)	4	89						
	Rock Drill	5	85						
	Roller	10	98						
	Scraper	8	74						
	Shovel	6	88						
	Truck	16	82						

Source: USEPA Technical Document NTID300.1, December 1971; Power Plant Construction Noise Guide, Bolt Beranek and Newman, Inc., 1977.

Actual received sound levels will fluctuate, depending on the construction activity, equipment type, and separation distances between source and receiver.

The construction activities will generally occur during daytime hours (between 6:00 a.m. to 10:00 p.m.), when acceptance toward noise by the general public is higher, and the risk of sleep disturbance and interference with relaxation activities is low. Construction activities will normally be conducted from Monday through Saturday, but extended hours may be necessary occasionally for certain activities. High-noise activities, such as blasting, would be limited to daytime periods and would involve prior notice to residents in the surrounding area. Traffic noise generated during construction on- and off-site will also temporarily add to overall sound levels. The transient nature of construction noise, coupled with the impact levels reflected in Table 07-4 is expected to result in minimal community noise impact during Facility construction.

(b) Operational Noise Levels

A three-dimensional acoustical model of the Facility's proposed operations was developed, using SoundPlan, in order to predict noise levels at nearby sensitive receivers resulting from the operational Facility. Details of the model, modeling inputs, and results can be found in the Operational Sound Level Impact Report provided in Appendix K.

Facility layout and design has positioned louder equipment in locations further from boundaries or off-site residences. Enclosures and shielding are used in the layout to further reduce sound levels. Additional mitigation measures have been incorporated into the Facility to minimize the potential for impact to the surrounding community. The modeling results, showing anticipated operational sound levels associated with the

operational Facility at the nearest noise-sensitive locations (as shown on Figure 07-2), are provided in Table 07-6.

TABLE 07-6
Predicted Residential Noise Levels Using Mitigated Acoustical Design

Receiver	Highest Predicted Facility Noise Level (dBA)	Facility Noise Level Design Goal (dBA)	Exceedence (+) / Margin (-)
R1	39	45	-6
R2	44	45	-1
R3	45	45	0
R4	45	45	0
R5	43	45	-2
R6	39	45	-6
R7	41	45	-4

With incorporation of additional mitigation measures, the Facility achieves a noise level design goal of 45 dBA. In establishing this noise level design goal for the Facility, it was useful to review: applicable laws, ordinances, regulations and standards for the control of noise; prior OPSB approvals for similar projects; and other general noise control criteria.

- *Applicable Laws, Ordinances, Regulations and Standards* – There are no numerical (dB) limits applicable to the Facility at the local, county, state or federal level.
- *Previous OPSB Approvals* – A noise level limit of 50 dBA at residential receivers was generally identified as the most restrictive performance standard to be achieved, based on a review of OPSB approvals for combustion turbine merchant power projects similar to the Facility, as outlined in Table 07-7. This level is consistent with widely promulgated levels in state and local jurisdictions throughout the U.S. for the control of industrial noise at residential receivers.

TABLE 07-7
Summary of Residential Noise Levels/Limits from OPSB Approvals

Project Name	Case	Type	Rating (MW)	Noise Level Allowed at Nearest Residences (dBA)
Dresden	00-686-EL-BGN	CCGT	550	< 60
Fremont	00-1527-EL-BGN	CCGT	700	≤ 50
Hanging Rock	01-175-EL-BGN	CCGT	1240	51 − 59
Oregon	12-2959-EL-BGN	CCGT	799	57 − 65
Rolling Hills	00-1616-EL-BGN	SCGT	800	61 − 62
Washington	00-0670-EL-BGN	CCGT	620	< 50
Waterford	00-0723-EL-BGN	CCGT Mode	850	< 50
Waterford	00-0723-EL-BGN	SCGT Mode	167	< 58

CCGT = Combined Cycle Gas Turbine
SCGT = Simple Cycle Gas Turbine

- *Speech Interference Criteria* – Interference with speech communication has long been recognized as an important consideration of noise control. Speech spoken in relaxed conversation is fairly well intelligible when background (i.e., Facility) noise levels do not exceed 55 dBA.[10] Similarly, to be able to hear and understand spoken messages indoors, it is recommended that background sound levels do not exceed 45 dBA (L_{eq}). Since the noise reduction for typical homes with partially open windows is about 15 dB, an exterior noise level up to 60 dBA would result in acceptable levels of indoor noise for speech communication, (i.e., 45 dBA $_{\text{Interior Noise Level}}$ + 15 dBA $_{\text{Window Noise Reduction}}$ = 60 dBA $_{\text{Exterior Noise Level}}$).

[10] *Community Noise*, Archives of the Center for Sensory Research, Berglund, B., & Lindvall, T. (Eds.), 1995

- *Sleep Interference Criteria* – In order to avoid negative effects on sleep, indoor sound levels (L_{eq}) should not exceed 30 to 35 dBA.[11] Since noise reduction for typical homes with partially open windows is 15 dB, exterior noise levels of 45 to 50 dBA result in indoor levels consistent with recommended criteria, (i.e., 35 dBA $_{\text{Interior Noise Level}}$ + 15 dBA $_{\text{Window Noise Reduction}}$ = 50 dBA $_{\text{Exterior Noise Level}}$). Moreover, interior levels of about 35 dBA are consistent with those historically recommended by acoustical consultants as acceptable for indoor settings. [12]
- *Community Noise Guidelines* – During the daytime, few people are seriously annoyed when noise levels are less than 55 dBA, or moderately annoyed when less than 50 dBA. In 1999, the World Health Organization recommended that sound levels during nighttime periods should not exceed 45 dBA, to allow people to sleep with bedroom windows open. [13]

Based upon these considerations, 45 dBA was identified as the Facility design goal, which is considerably lower than the most restrictive levels approved for similar projects in Ohio, and appreciably lower than many laws, ordinances, regulations and standards promulgated throughout the U.S. for the construction of industrial noise sources at residential land uses. Moreover, adding mitigation to control sound to 45 dBA results in sound from the Facility at levels that are expected to avoid sleep disturbance or

[11] *Community Noise*, Archives of the Center for Sensory Research, Berglund, B., & Lindvall, T. (Eds.), 1995

[12] *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, United States Environmental Protection Agency, Office of Noise Abatement and Control, USEPA Report 550/9-74-004 (March 1974).

[13] *Guidelines For Community Noise*, World Health Organization, Berglund, B., & Lindvall, T. Schwela, D. (Eds.), 1999

speech interference, and are consistent with general community noise guidelines and acoustical recommendations for indoor settings.

(c) Identification of Noise-Sensitive Areas

As shown in Figure 07-2, the closest residences to the Facility are located along Mobile Road NE. Five residences located on Mobile Road NE are located within 1,000 feet of the Facility, with the nearest residence located approximately 350 feet to the south. Across the street from that residence are two other homes, located approximately 460 and 635 feet, respectively, from the Facility. Further north on Mobile Road NE, a residence is located approximately 670 feet to the east of the Facility. Further south on Mobile Road NE, a residence is located approximately 800 feet to the south of the Facility. More distant scattered residences exist in the area. The schools and residential facilities are located approximately 0.5-mile from the Facility Site. The modeled sound contours illustrated in Figure 07-3 indicates anticipated sound levels at all locations surrounding the Facility Site.

(d) Description of Equipment and Noise Mitigation Measures

Construction Noise – Construction noise is difficult to control because of the mobile nature of its sources and the flexibility of schedule inherent in most construction work. However, construction is also temporary in nature. In order to mitigate the possible effect of noise caused during the temporary construction period, the following steps will be taken:

- The construction equipment manufacturers' normal sound muffling devices will be used and will be kept in good repair throughout the construction process.

- Construction activities that produce significant sound (pile driving, blasting and steam blowouts) will be restricted to daylight hours.

By scheduling the construction effort to be as efficient as possible, sound associated with construction activity will be minimized as the duration of the construction effort is minimized. Because of the temporary nature of the construction noise, no adverse long-term effects are anticipated.

Operational Noise – Specific sound-control elements incorporated into the Facility noise analysis have been identified, as detailed in Appendix K. Adjustments to this mitigation may occur through final design, eliminating or modifying features as appropriate while maintaining sound level commitments. Following final design, the noise analysis will be updated to reflect final design conditions and confirm that the final design meets the results reflected in this Application. Specific mitigation measures presumed in the model include:

- High-performance silencers within the air intake ductwork of the CTGs;
- Acoustically insulated combustion turbine air intake weather hoods;
- Close-fitted acoustical barriers around the CTGs;
- Silencers installed on fans providing ventilation air for the turbine compartments;
- CTG exhaust noise attenuation via the HRSG units and HRSG stack silencing;
- Acoustical shrouds and/or thicker walls for the HRSG transition ducts and boiler sections;
- Low-noise air-cooled condenser;
- Low-noise air cooled heat exchanger;

- Enclosures around the boiler feedwater pumps;
- A building enclosing the steam turbine and associated equipment;
- Acoustically treated ventilation openings for the steam turbine building;
- Low-noise ammonia forwarding pumps;
- Low-noise natural gas metering and regulating equipment; and
- A building enclosing water treatment equipment.

(4) Water

No significant impact to water bodies is anticipated as a result of the Facility. The Facility will not develop its own on-site water source, but will obtain process and potable water from an existing supplier in the area. Peak water consumption associated with Facility, which is air cooled, is significantly lower than would be required for a conventional wet-cooled electric generating facility of a similar size.

Wastewater discharge will be to an existing POTW in compliance with required limits.

Stormwater will be treated on-site through settling and stormwater collection ponds prior to release of storm flows. Stormwater features, stormwater calculations and additional details are provided in Appendix B.

(a) Construction and Operation Impact to Public and Private Water Supplies

The Facility intends to obtain process and potable water during commissioning, start-up, and operation from existing public suppliers of water in the surrounding area, such as the Village of Malvern or the Village of Carrollton. Water reservation agreements are actively being developed with both entities to reserve the volume of water required

for the Facility, and CCE is committed to working closely with both entities to select the appropriate source(s), and identify any required system improvements that are required to reliably meet Facility needs without constraining other users.

Local residents rely on private wells for personal water use. Known locations of wells are shown in Figures 04-6 and 04-7, and geological conditions at the Facility Site are shown in the cross-sections on Figure 04-4. Because the Facility will not develop an on-site well, other wells proximate to the Facility Site will not have the potential to be affected by Facility water use. In addition, spill prevention practices will be designed and implemented to prevent potential contamination of groundwater. Use of water available from existing regulated water suppliers will be subject to protection zones and other controls to avoid adverse effect to other community water users.

Based on careful coordination with water providers, distance from the Facility Site and use of BMPs for spill prevention and control, potential impact to public or private water supplies is expected to be extremely low as a result of construction and operation. In addition to design measures, the Facility staff will receive training on emergency procedures to ensure prompt and efficient response in the event of an accidental release to the environment.

(b) Impact of Pollution Control Equipment Failures on Public and Private Water Supplies

No impact to public or private water supplies is anticipated as a result of water pollution control equipment failures. Non-point source water pollution controls to be used at the Facility consist of an oil/water separator for in-plant treatment of floor drains and equipment washdown areas, and containment devices around aboveground storage tanks and station transformers (outdoors). The oil/water separator will be regularly maintained

to ensure good operating condition. The containment devices will be designed to collect stormwater. After completion of a visual inspection, collected stormwater will be released through the stormwater discharge system.

No adverse impacts are anticipated to occur to public or private water supplies as a result of coordination with water-providing entities, distance and BMPs that will be implemented.

The wastewater discharge will have insignificant impacts because of its physical and chemical characteristics. Typical chemicals that are added to the water include: biocides; minor amounts of chemicals associated with system cleaning; acid and caustic for neutralization; and boiler water treatment chemicals. All Facility wastewaters will be discharged into sewer piping that will be extended along Route 9.

(B) ECOLOGICAL IMPACT

(1) Site Information

(a) Mapping

Figure 07-4 shows the boundary of the Facility Site (including the area one half mile outside the Facility Site boundary) and Construction Laydown Area, with information including: the location of wood lots or vacant fields; and surface bodies of water, which are limited in this location to unnamed tributaries of Pipes Fork. No wildlife areas, nature preserves or other conservation areas are present in the Facility Site or Construction Laydown Area.

NRCS soil mapping (Figure 04-2) indicates the presence of highly erodible land on the majority of the Facility Site and Construction Laydown Area, largely related to sloping terrain. Steep slopes of greater than 15 percent are present within narrow ravines

and side slopes within portions of the Project Area. Figure 07-4 illustrates all delineated surface water resources located on the Facility Site and Construction Laydown Area. Additional details associated with Facility Site ecology are provided in the following sections.

(b) Vegetation Survey

A survey was conducted of representative plant species present on the Facility Site and Construction Laydown Area. The majority of the Facility Site and Construction Laydown Area is an active agriculture area; adjacent areas included upland fields, maintained grass fields, forested uplands, emergent and scrub-shrub wetlands, and upland thicket plant communities. Perimeter and riparian vegetation species data were recorded for the tree overstory, shrub understory, woody vines, and ground cover layer. A list of plant species within each plant community noted during the survey is provided in Tables 07-8, 07-9, 07-10 and 07-11 for forested upland areas; fields and agricultural areas; thicket vegetation areas; and wetland areas, respectively. Land within one-half mile of the Facility Site and Construction Laydown area is similar in character, with agricultural fields and wooded areas predominating.

The tree overstory component includes woody plants capable of growing to greater than 20 feet in height, while the shrub understory includes woody plants between 3 and 29 feet in height. The ground cover layer includes all plants less than 6 feet in height. The woody vine layer includes vines greater than 3 feet in height.

TABLE 07-8
Vegetation Recorded Within Forested Uplands

Common Name	Latin Binomial
American Beech	*Fagus grandifolia*
Asiatic Bittersweet	*Celastrus orbiculatus*
Bitter Dock	*Rumex obtusifolius*
Black Birch	*Betula lenta*
Black Cherry	*Carya ovate*
Black Locust	*Robinia pseudoacacia*
Black Oak	*Quercus velutina*
Black Raspberry	*Rubus occidentalis*
Box elder	*Acer negundo*
Chestnut Oak	*Quercus prinus*
Christmas Fern	*Polystichum acrostichoides*
Cleavers	*Galium aparine*
Common Blackberry	*Rubus allegheniensis*
Common Blue Violet	*Viola papilionacea*
Common Burdock	*Arctius minor*
Common Chickweed	*Stellaria media*
Common Cinquefoil	*Potentilla simplex*
Common Dandelion	*Taraxacum officinale*
Common Elderberry	*Sambucus nigra var. canadensis*
Common Wintercress	*Barbarea vulgaris*
Corn Salad	*Valerianella olitoria*
Cut-leaved Toothwort	*Dentaria laciniata*
Flowering Dogwood	*Cornus florida*
Fox Grape	*Vitis labrusca*
Garlic Mustard	*Alliaria petiolata*
Ground Ivy	*Glechoma hederacea*
False Nettle	*Boehmeria cylindrical*
Hayscented Fern	*Dennstaedtia punctilobula*
Hophornbeam	*Ostrya virginiana*
Japanese Barberry	*Berberis thunbergii*
Japanese Honeysuckle	*Lonicera japonica*
Jewelweed	*Impatiens capensis*
Kidney-leaved Buttercup	*Ranunculus abortivus*
Mayapple	*Podophyllum peltatum*
Multiflora Rose	*Rosa multiflora*
Musclewood/Ironwood	*Carpinus caroliniana*
Northern Blue Violet	*Viola septentrionalis*
Pennsylvania Sedge	*Carex laxifolia*
Poison Ivy	*Toxicodendron radicans*
Pokeweed	*Phytolacca Americana*
Purple Dead Nettle	*Lamium purpereum*
Red Maple	*Acer rubrum*

Common Name	Latin Binomial
Red Oak	*Quercus rubra*
Rue anemone	*Anemonella thalictroides*
Sassafras	*Sassafras albidum*
Sensitive Fern	*Onoclea sensibilis*
Shagbark Hickory	*Carya ovate*
Skunk Cabbage	*Symplocarpus foetidus*
Slippery Elm	*Ulmus rubra*
Small-flowered Agrimony	*Agrimonia parviflora*
Small-flowered Bittercress	*Cardamine parviflora*
Spring Beauty	*Claytonia virginica*
Stinging Nettle	*Urtica dioica*
Sugar Maple	*Acer saccharum*
Tartarian Honeysuckle	*Lonicera tatarica*
Tree of Heaven	*Ailanthus altissima*
Unidentified Grape	*Vitis sp.*
Unidentified Grass	*Poaceae sp.*
Virginia Creeper	*Parthenocissus quinquefolia*
White Avens	*Geum canadense*
White Oak	*Quercus alba*
White Pine	*Pinus strobus*
Wild Basil	*Clinopodium vulgare*
Wild Blue Phlox	*Phlox divaricate*
Wild Onion	*Allium cernuum*
Wood Strawberry	*Fragaria vesca*
Yellow Corydalis	*Corydalis lutea*

TABLE 07-9
Vegetation Recorded Within Maintained Fields, Upland Fields, and Agricultural Areas

Common Name	Latin Binomial
Bitter Dock	*Rumex obtusifolius*
Black Locust	*Robinia pseudoacacia*
Black Raspberry	*Rubus occidentalis*
Canada Goldenrod	*Solidago canadensis*
Canada Thistle	*Cirsium arvense*
Coltsfoot	*Tussilago farfara*
Common Blackberry	*Rubus allegheniensis*
Common Blue Violet	*Viola papilionacea*
Common Burdock	*Arctius minor*
Common Chickweed	*Stellaria media*
Common Cinquefoil	*Potentilla simplex*
Common Dandelion	*Taraxacum officinale*
Common Milkweed	*Asclepias syriaca*

Common Name	Latin Binomial
Common Mugwort	*Artemisia vulgaris*
Common Plantain	*Plantago major*
Common Ragweed	*Ambrosia artemisiifolia*
Common Wintercress	*Barbarea vulgaris*
Common Yarrow	*Achillea millefolium*
Crown Vetch	*Securigera varia*
Field Fescue	*Festuca pratensis*
Garlic Mustard	*Alliaria petiolata*
Ground Ivy	*Glechoma hederacea*
Groundsel	*Senecio vulgaris*
Indian Hemp Dogbane	*Apocynum cannabinum*
Jimson Weed	*Datura stramonium*
Kidney-leaved Buttercup	*Ranunculus abortivus*
Mullein	*Verbascum thapsus*
Multiflora Rose	*Rosa multiflora*
Northern Blue Violet	*Viola septentrionalis*
Onion Grass	*Allium cernuum*
Orchard grass	*Dactylis glomerata*
Poison Ivy	*Toxicodendron radicans*
Pokeweed	*Phytolacca americana*
Poverty Grass	*Danthonia spicata*
Purple Dead Nettle	*Lamium purpereum*
Queen Anne's Lace	*Daucus carota*
Red Clover	*Trifolium pratense*
Redtop	*Agrostris gigantea*
Reed Canarygrass	*Phalaris arundinacea*
Shepherd's Purse	*Capsella bursa-pastoris*
Small-flowered Agrimony	*Agrimonia parviflora*
Small-flowered Bittercress	*Cardamine parviflora*
Soft Rush	*Juncus effusus*
Tall Blue Lettuce	*Lactuca biennis*
Tall Goldenrod	*Solidago altissima*
Timothy	*Phleum pratensis*
Unidentified Grape	*Vitis sp.*
Unidentified Grass	*Poaceae sp.*
White Avens	*Geum canadense*
White Clover	*Trifolium repens*
Wild Basil	*Clinopodium vulgare*
Wild Onion	*Allium cernuum*
Wood Strawberry	*Fragaria vesca*
Yellow Corydalis	*Corydalis lutea*
Yellow Foxtail	*Setaria pumila*

TABLE 07-10
Vegetation Recorded Within Upland Thicket Vegetational Community

Common Name	Latin Binomial
Asiatic Bittersweet	*Celastrus orbiculatus*
Bitter Dock	*Rumex obtusifolius*
Black Locust	*Robinia pseudoacacia*
Black Raspberry	*Rubus occidentalis*
Canada Goldenrod	*Solidago canadensis*
Common Blackberry	*Rubus allegheniensis*
Common Burdock	*Arctius minor*
Common Chickweed	*Stellaria media*
Common Cinquefoil	*Potentilla simplex*
Common Dandelion	*Taraxacum officinale*
Common Ragweed	*Ambrosia artemisiifolia*
Crown Vetch	*Securigera varia*
Fox Grape	*Vitis labrusca*
Garlic Mustard	*Alliaria petiolata*
Ground Ivy	*Glechoma hederacea*
Kidney-leaved Buttercup	*Ranunculus abortivus*
Multiflora Rose	*Rosa multiflora*
Poison Ivy	*Toxicodendron radicans*
Purple Dead Nettle	*Lamium purpereum*
Queen Anne's Lace	*Daucus carota*
Small-flowered Agrimony	*Agrimonia parviflora*
Staghorn Sumac	*Rhus typhina*
Tartarian Honeysuckle	*Lonicera tatarica*
Unidentified Grape	*Vitis sp.*
Unidentified Grass	*Poaceae sp.*
White Avens	*Geum canadense*
Wild Basil	*Clinopodium vulgare*
Wild Onion	*Allium cernuum*
Wood Strawberry	*Fragaria vesca*
Yellow Corydalis	*Corydalis lutea*

TABLE 07-11
Vegetation Recorded Within Emergent and Scrub-Shrub Wetlands

Common Name	Latin Binomial
Beggars Ticks	*Bidens sp.*
Black Willow	*Salix nigra*
Box Elder	*Acer negundo*
Common Blue Violet	*Viola papilionacea*
Common Elderberry	*Sambucus nigra var. canadensis*
Common Wintercress	*Barberea vulgaris*

Common Name	Latin Binomial
Corn Salad	*Valerianella olitoria*
Fox Sedge	*Carex vulpinoidea*
Franks Sedge	*Carex frankii*
Garlic Mustard	*Alliaria petiolata*
Ground Ivy	*Glechoma hederacea*
Japanese Stilt Grass	*Microstegium vimineum*
Jewelweed	*Impatiens capensis*
Kidney-leaved Buttercup	*Ranunculus abortivus*
Lurid Sedge	*Carex lurida*
Moneywort	*Lysimacchia nummularia*
Multiflora Rose	*Rosa multiflora*
Musclewood/Hornbeam	*Carpinus caroliniana*
Pennsylvania Bittercress	*Cardamine pensylvanica*
Poison Ivy	*Toxicodendron radicans*
Purple-leaved Willowherb	*Epilobium coloratum*
Red Osier Dogwood	*Cornus sericea*
Redtop	*Agrostis gigantea*
Reed Canarygrass	*Phalaris arundinacea*
Rough Goldenrod	*Solidago rugosa*
Sensitive Fern	*Onoclea sensibilis*
Silky Dogwood	*Cornus amomum*
Skunk Cabbage	*Symplocarpus foetidus*
Slippery Elm	*Ulmus rubra*
Small-flowered Agrimony	*Agrimonia parviflora*
Small-flowered Bittercress	*Cardamine parviflora*
Smartweed	*Polygonum sp.*
Soft Rush	*Juncus effuses*
Spring Beauty	*Claytonia virginica*
Spring Cress	*Cardamine bulbosa*
Unidentified Grass	*Poaceae spp.*
Unidentified Sedge	*Carex sp.*
White Avens	*Geum canadense*
White Grass	*Leersia virginica*
Wild Basil	*Clinopodium vulgare*
Wild Onion	*Allium cernuum*

Upland field areas comprise the majority of the Facility Site and Construction Laydown Area. Maintained grass field and upland thicket vegetational communities abut the agricultural fields, predominantly comprised of grasses (*Poaceae* spp.), purple dead

nettle (*Lamium purpureum*), multifloral rose, black raspberry, and Canada goldenrod (*Solidago canadensis*).

Wooded areas also occur throughout the Facility Site (approximately 49 acres of the 77-acre property) and Construction Laydown Area (approximately 4 acres of the 23-acre property). Land within one-quarter mile of the Facility Site is similar in character, as shown on Figure 07-4. The wooded areas throughout the Facility Site and Construction Laydown Area consist of oak-hickory complexes with areas of interspersed successional hardwoods and were comprised primarily of a mix of red oak (*Quercus rubra*), shagbark hickory (*Carya ovata*), black cherry (*Prunus serotina*), slippery elm (*Ulmus rubra*), and sugar maple (*Acer saccharum*). The canopy throughout the Facility Site and Construction Laydown Area is typically open with understory often dominating. The understory included multiflora rose (*Rosa multiflora*), tartarian honeysuckle (*Lonicera tatarica*), blackberry (*Rubus allegheniensis*), and black raspberry (*Rubus occidentalis*). Though some variations in amount of overstory and understory occur throughout the Facility Site and Construction Laydown Area, the wooded areas consist primarily of similar species and tree size.

An intermittent, unnamed tributary of Pipes Fork extends along the northerly portion of the Facility Site. This stream flows east from pasturelands on the adjacent property to the west to its confluence with a perennial, unnamed tributary of Pipes Fork, adjacent to Mobile Road NE. This watercourse is supported by groundwater, drainage from tributaries, drainage from the aforementioned pastureland, and surficial runoff from adjacent uplands. The stream channel is approximately 6 to 7 feet in width and contains a sand, gravel, cobble, and boulder substrate.

A second perennial, unnamed tributary of Pipes Fork is located along the eastern boundary of the Facility Site, adjacent to Mobile Road NE. This stream flows north along the Facility Site boundary and is supported by groundwater, drainage from adjacent uplands, surficial runoff from adjacent uplands, and drainage from tributaries. The stream channel is approximately 7 to 10 feet in width and contains a silt, sand, gravel, and cobble substrate.

The riparian corridor canopies, where present, are comprised of a mix of black cherry (*Prunus serotina*), red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), and shagbark hickory (*Carya ovata*) in the overstory. The understory is comprised of multiflora rose (*Rosa multiflora*), with tartarian honeysuckle (*Lonicera tatarica*), blackberry (*Rubus allegheniensis*), and black raspberry (*Rubus occidentalis*) present.

Within the riparian corridors, several associated wetlands have been delineated, as described in detail in Appendix F. These wetlands are located outside of the proposed limit of disturbance associated with the Facility.

Two small emergent wetlands, created by historic diversion ditches and totaling 450 square feet, are located within the proposed Facility footprint. Dominant vegetation within these wetlands includes skunk cabbage (*Symplocarpus foetidus*), sedges (*Carex* spp.), grasses (*Poaceae* spp.), jewelweed (*Impatiens capensis*), and soft rush (*Juncus effusus*).

(c) Species Survey

An assessment of wildlife species and habitat was conducted during Facility Site visits in April 2013, for an area that included one quarter mile around the Facility Site in addition to the Construction Laydown Area. Wildlife species were identified by visual

and auditory observations, tracks, necropsy, and scat. Table 07-12 lists wildlife species observed during field investigations. Land use of the Facility Site, Construction Laydown Area and surroundings is active agriculture, pasturelands, and forested upland and riparian corridors, which may provide moderate quality wildlife habitat.

TABLE 07-12
Wildlife Species Observed on and Adjacent to the Facility Site and Construction Laydown Area

Common Name	Latin Binomial	Observation
American Crow	*Corvus brachyrhynchos*	Visual
American Robin	*Turdus migratorius*	Visual
Blue Jay	*Cyanocitta cristata*	Visual
European Starling	*Sturnus vulgaris*	Visual
Eastern Chipmunk	*Tamias striatus*	Visual
Field Sparrow	*Spizella pusilla*	Auditory
Fowlers Toad	*Bufo fowleri*	Visual
Grey Catbird	*Dumetella carolinensis*	Visual
Grey Squirrel	*Sciurus carolinensis*	Visual
Northern Cardinal	*Cardinalis cardinalis*	Auditory, Visual
Northern Mockingbird	*Mimus polyglottos*	Auditory, Visual
Raccoon	*Procyon lotor*	Tracks, Necropsy
Red Fox	*Vulpes vulpes*	Scat
Spicebush Swallowtail	*Papilio troilus*	Visual
Tadpoles	*Rana sp.*	Visual
Tiger Swallowtail	*Papilio glaucus*	Visual
Turkey Vulture	*Cathartes aura*	Visual
White-tailed Deer	*Odocoileus virginianus*	Tracks, Scat
Wild Turkey	*Meleagris gallopavo*	Visual
Woodchuck	*Marmota monax*	Burrow

Aquatic invertebrates (*Plecoptera* sp.) were observed within intermittent and perennial unnamed tributaries of Pipes Fork. Tadpoles (*Rana* sp.) were observed within the lower portions of the reach of the intermittent, unnamed tributary of Pipes Fork near its confluence with the perennial unnamed tributary of Pipes Fork. Unidentified small fish such as minnows or darters were observed only in the perennial unnamed tributary of Pipes Fork that extends along the Facility Site's eastern boundary.

Avian species may utilize the Facility Site and Construction Laydown Area for foraging during spring and fall migration periods along with the presence of non-migratory resident species. Forested plant communities encompass approximately 53 acres of the Facility Site and Construction Laydown Area, although they are located along the fringe of the proposed limit of disturbance. The riparian corridors are predominantly forested and mostly occur within ravines or at the toe of slopes, again outside of the limit of proposed work. Common passerines, doves, and corvids would be expected to utilize this type of area for foraging and/or nesting. Representative species that could be found to utilize the Facility Site and Construction Laydown Area include: house sparrow (*Paser domesticus*), European starling (*Sturnus vulgaris*), song sparrow (*Melospiza melodia*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), and blue jay (*Cyanocitta cristata*).

Although few mammals or signs of mammals were observed, mammals that reasonably could utilize the Facility Site and Construction Laydown Area include herbivorous species such as white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), carnivorous species such as red fox (*Vulpes vulpes*) and omnivores such as raccoon (*Procyon lotor*), North American opossum (*Didelphis virginiana*), and striped skunk (*Mephitis mephitis*). The proposed limit of disturbance consists predominantly of agricultural fields with a fringe of forested uplands and provide low quality habitat.

Although only two amphibians (tadpoles and Fowler's toad) were observed, reptile and amphibian species such as eastern garter snake (*Thamnophis sirtalis*) and

American toad (*Bufo americanus*) would be expected to occur within the Facility Site and Construction Laydown Area. The proposed limit of disturbance consists of predominantly agricultural fields with a fringe of forested uplands and provide low quality habitat. Other more aquatic species such as the green frog (*Rana clamitans*), would be expected to potentially inhabit the intermittent and perennial tributaries to Pipes Fork.

(d) Ecological Study

Wetland Assessment – Wetlands were delineated within and around the Facility Site and Construction Laydown Area. Details characterizing wetlands and streams identified within the survey area are provided in the Wetland Delineation and Stream Identification Report provided in Appendix F. The majority of identified wetlands are associated with intermittent and perennial tributaries to Pipes Fork, and are outside of the proposed area of activity. Two small emergent wetlands, totaling 450 square feet, are located within the proposed Facility footprint.

Ecological Impact Study Summary – The ecological impact studies conducted for the Facility have relied upon field surveys conducted in April 2013 and existing information obtained from resource agencies. The Facility has been carefully sited to minimize the need for tree clearing and, instead, use portions of the Facility Site that have been in active agricultural use. Wetlands have been avoided by the Facility layout, with the exception of two very small wetlands (totaling 450 square feet) that cannot be avoided within the Facility footprint due to constraints associated with existing topography and required grading and layout features. Due to the very small level of impact, it is anticipated that authorization will be under a nationwide permit from the

U.S. Army Corps of Engineers (USACE), reflective of the proposed minor discharges of less than 0.1 acre of fill material.

(e) List of Major Species

Endangered or Threatened Species – The United States Fish and Wildlife Service (USFWS) and the ODNR were contacted regarding the potential presence of any sensitive natural communities or rare or endangered species in the vicinity of the Project Area (Appendix L). The response letter from ODNR indicated that no records exist in their database of unique ecological attributes or rare or endangered species within 1 mile of the Facility Site.

The USFWS correspondence indicated there were no federal wilderness areas, wildlife refuges, or designated critical habitat within the vicinity of the Facility Site, but requested additional information to confirm the potential for impact to the bald eagle (*Haliaeetus leucocephalus*) or the Indiana bat (*Myotis sodalist*). Additional information has been provided to the USFWS documenting that field reconnaissance in the Project Area did not identified eagle nests in proximity to the Facility Site, and that the clearing necessary for the Facility will be restricted and will not occur from April 1 through September 30. Although the total permanent clearing associated with the Facility is limited and no roost trees have been specifically identified, shagbark hickories of various size do occur within the Facility Site and adjoining areas. Restricting clearing to the winter months, when Indiana bats would not be using roost trees, provides a safeguard against any potential impact to the Indiana bat.

Recreational or Commercial Species – Based on observations of the Facility Site and the surrounding agricultural and industrial land use, limited recreational or

commercial species are likely to be present. Terrestrial game species include white-tail deer and mourning dove. Mourning doves breed in areas of shrubs and small trees, habitats that will largely remain undisturbed. Mourning doves forage for seeds in open fields and, although the Facility will affect some agricultural land, the percentage lost in the local area is small and should not reduce foraging habitat to a degree that would affect the mourning dove population.

(2) Construction

(a) Impact of Construction on Undeveloped Areas

Facility construction will result in both temporary and permanent impacts on plants and animals at the Facility Site and Construction Laydown Area. Temporary impacts to wildlife are likely to result during the construction phase as increased noise levels and human activity may displace wildlife to surrounding habitats. After construction is complete, some of the displaced wildlife is expected to recolonize those areas of the Facility Site that will remain undeveloped.

The Facility is primarily located within existing agricultural fields. Two small wetland areas, totaling 450 square feet, are unavoidable and will be filled to accommodate the Facility; all other wetlands and streams will be avoided. It is anticipated that this unavoidable fill will be authorized through USACE's nationwide permit program.

Some Facility features and grading will extend into wooded portions of the Facility Site. Of the total 77-acre Facility Site, the footprint of the proposed Facility and switchyard will occupy 17 acres. Additional work space is required for temporary work. Also, clearing of tall vegetation will be required to allow for electrical wires extending

from the step-up transformers to reach the on-site switchyard and then extend along the proposed electrical interconnection corridor. A total of 7 acres of permanent clearing of wooded vegetation will occur within the Facility Site. Approximately 5.5 acres of wooded vegetation will be cleared during construction but allowed to revegetate, and an additional 3.8 acres will be allowed to revegetate with only low-growing species due to electrical wires extending overhead.

Within the Construction Laydown Area, the access road and other permanent features will be located within agricultural fields. Approximately 2 acres of wooded area will be cleared during construction but allowed to revegetate following completion of construction, while another 0.5 acre of wooded area will need to be maintained with low-growing species due to the electrical transmission corridor. Additional, limited clearing associated with the proposed electric transmission corridor will be addressed in a separate filing with the OPSB.

Given the characteristics of the Facility Site and the Facility's location and design within in, no significant impacts to ecological resources are anticipated that would require special mitigation.

(b) Impact of Construction on Major Species

Impacts to endangered or threatened species are not anticipated, based on correspondence from the ODNR and USFWS, field-confirmation that Facility Site and Construction Laydown Area habitat is not suitable for federally listed species, and seasonal restriction of clearing to be protective of potential Indiana bat presence. Significant construction impacts on recreational or commercial species are also not

anticipated. The limited terrestrial habitat to be altered that would be suitable for such species is not anticipated to have an adverse impact on species populations.

(c) Mitigation for Short-Term and Long-Term Construction Impacts

The following measures are proposed to ensure that short- and long-term construction impacts to ecological resources remain insignificant:

- Sediment and Erosion Control – A detailed sediment and erosion control plan will be developed prior to initiating Facility construction. The plan will detail temporary stormwater collection ponds as well as silt fencing or other erosion control devices proposed to limit off-site transport of sediment. In addition, a Notice of Intent will be filed with the Ohio EPA for coverage under the NPDES General Construction Stormwater Permit. Preliminary information is provided in the Stormwater Management Plan presented in Appendix B.
- Dust and Particulate Control – During grading activities, dust may be generated as exposed soils dry. Water sprays or other dust suppression methods will be employed on areas of exposed soils to minimize the potential for dust generation.
- Revegetation – Areas of the Facility Site temporarily impacted by construction activities will be revegetated as soon as possible following completion of construction to stabilize exposed areas of soil. Species proposed for the seeding will be selected to ensure compatibility and suitability with surrounding agricultural areas. Per comments received from the USFWS (Appendix L), care will be taken to prevent the spread of invasive species through revegetation processes.

(3) Operation

(a) Impact of Operation on Undeveloped Areas

Facility operation is expected to result in a localized increase in lighting and noise in its immediate vicinity. Wildlife species are not anticipated to significantly use the agricultural fields where the majority of the development is proposed. Wildlife species present on the Facility Site and Construction Laydown Area are expected to become acclimated to the normal Facility operations over time.

(b) Impact of Operation on Major Species

State threatened or endangered terrestrial or aquatic species or their habitats will not be impacted by Facility operation. Once the limited clearing necessary for construction is completed, Facility operation would not be expected to affect the potential for Indiana bat to use surrounding habitat. Recreational or commercial species will also be unaffected by Facility operation; the Facility has been designed to limit ecological impact by being sited in a location with little terrestrial habitat diversity.

(C) Economics, Land Use and Community Development

(1) Land Uses

(a) Land Use Mapping

Figure 02-1a through 02-1i illustrates land uses within 5 miles of the Facility Site, while Figure 07-5 focuses on land uses within a 1-mile radius of the Facility Site. As can be seen, the majority of land uses in the Project Area consist of agricultural land and forest vegetation. Utility easements traverse the area, and residences are scattered throughout. The closest recreational use is to the west, the Carroll County Veterans Park.

The nearest school is the Carroll Hills facility, located approximately 0.5 mile from the proposed Facility.

(b) Residential Structures

No residential structures are located on the Facility Site. As can be seen in Figure 07-5, the closest residences to the Facility are located along Mobile Road NE. Five residences located on Mobile Road NE are located within 1,000 feet of the Facility, with the nearest residence located approximately 350 feet to the south. Across the street from that residence are two other homes, located approximately 460 and 635 feet, respectively, from the Facility. Further north on Mobile Road NE, a residence is located approximately 670 feet to the east of the Facility. Further south on Mobile Road NE, a residence is located approximately 800 feet to the south of the Facility.

(c) Land Use Impact

The Facility's impact on surrounding land uses within a 1-mile radius will be minimal, and consistent with Carroll County's economic development plans for this area. As shown in Figure 07-5, the Facility Site is currently comprised of lands that are in active agricultural use or wooded. Electric transmission lines and natural gas pipeline corridors surround the Facility Site. County-owned land currently providing various services and targeted for future development as an industrial and commercial park is located immediately north along Route 9.

Table 07-13 presents land uses within l mile of the Facility Site. The character of surrounding land within a mile radius of the Facility Site is very similar to the immediate vicinity; about 86 percent of land within 1 mile is in agricultural, forested/vegetation or water land use. Residences are scattered throughout the area, with residential representing

about 3.5 percent. A few small concentrations of commercial development exist (about 9 percent of the area) to the north of the Facility Site. Carroll Hills is the closest school to the Facility Site, at approximately 0.5 mile. No other schools or places of worship are located within the 1-mile radius. The only recreational land use within 1 mile is the Veteran's Park, approximately 0.5-mile from the Facility.

TABLE 07-13
Land Use within a One-Mile Radius of the Facility Site

Land Use	Approximate Acres	Approximate Percentage of Total Area
Agricultural	1,393	46%
Commercial	271	9%
Forest, shrub and brush	1,194	40%
Institutional	9	0.3%
Lakes	5	0.2%
Residential	99	3.5%
Utility	26	1%

(d) Structures to be Removed or Relocated

No structures will be removed or relocated as a result of the proposed Facility.

(e) Formally Adopted Plans for Future Use of the Site and Surrounding Lands

Carroll County has not produced a formal land use plan for many years. However, the County Commission, CIC and various other groups within the County actively anticipate and plan for strategic growth within the community. No formally adopted plans exist for future use of the Facility Site. The land located north of the Facility Site along Route 9 is owned by the Carroll County CIC and is specifically advertised as an area with priority in the County for economic development, including commercial and industrial uses.

(f) Applicant Plans for Concurrent or Secondary Uses of the Site

There are no planned concurrent or secondary commercial uses of the Facility Site other than for the proposed Facility and its associated facilities, such as the natural gas pipeline interconnection and tie-in to the existing overhead transmission lines.

(2) Economics

(a) Annual Total and Present Worth of Construction and Operation Payroll

Construction of the Facility is scheduled to take place during the period from February 2015 to May 2017. Facility construction is estimated to generate $943.8 million in total economic impact throughout Ohio, $308.3 million in gross state product, and create 1,403 jobs and $153.1 million in new wages over the 28-month construction period (representing direct, indirect and induced benefits).

Operations of the Facility are estimated to annually generate $17.0 million in total economic impact and $9.4 million in gross state product, as well as to create 72 permanent jobs and $5.6 million in annual wages over the Facility's operational life (representing direct, indirect and induced benefits).

See Appendix M for the Economic Assessment report and additional analysis of this information.

(b) Construction and Operation Employment

The number of employees and the duration of construction activities will vary on a monthly basis in accordance with the Facility construction schedule; an average of 500 jobs is anticipated to come from within Ohio during the 28 month construction effort (see Appendix M). Approximately 25 to 30 employees will be directly employed during Facility operation. CCE will seek to use local labor where practical.

(c) Increase in Local Revenue

CCE intends seek an Enterprise Zone (EZ) Agreement that would result in a significant increase in local revenues and payments to affected school districts and other taxing units. The terms of the EZ Agreement would require CCE to pay annual compensation to the Carrollton Exempted Village School District (the School District) and potentially other taxing units in exchange for real and personal property exemptions. CCE is also aware that the Village of Carrollton and Washington Township may wish to establish a joint economic development district (JEDD). A JEDD is a special body (corporate and politic) than can levy a local income tax (up to 1%) in an unincorporated area.

EZ Agreement discussions with Carroll County officials have been very preliminary to date and CCE has not been approached by the Village or the Township with regards to their interest in establishing a JEDD, therefore, it is very difficult to predict the total increase in local revenues. However, CCE estimates the total annual amount of compensation payments would be approximately [redacted] per year during the 15-year term of the EZ Agreement.

(d) Economic Impact on Local Commercial and Industrial Activities

Construction and operation of the proposed Facility will have a substantial positive effect on local commercial and industrial activities. Not only does the Facility represent a substantial economic contribution to the County's plans for commercial and industrial development along Route 9, Facility construction and operations will benefit Ohio commercial and industrial activities through direct purchases related to construction

activities, indirect purchases from purchase of local supplies and induced impacts from workers spending wages locally.

CCE has retained an independent firm to analyze the direct, indirect, and induced economic impact of constructing and operating of the Facility. The full details of the analysis can be found in Appendix M. A brief summary of the results are discussed below.

Direct economic impacts associated with the Facility reflect the preliminary construction budgets for the Facility. The expected result is $655.2 million in direct economic impact to the State of Ohio during construction, including $148.3 million in gross state product, an average of 500 jobs at any one time during construction, and $91.2 million in wages over the 28-month construction period.

Indirect economic impacts associated with the Facility reflect the purchasing of supplies and services, which is expected to result in the following over the 28-month construction period:

- $114.1 million of indirect economic impact to the State of Ohio during construction, including $56.7 million in gross state product, an average of 294 jobs at any one time during construction, and $36.7 million in wages; and
- $62.5 million of indirect economic impact to the Northeast Ohio Region during construction, including $31.1 million in gross regional product, an average of 156 jobs during construction, and $20.1 million in wages.

Induced economic effects associated with the Facility reflect worker wages being spent locally, which is expected to result in the following over the 28-month construction period:

- $174.4 million of induced economic impact within the State of Ohio, including $103.3 million in gross state product, an average of 609 jobs at any one time during construction, and $56.8 million in wages; and
- $127.4 million of induced economic impact within the Northeast Ohio Region, including $76.2 million in gross regional product, an average of 450 during construction, and $41.8 million in wages.

During the 30-year operational phase, the Facility will also provide direct, indirect and induced economic benefits to the Northeast Ohio Region and the state of Ohio. These effects can be summarized as follows:

- $11.7 million of annual direct economic impacts to the State of Ohio, including $6.2 million in gross regional product, 29 new jobs and $3.8 million in annual wages;
- $0.9 million of annual indirect economic impact to the State of Ohio, including $0.5 million in gross state product, 6 new jobs, and $0.3 million in annual wages;
- $4.5 million of annual induced economic impact to the State of Ohio, including $2.7 million in gross state product, 37 new jobs, and $1.5 million in annual wages;
- $0.7 million of annual indirect economic impact to the Northeast Ohio Region, including $0.4 million in gross regional product, 5 new jobs, and $0.3 million in annual wages; and

- $4.3 million of annual induced economic impact to the Northeast Ohio Region, including $2.6 million in gross regional product, 35 new jobs, and $1.4 million in annual wages.

These economic impacts do not include the effect of local property tax payments that will be made by CCE for the Facility.

(3) Public Services and Facilities

The proposed Facility will provide significant economic value to the region. However, since the Facility will have new employment in the range of 25 to 30 during operations, and will not place major demands on local infrastructure, there will not be a significant impact on local services. It is presumed that the staffing of construction and operation jobs can be met regionally, with no significant need for workers to relocate into the area.

Workers will commute to the Facility Site on a daily basis. Hiring of non-resident workers is expected to be limited to highly specialized skills for brief periods of time; it is expected that such workers would stay in local motels and would not require new housing.

The Facility represents a favorable economic impact to the local community because the region receives the benefit of added employment and purchases of material, supplies, and services without having to expend public capital for expanding local services. The economic impacts associated with construction and first 30 years of operation of the Facility have been determined in a study is attached as Appendix M.

The principal impact on public services would be short-term increases in traffic on routes leading to the Facility due to deliveries of equipment and materials during

construction. Workers arriving and departing during construction would also increase traffic. Some traffic management during the construction phase may be necessary in the immediate vicinity of the Facility Site to ensure safe and efficient maintenance of existing traffic patterns and usages. A preliminary Transportation Management Plan is provided in Appendix G. Once the Facility is operational, related traffic would be minimal and would not be expected to significantly impact local roadways.

Potential emergency service requirements will be coordinated with local officials. Local emergency response personnel will be trained to be familiar with the Facility's emergency response system. As noted in Section 4906-13-04 (C)2(d), and Emergency Response Plan will be prepared prior to construction mobilization in order to anticipate and prepare for potential emergencies. Through this process, coordination with local officials and responding entities will inform the procedures identified, and appropriate training of personnel will reflect specific conditions and resources of the Facility. The Emergency Response Plan utilized during construction will be modified to reflect operational conditions, and similar detailed review of procedures and resources will occur to ensure appropriate measures are in place.

(4) Impact on Regional Development

(a) Impact on Regional Development

The Facility will have a sizeable positive impact on regional development because it will contribute to the flow of investments into the local economy, without the need for governmental investment.

Construction of the Facility will employ workers both directly and indirectly in the Northeast Region of Ohio, where Carroll County is located. As detailed in the

Economic Assessment provided in Appendix M, the economic benefits associated with the Facility's 28-month construction period will be substantial.

Since regional human and material resources are abundant and mobile, no scarcities in labor or materials and equipment are likely. Accordingly, any requirement for non-regional resources, with the exception of major equipment, is expected to be negligible. Additional housing and other services, such as education, public health and public safety, are very unlikely to be required because the labor force for the Facility is already locally available.

Transportation facilities will not require expansion as a result of the Facility because the impacts of construction will be temporary. Commuting by the approximately 25 – 30 operating personnel is not expected to have a significant impact on local roads.

(b) Compatibility with Regional Plans

Although no formal regional plans exist, with the exception of economic plans reflected by the CIC, the Facility is consistent with Carroll County's focus on economic development along Route 9 in the vicinity of the Project Area. The Facility is also consistent with regional energy planning, as evidenced by the review ongoing by PJM that indicates favorable interconnection into the existing AEP 345 kV transmission grid located just west of the Facility Site. The PJM System Impact Study has been issued (Appendix D), and identifies the need for no network upgrades as a result of the Facility

(D) Cultural Impact

A Phase I archaeological survey, including a literature review, was submitted to the OHPO for its review on June 25, 2013 (Appendix N). The findings of the investigation are described below.

(1) Cultural Resource Mapping

The map provided in Figures 07-6a through 07-6i depicts formally adopted land and water recreation areas and registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within a 5-mile radius of the Facility Site.

(2) Cultural Resource Impacts

No significant impact to the continued meaningfulness of registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significant is anticipated due to the Facility, as discussed in this section and Section 4906-13-07(D)(3).

A Phase I archaeological investigation was conducted for an area including the Facility Site and Construction Laydown Area (Appendix N). These investigations involved surface collection, subsurface testing, and visual inspection. The work resulted in the identification of three cultural finds, none of which possess significant archaeological value.

The first find was a chipped-stone knife or projectile point fragment within the Construction Laydown Area, attributable to an unspecified prehistoric Native American period. Supplemental shovel testing around the find identified no further artifacts or cultural features and it was determined that the isolated find does not possess any significant archaeological value.

The second cultural find was located outside of the Facility Site to the north, and consists of a 19th century stone foundation corresponding to a map-documented structure depicted on the 1874 *Carroll County Atlas*. It was concluded that this foundation was a barn on the John Shook farm during the period circa 1860 to 1880. Shovel testing around and within the barn structure yielded no cultural artifacts or features.

The third cultural find was also located outside of the Facility Site to the north, and was the ruins of a modern hunting cabin built circa 1990 on the site of a residence depicted on the 1874 County atlas. It was concluded that there are no significant remnant archaeological traces of the former 19th century structure.

No further work is recommended for the archaeological sites in the vicinity of the Facility Site and Construction Laydown Area.

(3) Cultural Resource Landmarks

No cultural resource landmarks or historic structures are located within the Facility Site or Construction Laydown Area, therefore, the primary potential effect considered for such resources would be visual. The Historic Architecture Survey completed for the Facility is provided in Appendix O. As shown in Figures 07-6a through 07-6i, a total of five previously-listed National Register of Historic Places (NRHP) properties and 158 Ohio Historical Inventory (OHI) resources (including the five NRHP-listed properties), were identified within 5 miles of the Facility Site.

To evaluate potential visual effects associated with the Facility, an Area of Potential Effect (APE) was established based on the use of visual screening tools and further characterized by distance. Because the tallest visual element will be the Facility stacks, distance zones were established based on the APE for cell towers (similarly tall structures) included in the Nationwide Programmatic Agreement for Review of Effects on Historic Properties for Certain Undertakings Approved by the Federal Communications Commission. Using this guidance, the APE for the Facility was divided into a zone of up to 0.75 mile from the Facility and a more distant zone extending out to the boundaries of the 5 mile radius.

In the closer zone, a reconnaissance survey was undertaken of all buildings style-dated in the field as 50 years or older. No previously recorded NRHP or OHI buildings existed within this distance zone. Data were recorded on 15 previously unrecorded structures in this area. None of these properties is recommended as potentially eligible to the NRHP.

Within the further distance zone, both intervening topography and distance play a significant role in reducing visibility. The focus in this portion of the survey area was on examining previously documented resources to assess their significant and the potential effect of the Facility on their continued meaningfulness.

Of the five NRHP-listed properties within that zone, one was completely outside the APE in an area of no visibility. The Henry and Mary Pottorf House and Farmstead, in Mechanicstown, is at the very edge of the 5-mile radius to the northeast. The remaining three (the Van Horn Building/Salzman Drugstore, Carroll County Courthouse, and Daniel McCook House) are all located in downtown Carrollton, more than 2.5 miles from the Facility, and in a densely settled area where intervening buildings significantly obstruct more distant views. None of these NRHP-listed structures are anticipated to be significantly affected by the Facility's presence.

Of the 158 OHI-listed properties, 64 were eliminated from the APE due to obstruction of views by local topography. Of the 94 remaining structures, 88 of them are located in downtown Carrollton where, as previously mentioned, views are not only distant but affected by the densely settled nature of the Village area. The remaining 6 structures are located in the surrounding countryside. While the Facility may be visible from some locations within this portion of the APE, views are anticipated to

predominantly be limited to the top of the stacks. Consideration of vegetation would further reduce visibility from the surrounding area. In addition, the Facility and its stacks will not be the only modern intrusion in the landscape; transmission lines, other lighted towers, and other modern buildings exist throughout the landscape. From viewers in this distance zone, where the Facility is visible, it will simply be another distant feature on an already crowded horizon.

(4) Land and Water Recreation Area Mapping

The map provided in Figures 07-6a through 07-6i depicts formally adopted land and water recreation areas and registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within a 5-mile radius of the Facility Site.

(5) Land and Water Recreation Areas

There are 4 parks, recreation areas and/or golf courses that exist within 5 miles of the Facility Site, as shown in Figures 07-6a through 07-6i. This includes the Carroll County Veterans Park which is located approximately 0.5 mile west of the Construction Laydown Area. The Veterans Park is owned by the Carroll County Veterans Club, Inc., a private associated established in 1945. The facility incorporates almost 60 acres, and includes a clubhouse, ball fields, and the Veterans Memorial Pool, among other amenities. The Veteran's Memorial Pool, which is a complex containing three pools, was originally constructed in 1972 by the Veterans Club. Ownership transferred to the Carrollton Exempted Village School District for a period of time; some mapping indicates a "Waterworks Park" in that vicinity. In 2009, ownership transferred to a local non-profit, Carroll County Veteran's Club Memorial Fund Inc. and it is operated from the Veterans Park.

The second park within the 5-mile radius is the Bluebird Farm Park located approximately 3 miles from the Facility Site, just south of the Village of Carrollton. This facility is operated by the Carroll County Park District, and is sited on a 55-acre farm homesteaded in 1816. It includes a refurbished farm house, pre-Civil War barns, gardens, walking trails, an amphitheater, a childhood toy museum, and a bed & breakfast/function facility.

The Carroll Meadows Golf Course is located to the south, just over 1 mile from the Facility Site and north of the Village of Carrollton. Carroll Meadows is an 18-hole, par 71 professionally designed golf course. There is a pro-shop on site and food available.

Carroll County Fairgrounds is located just south of the golf course. Established in 1850, the Carroll County Fair opens on the third Thursday of July each year.

None of these recreation areas are in immediate proximity to the Facility. No impact to land or water recreation is anticipated to result.

(6) Recreational Areas and Potential Impacts

The proposed Facility is not expected to have a negative impact on land and water recreational resources identified within a 5-mile radius. The closest recreational feature is the Veterans Park, a private facility located just within 0.5 mile of the Facility Site.

(7) Measures to Minimize Visual Impacts

Figure 02-4 presents an artist's rendering of the proposed Facility. The Facility has been located on approximately 17 acres of a 77-acre parcel, retaining the surrounding wooded vegetation as a visual buffer. This careful siting, in combination with the natural topographic screening associated with terrain on the Facility Site and surrounding areas, will minimize the Facility's potential visual effect.

(E) Public Responsibility

(1) Public Interaction Program

Facility-related work within the community has been on-going since 2011, when informal discussions with interested parties began associated with exploring potential sites. In July of 2012, additional evaluation and interaction with local economic development and other officials was undertaken.

CCE has developed a number of Facility-related presentations for various meetings, and has met with reporters from the local newspapers to advise them of the Facility and its status. CCE has created a Facility web-site, as a means of keeping the community informed, and intends to open a local office in the future.

On July 2, 2013, a pre-application conference meeting was held with the OPSB Staff in Columbus, Ohio to introduce CCE and the Facility. On August 22, 2013, CCE held a public information meeting as required by OAC Rule 4906-5-08. The meeting was properly noticed in the local newspapers. Representatives for the Facility, including CCE personnel and consultants staffed the meeting, which included a display of Facility information and an opportunity to speak one-on-one with Facility representatives. In addition, CCE and its representatives have held numerous meetings with local public officials and nearby neighbors to discuss the Facility.

CCE will continue to engage in active public outreach prior to, during and after Facility construction. Once the Facility is in commercial operation, CCE intends that its local personnel will maintain a high level of community involvement.

During the Facility's construction phase, an on-site construction manager will be available to respond to local issues.

To the extent individuals would like to tour the Facility, once operational, CCE will host and provide complimentary tours of the Facility. This is anticipated to be an excellent tool for educating the public about electric generation technology, and is consistent as well with the County's plans for offering education and training for young people interested in careers in the energy field.

(2) Liability Compensation Plans

CCE will carry significant amounts of liability insurance. The Facility will be covered under CCE's liability insurance programs for general commercial liability insurance and automobile liability insurance during the Facility's construction and operation.

(F) AGRICULTURAL DISTRICT IMPACT

No agricultural district land is located within the boundaries of the Facility Site or Construction Laydown Area.

(1) Agricultural Land Mapping

Figure 07-7 illustrates agricultural land located within and proximate to the boundaries of the proposed Facility Site and Construction Laydown Area. No agricultural district land is located within the boundaries of the Facility Site or Construction Laydown Area.

(2) Potential Impact to Agricultural Lands

(a) Potential Construction, Operation and Maintenance Impacts

No impacts to field operations, irrigation or field drainage systems associated with agricultural district lands will occur as a result of construction, operation, or maintenance

of the proposed Facility on agricultural district lands. No such lands were identified on the Facility Site or Construction Laydown Area and measures will be taken to ensure that no impact will occur to adjacent properties. The use of the Facility Site and easements that will extend across the Construction Laydown Area will eliminate land that is currently in agricultural use from future agricultural use during the Facility's life for the 77-acre Facility Site and the access road; however, outside of the easement areas, the Construction Laydown Area will be allowed to return to its current agricultural use or other uses as the landowner determines. It is estimated that approximately 35 acres of agricultural land will be taken out of production during the Facility's operating life.

(b) Agricultural Mitigation Practices

No agricultural districts will be impacted that would require special mitigation procedures. The Facility Site and Construction Laydown Area include agricultural lands. Construction will incorporate as mitigation identification of any drainage tile systems utilized by adjoining parcels and, if they will be affected, they will be either relocated or restored.

(3) Potential Impact on Agricultural Viability

No impacts will occur as a result of construction, operation, or maintenance of the proposed Facility on agricultural district lands since no such lands were identified on the Facility Site or Construction Laydown Area. Once the Facility is constructed, the majority of the Construction Laydown Area can return to agricultural production; only the easement required for the access road will be restricted from agricultural use. Approximately 35 acres of agricultural land Site will remain out of agricultural production for the Facility's life. Where field tile disruptions are necessary, CCE will

work with appropriate landowners to repair or relocate such drainageways, or to facilitate suitable drainage alternatives.

Summary: Application for a Certificate of Environmental Compatibility and Public Need to Construct an Electric Generation Facility electronically filed by Ms. Miranda R Leppla on behalf of Carroll County Energy LLC