Application for Certificate of - Environmental Compatibility and Public Need

Case No. 17-1189-EL-BGN

Harrison Power Project
Village of Cadiz, Harrison County, Ohio

Submitted by:
Harrison Power LLC
3000 Wilcrest Drive, #200
Houston, TX 77042

With assistance from:
APTIM
500 Penn Center Boulevard, Suite 1000
Pittsburgh, Pennsylvania 15235

September 2017

Table of Contents

List of Tables iv

List of Figures v

List of Appendices v

4906-4-02 Project Summary and Applicant Information 1
(A) SUMMARY 1
(1) General Purpose of the Facility 1
(2) Description of the Facility 1
(3) Site Suitability 2
(4) Facility Schedule 2
(B) ADDITIONAL INFORMATION 2
(1) Future Plans 2
(2) Applicant Information 2

4906-4-03 Project Description and Schedule 4
(A) DETAILED DESCRIPTION OF PROJECT AREA 4
(1) Project Map 4
(2) Project Area 4
(B) PROJECT DESCRIPTION 5
(1) Project Details 5
(2) Description of Construction Methods and Project Components 6
(3) Description of New Transmission Facility 9
(4) Map of Project Site 9
(C) DETAILED PROJECT SCHEDULE 9
(1) Schedule 9
(2) Construction Sequence 9
(3) Delays 9

4906-4-04 Project Area Selection and Site Design 10
(A) SITE SELECTION PROCESS 10
(1) Description of Study Area 10
(2) Map of Evaluated Sites 10
(3) Siting Criteria 10
(4) Process for Identifying the Proposed Site 10
(5) Factors in Selecting the Proposed Site 10
(B) PROJECT LAYOUT 12
(1) Constraints Map 12
(2) Project Layout and Alternatives Considered 12
(3) Comments Received 12

4906-4-05 Electric Grid Interconnection 13
(A) ELECTRIC GRID INTERCONNECTION 13
(B) FACILITY INTERCONNECTION WITH REGIONAL POWER GRID 14
(1) Generation Interconnection Request Information 14

(2) Interconnect Studies 14
(A) OWNERSHIP 14
(B) CAPITAL AND INTANGIBLE COSTS 15
(1) Capital and Intangible Costs 15
(2) Capital Cost Comparison 15
(3) Present Worth and Annualized Capital Costs of Alternatives 16
(C) OPERATION AND MAINTENANCE EXPENSES 16
(1) Estimated Annual Operations and Maintenance Expenses 16
(2) Operation and Maintenance Expenses Comparison 16
(3) Present Worth and Annualized Operation and Maintenance Expenses for Alternatives 16
(D) DELAYS 17
(E) ECONOMIC IMPACTS 17
(1) Annual Total Present Worth of Construction and Operation Payroll 17
(2) Construction and Operation Employment 18
(3) Increases in Local Revenue (Public Entities) 18
(4) Economic Impact on Commercial and Industrial Activities 18
(F) PUBLIC RESPONSIBILITY 20
(1) Public Information Program 20
(2) Liability Compensation Plans 20
(3) Impacts to Surrounding Infrastructure 20
(4) Transportation Permits 21
(5) Plan for Decommissioning 21

4906-4-07 Air, Water, Solid Waste, and Aviation Regulations 22
(A) AIR, WATER, SOLID WASTE, AND AVIATION REGULATIONS 22
(B) AIR QUALITY 22
(1) Preconstruction 22
(2) Construction 34
(3) Operation 34
(C) WATER QUALITY 37
(1) Preconstruction Water Quality 37
(2) Construction Water Quality 38
(3) Operation Water Quality 38
(D) SOLID WASTE 40
(1) Preconstruction 40
(2) Construction 40
(3) Operation 40
(4) Licenses and Permits 40
(E) AVIATION 41
(1) Surrounding Air Facilities 41
(2) Federal Aviation Administration Filings 41

4906-4-08 Health and Safety, Land Use and Ecological Information 42
(A) HEALTH AND SAFETY 42
(1) Equipment Safety and Reliability 42
(2) Impact of Air Pollution Control Equipment Failures 47
(3) Noise 51

(4) Water 64
(5) Geology 65
(6) High Winds 66
(7) Blade Shear Impacts 67
(8) Ice Throw Impacts 67
(9) Shadow Flicker Impacts 67
(10) Interference with Radio/TV Reception 67
(11) Interference with Military/Civilian Radar Systems 67
(12) Interference with Microwave Communication Paths 67
(B) ECOLOGICAL RESOURCES 67
(1) Existing Ecological Resources 67
(2) Ecological Resource Impacts During Construction 72
(3) Ecological Resource Impacts Post-Construction, Operation, and Maintenance 73
(C) LAND USE AND COMMUNITY DEVELOPMENT 74
(1) Land Use Information and Impacts 74
(2) Land Use Plans 75
(D) CULTURAL AND ARCHAEOLOGICAL RESOURCES 75
(1) Cultural Resource Mapping 75
(2) Cultural Resource Impacts 75
(3) Recreation Areas 77
(4) Visual Impacts 77
(E) AGRICULTURAL DISTRICTS AND POTENTIAL AGRICULTURAL IMPACTS 77
(1) Agricultural Land Mapping 77
(2) Potential Impact to Agricultural Lands 78

List of Tables

Table 3-1 Fuel Characteristics
Table 3-2 Pollutant Quantities
Table 6-1 Estimated Capital and Intangible Costs
Table 6-2 Additional Economic Impacts - Construction
Table 6-3 Additional Economic Impacts - Operation
Table 7-1 Background Ozone Monitoring Data
Table 7-2 Expected Efficiency, Power Consumption and Operating Costs of Air Pollution Control Equipment
Table 7-3 Maximum AERMOD Predicted Impact Concentrations
Table 8-1 Air Pollution Control Equipment
Table 8-2 Sound Pressure and Sound Pressure Levels of some sources
Table 8-3 Subjective Response to Sound Pressure Levels
Table 8-4 Ambient Sound Level Measurement Locations
Table 8-5 Ambient Sound Levels
Table 8-6 Predicted Construction Noise Levels
Table 8-7 Modeling Parameters
Table 8-8 Equipment Noise Contribution Levels
Table 8-9 Building Wall & Roof Acoustical Performance
Table 8-10 Comparison of Predicted Sound Levels with Lowest Ambient Sound Levels
Table 8-11 Soil Properties and Characteristics
Table 8-12 Physical Characteristics of Streams within the Project Area
Table 8-13 Vegetative Survey of Wetland and Upland Communities
Table 8-14 Wildlife Species Observed on and Adjacent to the Project Area and Construction Laydown Area

List of Figures

Figure 2-1 Project Location
Figure 3-1 Schedule
Figure 3-2 Surrounding Area
Figure 3-3 Project and Vicinity
Figure 3-4a Plot Plan
Figure 3-4b Facility Components
Figure 3-4c Monitoring Locations
Figure 3-5 Gas Corridors
Figure 4-1 Site Selection Constraints
Figure 7-1 Air Monitoring Locations
Figures 7-2 through 7-25 Air Mapping
Figure 7-26a and 726b Project Water Balance
Figure 7-27 Water Monitoring Location
Figure 8-1 Noise Monitoring Locations
Figure 8-2 A-weighted Noise Propagation Contour
Figure 8-3 Aquifers
Figure 8-4 Soils and Floodplains
Figure 8-5 Existing Ecological Resources
Figure 8-6 Ecological Impacts
Figure 8-7 Village of Cadiz Zoning
Figure 8-8a through 8-8c Viewshed Mapping
Figure 8-9 Project Simulations

List of Appendices

Appendix A Traffic Management Plan
Appendix B Public Meeting Summary
Appendix C Comment Form
Appendix D Economic Impact Analysis
Appendix E Wetland Report
Appendix F Section 106 Project Summary and Agency Response
Appendix G Feasibility Report
Appendix H County-wide Geotechnical Report
Appendix I Letter to Airport

4906-4-02 Project Summary and Applicant Information

(A) SUMMARY

Harrison Power LLC (HPL), a Delaware limited liability company and wholly owned by Ember Partners LP (EmberClear), is proposing to develop, build, and operate the Harrison Power Project (the Facility), a natural gas-fired combined-cycle (CCGT) electric generating facility to be located in Harrison County, Ohio. Three waivers have been submitted in regards to this application: a waiver related to site selection, a waiver of test borings, and a waiver requesting a delayed submittal of the PJM System Impact Study.

(1) General Purpose of the Facility

The HPL Facility will help drive down energy costs while serving the power demand in the region. PJM and Ohio are moving toward a more efficient, cleaner fuel source. The region has recently incurred retirements of its aging fleet combined with the planned retirement of existing coal-fueled generating assets located in PJM1[1] (12.8 gigawatts [GW] have retired since 2014 and 2.6 GW are pending retirement by the end of 2019), including several plants in Ohio (i.e., Burger and BL England Diesel). The HPL Facility will allow a seamless transition into a cleaner burning, more efficient fuel base. This project will provide additional base load capacity, with the unique ability to ramp up or down to match demand in the region and output from wind and solar generation.

(2) Description of the Facility

The proposed Facility is a state-of-the-art combined cycle natural gas fired turbine electric generating facility designed in a 2 train 1x1 configuration. The Facility will be tied into a gas transportation system with multiple feeds. The Facility will utilize two integrated natural gas fueled, CCGT electric power generating units, each with a dedicated supplementary-fired heat recovery steam generator (HRSG); two steam turbine generators (GTs); and two Air Cooled Condensers. The Facility will have a Nominal Net Output of 1,050 MW (with inlet air cooling at 59 degrees Fahrenheit [°F] ambient temperature). Another major component is the auxiliary boiler, which has a maximum input capacity of 80 MMBtu/hr.

HPL has multiple sources for procuring natural gas to its Facility. This should allow for the smooth flow of natural gas to the Facility without having an adverse impact on the area's natural gas needs (for heating) during peak demand periods.

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).

The proposed Facility (which includes the power generating facility, on-site switchyard, and ancillary equipment) is to be located inside the Harrison County Industrial Park, which boasts 513 original tract acres of property utilized for the sole purpose of enticing industrial development. The Facility will be located within the Village of Cadiz, in Harrison County, Ohio.

Construction laydown area will be finalized upon completion of negotiations with adjacent tenants inside the Park on Industrial Park Road. Most of the surrounding land is owned by the Harrison County Community Improvement Corporation (CIC). Adjacent to the Facility is an existing laydown yard, for which a potential lease is being negotiated.

HPL will have third party providers for the transportation of natural gas, electrical interconnect, and other utility interconnections associated with the production of power. The natural gas line (HGP) will be less than a mile and built, owned, and operated by a subsidiary of Republic Partners (Republic). Republic will provide its own filing(s) to the appropriate regulatory agency for the pipeline. An application for the Harrison Power Transmission Line (HPTL) will be filed separately with the OPSB for the electric transmission interconnection.

(3) Site Suitability

The Facility location was presented to EmberClear by the CIC. It has all the necessary earmarks of a good location for construction and operating an industrial complex. The area is relatively flat and has excellent access for workers and heavy haul equipment. The proposed Facility location was determined to be in environmentally good standing and devoid of any historical or cultural artifacts that would need to be preserved. Additionally, the proposed Facility location is within an Industrial Park and is appropriately zoned for the intended use. Project location is shown in **Figure 2-1.**

(4) Facility Schedule

A Gantt chart explaining the project schedule is located in **Figure 3-1**.

(B) ADDITIONAL INFORMATION

(1) Future Plans

HPL does not have any plans to add additional generation units or facilities in the region.

(2) Applicant Information

HPL will be the owner and operator of the Facility, and is wholly owned by EmberClear. EmberClear is a natural gas energy developer with projects across the northeast, Midwest and southern United States. EmberClear developed a 485 MW natural gas-fired power plant in Birdsboro, Pennsylvania that is now in construction. In addition, EmberClear is developing a similar project in Archbald, Pennsylvania that is in the advanced development phase.

EmberClear is also developing multiple projects in the Midwestern United States. Project team members have over 100 years of combined experience in engineering, development, construction, operations and finance.

EmberClear has a proven track record of success and works seamlessly with local communities to create energy projects that have a positive economic partnership between the host communities and the regions where they are located. For this project, HPL has engaged with local agencies, such as: Jobs Ohio, the CIC, and the Village of Cadiz.

4906-4-03 Project Description and Schedule

(A) DETAILED DESCRIPTION OF PROJECT AREA

(1) Project Map

A map showing transportation routes and gas and electric transmission corridors, rivers, streams, lakes, reservoirs, institutions, parks, recreational areas, proposed Facility and administrative boundaries, and population centers is shown in **Figure 3-2**. A map showing the project and vicinity is shown in **Figure 3-3**. All maps are shows *at least* at the required scale. A plot plan of the project is shown in **Figure 3-4a**. Additional detail on gas pipelines in the area is shown in **Figure 3-5**.

(2) Project Area

The Facility will be located on a 90 acre parcel that is currently under option by HPL for purchase from the CIC. It is accessed via State Route 22 & 9002C with Industrial Park Road dissecting the Harrison County Industrial Park. The generating plant itself will be situated to the east of an existing pipeline easement. The power generating equipment, on-site switchyard, and other ancillary facilities will be located on approximately 30 acres of the 90 acre parcel. Other portions of the 90 acre parcel will be potentially used for stormwater management, pending approval by the U.S. Army Corps of Engineers (USACOE) and Ohio Environmental Protection Agency (OHIO EPA). Temporary laydown and construction parking will be situated on the 90 acre parcel or leased separately from the CIC. The subject property is located wholly on reclaimed coal strip mine land, and consists of land previously used for grazing. A reclamation pond is located on the western portion of the property, surrounded by moderate slopes on all sides. The area where the Facility will be located is flat. A map showing topography is included as **Figure 3-4a.**

Prior to acquisition by CIC, the 90 acre parcel was owned by CONSOL Energy, Inc. Additionally, the area was under-mined, and all of its commercial coal reserves have been depleted. The proposed Facility will be located adjacent to the existing MarkWest gas processing facility, which processes natural gas for injection into inter and intra-state pipeline(s). AEP Ohio Transmission Company (AEP Ohio Transco) has a transmission line that runs from the Nottingham substation directly into the MarkWest processing plant. There is a 138 kV transmission line corridor along this path. HPL anticipates that the new transmission line to support the Facility will be constructed adjacent to the existing transmission line. Much of this area was formerly mined and the corridor extends approximately four and ¾ miles to just north of Route 519 (where the Nottingham Substation is located) from the Industrial Park Road at MarkWest.

The closest residential home is located southeast of the site and less than one mile east of the proposed Facility location, located off of State Route 9 further east. Sally Buffalo Park (a public recreational facility) is located approximately 0.5 miles northeast of the Facility location. The nearest densely populated area is the Village of Cadiz approximately 1.5 miles from the Facility location.

(B) PROJECT DESCRIPTION

(1) Project Details

The project will have access to over 2.5 Bcf of natural gas a day via the HGP, and tie into multiple sources of natural gas with a direct line to the producers. Republic will be have two interconnect points and the HGP is anticipated to be less than one mile. Figure 3-4b shows the different components of the Facility.

The fuel will be natural gas supplied at an approximate pressure of 650 pounds per square inch gauge (psig) or 820 psig, depending on the final vendor selection. The natural gas will feed into the HGP at 1050 psig. Through a series of let-down valves on the HGP, the natural gas provider will deliver fuel to an on-site metering station. HPL will also have a liquids removal, pre-heating system on-site. No additional compression will be required. The high efficiency gas turbines will require that the natural gas has a minimum pressure of about 630 psig or 810 psig (depending on final vendor selection) upon entry into the gas turbines. **Table 3-1** is a summary of the natural gas characteristics.

Table 3–1
Fuel Characteristics

Characteristics	Natural Gas
Ash (percent [%])	n/a
Sulfur Content (grains per 100 dry standard cubic feet	0.5
British thermal unit (Btu) Value (Btu/standard cubic foot, higher heating value [HHV])	1,064

HPL has entered into a Memorandum of Understanding (MOU) with the Village of Cadiz to supply 100% of its water (potable) and HPL has filed an industrial National Pollutant Discharge Elimination System (NPDES) permit to address effluent from the Facility. Additionally, HPL has entered into an Industrial Development Agreement (IDA) with the CIC for the construction and procurement of all water lines. The average water demand is 147,888 gallons per day and the average discharge is 116,208 gallons per day. Industrial effluent will be treated and discharged into Sally Buffalo Creek. A sewage treatment system is being designed on site for sanitary waste.

The project has two natural gas-fired turbines, each with a heat recovery steam generator and a steam turbine generator. At ambient conditions of 59° F, the net heat rate of the plant will be approximately 6,150 Btus/kWh and produce 1,050 nominal net MW. The project estimates a capacity factor of approximately 90% operating (approximately 7,884 hours per annum).

Pollutant emission quantities are listed in **Table 3-2**.

Table 3-2
Pollutant Quantities

Pollutant	Project Potential Emissions (TPY)
PM_{10}	158.55
$PM_{2.5}$	158.55
SO_2	70.98
NO_X	256.83
CO	205.86
VOC	159.03
SAM	63.64
Lead	0.002
CO_2e	4,443,366.83

(2) Description of Construction Methods and Project Components

A map of facility components is included in **Figure 3-4b**, with a scale to indicate dimension.

The Facility will be permitted as a 1,050-MW power plant configured in two (2), 1x1 single shaft combined cycle, natural gas fuel, with each unit consisting of one Combustion Turbine (CT), one Heat Recovery Steam Generator (HRSG), one Steam Turbine, one Electric Generator, and one Air Cooled Condenser (ACC). Details of the major equipment are provided below.

- *Combustion Turbine Generators* – The CTs will be advanced class GE 7HA.02 or MHPS M501JAC single fuel turbines rated to consume approximately 3406.MMBtu/hr, HHV, and produce approximately 525 MW at 92°F with pipeline natural gas as the fuel source and integrated DLN burners. The CTGs will utilize inlet air evaporative coolers to maximize output and increase efficiency at ambient temperatures of 59°F or greater.

- *Heat Recovery Steam Generator* – The Facility will utilize two supplementary-fired HRSGs to capture the exhaust gas heat from the CTs 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 Generators* – The Facility will utilize two STGs, with reheat fully condensing type with axial exhaust and the capability to generate electric power with and without duct burners operating. The STGs will each be housed in a building.

- *Air Cooled Condenser/Steam Condensing* – The ACC will provide cooling for condensing the steam turbine exhaust and the Facility closed-loop cooling system. The system will consist of an 18-cell with fin tube bundles, steam header, condensate collection headers and Steam duct from turbine exhaust flange to condenser for each electric generating unit.

- *Water Supply and Discharge* – As discussed in Section 4906-4-03(1)(*e*), 100% of the Project's water supply will be potable water from the Village of Cadiz. Wastewater (exclusive of sanitary sources) will be collected in a wastewater collection tank before discharge to the interconnection point at Sally Buffalo Creek. Wastewater quality testing will be completed on-site to ensure compliance with the facility's outfall requirements. Sanitary Sewage will be treated in a biological treatment unit to meet all waste discharge requirements and discharged to the facility's outfall.

- *Combustion Turbine Inlet Evaporative Coolers* – The evaporative coolers provide auxiliary cooling at the combustion turbine inlets to improve unit efficiency during ambient temperatures at or above 59˚F. The evaporative coolers will utilize demineralized water sourced from the demineralized water storage tank.

- *Substations, Switching Substations, and Step up Transformers* – The two single shaft electric generators will each be connected to a transformer that will step up generator output from 22 kV to 138 kV for connection to the new switchyard. The transformers will feed the collector bus located in the southern portion of the Project Site in the switchyard. An approximate 4 and ¾ mile, 138 kV line will connect the new 138 kV utility switchyard to the Nottingham substation (as previously discussed).

- *Auxiliary Boiler* – An auxiliary steam boiler, rated at approximately 80 MMBtu/hr, will be used as needed to keep the HRSGs warm during periods of Facility shutdown and provide steam to the STGs during start-ups.

- *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 also include an electric motor driven fire water pump and a backup diesel engine driven fire water pump. The diesel driven fire water pump will use 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 SFE's insurance carrier.

- *Stand-by Emergency Diesel Generator* – emergency diesel engine driven generator capable of producing a minimum of 1,000 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 to protect the equipment. ULSD will be utilized, and 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 coolers and as makeup water to the water/steam cycle. Water will be treated via the demineralizer system through a combined reverse osmosis and polishing 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 condensate makeup and be of sufficient size so as to allow normal Facility operations.

- *Wastewater System* – Wastewater at the Facility will be generated by sanitary sources, equipment drains, equipment blowdown, and filtration backwash. Wastewater, except for sanitary sources, will be collected in a wastewater collection tank before discharge to the interconnection point. Wastewater quality testing will be completed on-site to ensure compliance with the facility's NPDES outfall 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 double-walled ammonia storage tanks, each with a storage capacity of 20,000 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. 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 also be used in the ammonia delivery area to prevent accidental release to the environment during ammonia deliveries.

- *Laydown Areas* – A total of 19 non-contiguous acres consisting of two areas are available for temporary laydown during Project Construction. One of the areas, which is eight acres is west of the pond and will be primarily used as laydown. The other area of 11 acres is north of the site and will be used for both parking and laydown.

- *Security* – There will be no public access to the proposed Project. A security fence will be installed around the Project with card-activated gates and Project operator access control.

- *Other Installations* – No other installations have been identified.

(3) Description of New Transmission Facility

The project will tie into a natural gas line with a transfer station located across Industrial Park Road from the Facility. An electrical transmission line will connect the facility to the Nottingham Substation, located to the south of the Facility.

(4) Map of Project Site

Figure 3-3 shows the proposed facility, roads, and property lines.

(C) DETAILED PROJECT SCHEDULE

(1) Schedule

A Gantt chart included as **Figure 3-1** shows the timeline for land acquisition, environmental studies, interconnection studies, application preparation and certificate submittal, final design, start of operations, construction, and other critical path items. HPL will purchase the land in July 2018. The property is currently under option, which may be exercised upon 30 day notice.

(2) Construction Sequence

Construction will begin after permits are obtained and OPSB issues a certificate. Grading, clearing, stormwater management, and general preparation will then be completed. Construction of the Facility will follow, in accordance with design standards. After design has been completed and the Facility has been appropriately tested and approved for operations, operations will begin.

(3) Delays

Delays in Facility permitting could jeopardize commercialization and delay the Facility's projected in-service date. Delays of this nature would result in significant costs including losses in projected energy revenue, losses in capacity revenues, performance penalties associated with PJM Reliability Pricing Model (RPM) market participation, and may result in higher consumer prices due to decreased competition.

4906-4-04 Project Area Selection and Site Design

(A) SITE SELECTION PROCESS

(1) Description of Study Area

The Company determined that the best location for a power production facility would be in Northeast Ohio because of several key factors including: underutilized electricity infrastructure, nearby access to competitive Utica Shale natural gas supplies, a growing demand base as more manufacturing increases from access to the Utica Shale production, plentiful water supplies, road and rail transportation capabilities, and a long history of proven skilled labor force. In addition, several of the development team members within the Company have experience with developing power plants for industrial users in Northeast Ohio; thus understanding the regional requirements and capabilities to ensure a successful project development. With that focus, the project team visited eight potential locations in six Eastern Ohio counties. The project team also visited another location in Harrison County, adjacent to the town of Jewitt.

(2) Map of Evaluated Sites

Given the lack of alternative sites for the Facility and the description of the study area, a waiver of Rule 4906-4-04(A)(2) will be requested by motion to the OPSB.

(3) Siting Criteria

As with any manufacturing facility there are criteria that must be met to ensure success: *(i)* Access to Market one's goods and services; *(ii)* Access to Raw Materials; *(iii)* Pro-Business Climate; and *(iv)* Site Suitability for Construction. As the locations were reviewed, it was determined that Harrison County Industrial Park was the optimal location for the HPL Facility.

(4) Process for Identifying the Proposed Site

As indicated above, the project team visited eight potential locations in six Eastern Ohio counties. The project team also visited another location in Harrison County, adjacent to the town of Jewitt. These visits involved coordination with Jobs Ohio. The project team assessed the four identified criteria in relation to the various locations visited and concluded that the proposed location of the site in the Village of Cadiz best satisfying the identified criteria.

(5) Factors in Selecting the Proposed Site

Through an analysis of the siting criteria, it was determined that the selected location best fits the needs of the project.

Access to Market

In the power/energy industry, access to market is predicated on access to the high speed transmission system owned by the utilities, and generation is dispatched via the Independent System Operators (ISO's). PJM is the ISO for all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. The Industrial Park is located approximately 4 and ¾ miles from the recently erected substation (Nottingham) that is a part of a $3B expansion program being implemented by AEP Ohio Transco. The initial transmission studies demonstrated that the project would have the capability to inject 1,050 MW at this location without resulting in the need for extensive system upgrades and providing more surety and stability of power supplies in the county. The capacity at this locale was greater than any other locations that HPL studied.

Access to Raw Material

Proximity to raw materials is a critical component in the power industry. Those raw materials are natural gas, and water. HPL is located across the street from one of the largest gas processing plants in the area (MarkWest) and will have the ability to tie directly into the tail pipe of the processing facility (approximately 4,000 feet). It should be noted that MarkWest has three gas processing facilities in East Ohio, which are inter-connected via pipeline. In the event that the Cadiz processing facility has a forced outage, natural gas could be transported from its other processing plants. The second raw material is water for cooling, steam production, etc. Proximity to a reliable, cost-effective water source is a necessity for success of operations of any industrial complex. The Village and CIC have provided an optimal solution that is in close proximity to the Facility location, sustainable and will generate substantial revenue for the community.

Pro-Business Climate

In evaluating locations, HPL recognized that Harrison County, the Village of Cadiz and the State of Ohio encourage investment and entrepreneurship. HPL, the CIC, Harrison County, and the Village of Cadiz have worked together with a common goal of making this project a success, as evidenced by HPL's procurement of land from CIC and water from the Village of Cadiz. It is imperative for the area to convert its natural gas resources into higher value added products as opposed to merely producing a raw material. With a pro-business climate, the Facility will enhance Harrison County's and the Village's revenue base and assist in managed growth.

Site Suitability

As mentioned in the project summary, the Facility location has all the necessary earmarks of a good location for construction and operating an industrial complex. The area is relatively flat and has excellent access for workers and heavy haul equipment. The proposed Facility location was determined to be in environmentally good standing and devoid of any historical or cultural

artifacts that would need to be preserved. Additionally, the proposed Facility location is within an Industrial Park and is appropriately zoned for the intended use. These factors as well as the application of the above-discussed criteria make the Facility location suitable.

(B) PROJECT LAYOUT

(1) Constraints Map

A constraints map showing setbacks from residences, property lines, utility corridors, and public rights-of-way is shown as **Figure 4-1**. Constraints shown in the map were considered when designing the Facility. These factors included environmental features and residences. National Wetland Inventory (NWI) mapping identified a pond on the western portion of the project area. The pond, in addition to others that are impacted, will be permitted according to OHIO EPA standards.

(2) Project Layout and Alternatives Considered

The proposed project layout is shown in **Figure 3-4a**. The proposed project layout was a result of consideration of a pond on site, gas line easements and undermining of coal by prior owner. HPL wanted to avoid the small pond so was relegated to constructing the facility on the east side of the gas line easements. HPL also wanted to avoid heavy equipment (turbines) from being built directly over an undermined area. Given these limitations, no site design alternatives were considered. Note that major equipment evaluations are currently underway and will influence the final layout design.

(3) Comments Received

Public feedback was considered during the design of the Facility. A public meeting, conducted in open house format, was held on May 18, 2017. At the open house, there were 25 people that signed in. Attendees were given a comment form and were invited to view the informational displays throughout the room. Project team members were stationed at each exhibit to answer questions. A second public meeting was held on July 27, 2017. Eight people attended this meeting and viewed the same project information as that which was presented in the first meeting. See **Appendix A** to view public meeting materials. Two comment forms were collected at the first meeting, while none were collected at the second. One comment form indicated the desire to see union labor used on the job as much as possible. The other comment form stated that the meeting was very informative and much appreciated.

4906-4-05 Electric Grid Interconnection

(A) ELECTRIC GRID INTERCONNECTION

The Facility will connect to the regional electrical grid at AEP Ohio Transco's Nottingham 138 kV substation in Harrison County, Ohio, located approximately four miles south of the Facility.

A new double-circuit 138 kV line of approximately four miles will be constructed from the Facility to the Nottingham 138 kV substation. The circuits will be strung on double-circuit monopole tower structures, and will consist of phase and shield conductors, insulator assemblies, and other necessary appurtenances appropriately sized for the required duty and in accordance with all applicable codes and regulations. The width of the right-of-way (ROW) of the new double-circuit 138 kV line will be 100 feet, 50 feet each side from the center line.

The new double-circuit 138 kV line will follow a parallel path adjacent and to the east of the edge of the ROW of the existing Nottingham to Freebird 138 kV transmission line. In as much as possible, the new double-circuit 138 kV line will make use of the existing access roads for the Nottingham to Freebird 138 kV transmission line.

The proposed transmission route will only require ROW from two land owners: the CIC and CONSOL Energy, Inc. (Consol). A license agreement has been entered into with Consol to access the property for due diligence and subsequently purchase a ROW. Permission has also been received from CIC to enter its property to perform due diligence. The parties are working toward an option for ROW agreement at this time.

The new double-circuit 138 kV line from the Facility will tie into the Nottingham 138 kV substation. An additional 138 kV breaker-and-a-half bay will be built at the Nottingham 138 kV substation to receive the two 138 kV circuits from the Facility. This includes installing three (3) additional 138 kV breakers, extending the two 138 kV buses, and starting a new string. Installation of associated protection and control equipment, 138 kV line risers, SCADA, and 138 kV revenue metering will also be required.

The Facility generators will produce power at 23.5 kV. This power generation will be "stepped up" to 138 kV prior to being conveyed. Each of the two generation units will have a generator step-up transformer from 23.5 kV to 138 kV. The 138 kV circuits from the step-up transformers will merge in the Facility electrical yard. The new double-circuit 138 kV line will tie into the Facility electrical yard to transmit the power to the Nottingham 138 kV substation.

Final design of the proposed electrical interconnection will depend on guidance from PJM and AEP Ohio Transco as a result of the 3-step PJM generation interconnection process, and specifically from the results of the Interconnection Facilities Study.

The off-site electrical components associated with the Facility, including the transmission line, will be the subject of a separate filing with the OPSB.

(B) FACILITY INTERCONNECTION WITH REGIONAL POWER GRID

(1) Generation Interconnection Request Information

The applicant (HPL) submitted a 1,050 MW generation interconnection request with PJM on October 20, 2016. The Facility was assigned interconnection queue name AC1, interconnection queue number 103 (i.e., AC1-103) on 10/25/2016. Further details are available through the PJM website.[2]

(2) Interconnect Studies

The first step in the 3-step PJM generation interconnection process, the Feasibility Study, was completed by PJM on April 21, 2017. The Feasibility Study report can be found in **Appendix G** or through the PJM website.[2] Step 2 of the PJM generation interconnection process, the System Impact Study (SIS), was initiated with PJM on May 11, 2017. PJM has indicated (in the Feasibility Study Report) that it will complete the SIS on September 29, 2017. Based on the initial delay with the Feasibility Study, HPL anticipates a slight delay in delivery of the SIS due to the high level of activity in PJM. The SIS will be provided to OPSB staff once available, and will also be available through the PJM website. A waiver of Rule 4906-4-05(B)(2) has been requested to allow for the delayed submittal of the study4906-4-06 Economic Impact and Public Interaction

(A) OWNERSHIP

HPL will develop, construct, and is expected to own and manage operation of the proposed Facility. HPL currently has an option to purchase the approximately 90-acre property (on which it proposes to construct the Facility), and lease additional acreage from the CIC for construction laydown and parking during construction. HPL is currently owned 100 % by EmberClear, and will partner with appropriate parties to construct and operate the Project.

2 http://www.pjm.com/planning/generation-interconnection/generation-queue-active.aspx

(B) CAPITAL AND INTANGIBLE COSTS

HPL has provided estimated capital and intangible cost information in the table below for development and construction of the Facility in addition to the related costs of transmission interconnection and natural gas pipeline costs. Information on alternatives to the Facility is not applicable, as no Facility alternatives were considered.

(1) Capital and Intangible Costs

The below table shows estimated costs.

Table 6–1
Estimated Capital and Intangible Costs

Item	Cost ($000s)
Engineering, Procurement, Construction	[[redacted] [
Transmission Interconnection Costs	[[redacted] [
Natural Gas Pipeline Costs	[redacted] [
Project Development Costs	[[redacted]]
Land	[[redacted] [
Financing Costs and Interest During Construction	[[redacted]]
Total [redacted][3]	[[redacted]]

(2) Capital Cost Comparison

EmberClear has developed several projects over the past several years, including three in Pennsylvania (one in construction, one expected to begin construction in 2018 and one in advanced development). HPL has developed the as-built costs noted above that are comparable to those for EmberClear's natural gas-fired combined cycle projects in Pennsylvania with capital costs of $[[redacted]] per kW.

The April 2013 U.S. Energy Information Administration (EIA), "Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants"[4] study of capital costs of similar conventional combined cycle designs reports a cost of $917 per kW. These capital cost estimates are based on 2012 dollars. This was actually a slight reduction from 2010 cost estimates in the same report. HPL's proposed capital costs are [[redacted]] that are similarly situated and with EIA findings. It should be noted that all projects may have some costs that are not borne by

[3] Based upon net output at the PJM point of interconnection at maximum output of 1,050 MW.

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

some projects due to proximity to raw goods and services combined with proximity to the electric grid.

(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 Operations and Maintenance Expenses

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

HPL 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 90% percent capacity factor (CF) for the Facility (without duct burner operation), HPL estimates the total non-fuel O&M cost for each of Year 1 and Year 2 is approximately $[redacted] per annum ($[redacted]/MWH x 8760 hrs/yr x 90% x 1,050 MW).

HPL estimates natural gas costs to be approximately $[redacted] per million British thermal units (MMBtu) in Year 1 and Year 2 of operations. Assuming the estimated natural gas cost of $[redacted]/MMBtu and a 90% percent CF for the Facility (without duct burner operation), HPL estimates the total fuel costs for Year 1 and Year 2 would be approximately $[redacted] million per annum for each year ($[redacted]/MMBtu x 1,050,000kW x 8,760 hours/year x 90% CF x 6,150 Btu/kWh /1,000,000).

(2) Operation and Maintenance Expenses Comparison

There are many CCGTs in operations and maintenance expenses allowing HPL to estimate a range of costs between $[redacted] and $[redacted] per MWH 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 Facility fixed and variable cost components are also comparable with the cost estimates of combined cycle projects under development by EmberClear.

(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 commercialization and HPL's ability to participate in the 2021/22 PJM RPM Base Residual Auction and delay the Facility's projected in-service date. 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. If the project is delayed the energy revenues lost are estimated to total $[ ] per month ($[ ]/MWH x 1,050 MWH x 730 hours/month x 90%). This is due to the fact that electricity consumption and the value of energy is highest during these months.

Another significant portion of the Facility's annual revenues are a result of participation in the PJM capacity market. Based on capacity prices for the 2020/21 PJM RPM base residual auction, lost capacity revenues would be on the order of $2,363,000 per month ($75/MW-day x 1,050 MW x 30 days/month). Further, if HPL participated in the 2021/22 PJM RPM Base Residual Auction as planned and was not able to achieve the in-service date due, HPL would be assessed a penalty equal to lost capacity revenues plus 20 percent. Finally, the Facility would be susceptible to PJM's newly instituted capacity performance penalties if it is not operational during an emergency situation, as defined by PJM. Several factors influence the magnitude of potential penalties, including time of year in which the emergency occurs.

(E) ECONOMIC IMPACTS

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

HPL plans to begin construction of the facility in 2018 and commence operations by April/May 2021. During the project's construction period, it is estimated that approximately $172 million of labor income would be generated in the state of Ohio, with $153 million of that total in Eastern Ohio, and $19 million in the rest of Ohio.

Direct payroll for construction labor is estimated at $111 million which covers up to 500 direct jobs for around three years (with an implied average wage of $74,000 per year), the present worth of those jobs is approximately $104 million with a 3 year construction period at a 5% discount rate.

Direct payroll for operational labor is estimated to be $4.5 million per year and covers the wages associated with the 30 permanent jobs created to run and maintain the power plant (at an average wage of $75,000 per year totaling $2.25 million) plus an average additional $2.25 million per

year for routine and major maintenance workers, which occurs at regular intervals. The present worth of these jobs is approximately $61 million over a 20 year project life at a 5% discount rate.

See **Appendix D** for additional economic analysis.

(2) Construction and Operation Employment

During the construction peak, there would be approximately 500 workers on-site. The Facility will employ 30 direct full-time equivalent employees. Additional employment from business providing goods and services to the plant and employment generated from employees of the plant and its suppliers would contribute up to 252 jobs throughout Ohio (including plant operators). It is projected that 223 jobs of the 252 jobs will be located in Eastern Ohio. See **Appendix D** for additional economic analysis.

(3) Increases in Local Revenue (Public Entities)

Harrison County is not a part of an existing Enterprise Zone, but HPL is working with the Executive Director of the CIC to establish an Enterprise Zone where the Project will be located. Such an agreement would result in significantly increased revenues. In any such agreement, HPL would pay annual compensation to Harrison County, the Village of Cadiz and Harrison County School District and potentially other taxing authorities in exchange for real and personal property tax exemptions.

Enterprise Zone Agreements with Harrison County officials are undergoing and are in a preliminary stage. Therefore, it is very difficult to predict the total increase in revenues to the county, but HPL anticipates a payment in lieu of property taxes in the neighborhood of $[ ] per annum for the 15 year period. It should be further noted, that HPL is acquiring the property from CIC at a cost of $[ ] plus HPL will be leasing areas for laydown and ROW for various interconnects for water, gas and electrical interconnect (final price has not been determined). HPL will also acquire water from the Village of Cadiz generating approximately $350,000 per annum in additional revenue. In order for the Village of Cadiz to supply the water, HPL will spend up to $[ ] to upgrade the Village of Cadiz's water systems. All payments will be made by HPL. Additional data is provided in **Appendix D.**

(4) Economic Impact on Commercial and Industrial Activities

The Economic Study included in **Appendix D** includes information related to the economic impact of the Facility on local, commercial, and industrial activities. The study also addresses direct, indirect, and induced economic benefits. There will be various impacts on local commercial and industrial activities. Items needed to sustain operation include office equipment, general industrial and mechanical tools, vehicles, professional services, insurance, and the natural gas fuel needed in order to run the turbines.

The Impact of the construction of the Project would require an investment of approximately $[ ] million and would last three years. Businesses in the Ohio economy would experience increased sales of $464 million due to the Project, and the Ohio economy would increase its GDP by a cumulative $210 million over three years.

Within the region of 26 counties defined as Eastern Ohio, businesses would grow their sales by $406 million during construction, and the Project's contribution to regional GDP would be $188 million. The capex phase would support 805 total jobs – 500 direct construction jobs, an additional 227 jobs in Eastern Ohio, and 78 more jobs in the rest of the state. The total contribution to labor income statewide would be $172 million with $153 million going to the families of Eastern Ohio. These jobs and this new economic activity would help boost the state and Eastern Ohio's economies during construction.

Table 6–2
Additional Economic Impacts – Construction

Type	Economic Impact	State GDP	Number of Jobs	Wages
Direct	$260 MM	$121 MM	500	$111 MM
Indirect	$104 MM	$ 31 MM	66	$ 29 MM
Induced	$100 MM	$ 58 MM	239	$ 32 MM

The Impact of the operating phase also would be significant. Business in Ohio would experience an increased annual sales boost of $95 million, and the state's annual GDP would increase by $65 million. At the Eastern Ohio level, businesses would see their annual sales increase by $90 million, and the region would grow its annual GDP contribution by $62 million. The Project would sustain 252 new Ohio jobs – 30 direct plant jobs, an additional 193 jobs in Eastern Ohio and 29 more jobs in the rest of the state. The statewide impact on labor income would be $17 million annually with the majority of it ($15 million or 90 percent) staying in Eastern Ohio.

Table 6–3
Additional Economic Impacts - Operation

Type	Economic Impact	State GDP	Number of Jobs	Wages
Direct	$ 57 MM	$ 44 MM	30	$ 4 MM
Indirect	$ 27 MM	$ 14 MM	139	$ 9 MM
Induced	$ 11 MM	$ 7 MM	83	$ 4 MM

It should also be noted that industrial activity from the development of the Utica Shale formation will increase power demand in the region. Several fractionation and gas distillation facilities within Harrison County have plans to expand production. Therefore, the Facility would fit into the energy economy of Harrison County and the broader region.

(F) PUBLIC RESPONSIBILITY

(1) Public Information Program

On April 28, 2017, a letter was mailed to 16 people, including property owners abutting project limits and Harrison County and Village of Cadiz public officials, notifying them of the upcoming public meeting and plans for the project. In addition to property owner notification, HPL's public interaction included notices run in the Harrison News-Herald and the Free Press Standard, an e-mail account for submission of public comments, and two public meetings. The first meeting was held on May 18th 2017 and the second meeting was held on July 27th 2017 in Cadiz, Ohio and was accompanied by a July 6, 2017 letter to the same individuals and entities to which the April 28, 2017 letter was mailed. A public meeting summary is located in **Appendix B**.

Public meetings were held in an open house format. The purpose of these meetings was to gather input on the proposed project. At the open houses, informational exhibits were displayed around the room and attendees were encouraged to view the exhibits and ask project team members questions.

To address citizens' concerns during construction and operation, a Comment Form has been developed. With the form, citizens can submit comments to the project team or issues or concerns related to the construction and operation of the Facility. The Comment Form is presented in **Appendix C**. Comment Forms will be available at an appropriate central location, to be determined by the Village of Cadiz and the HPL project team. The Comment Form will allow for an extensive explanation of any issues, and Comment Form collection and responses will be monitored by the HPL project team during construction and operation of the Facility.

In addition, seven days prior to the start of construction, property owners and tenants will be notified of the start of construction via a mailing. A database of addresses has been compiled and will be maintained with updated information throughout construction and operation.

(2) Liability Compensation Plans

There are no insurance programs available for providing liability compensation directly to the public for damages. HPL will hold significant amounts of insurance consisting of general liability and property and casualty insurance at the project site. All project related deliveries and associated vehicles will have appropriate insurance coverage.

(3) Impacts to Surrounding Infrastructure

As indicated below, the project area is just over a mile from a state route (Route 22). Laydown areas are located near the Facility location, which will minimize the use of the roadways for truck transit. No road or bridge upgrades are anticipated for the project, as the Village of Cadiz already has planned for industrial use of this area and roads are sufficient to withstand heavy

industrial construction and operational traffic. For example, there is a significant amount of truck traffic nearby, due to the project area's proximity to the MarkWest facility. During operation, there will only be approximately 30 permanent workers at the Facility, which is not expected to cause impacts to the local roads or bridges.

(4) Transportation Permits

HPL will coordinate with state and local agencies to determine which transportation permits are needed. However, the project area is located close to an established transportation network, located just over a mile to the south of Route 22. Its proximity to established highways will make it accessible for delivery of equipment. Smaller roads in the area already accommodate industrial traffic and will be able to support the project. The project may cause increases in traffic during construction. A Traffic Management Plan is located in **Appendix A**.

(5) Plan for Decommissioning

The project is anticipated to have a 30 year useful life. Many power facilities are operated beyond that period if it has been maintained properly. In the event that the project has exceeded its useful life and is deemed to no longer be economically viable, then HPL would decommission the plant. After such time, if the project could not be re-furbished to continue operations, HPL would work with the Village of Cadiz to retain infrastructure that could continue to be used and remove items not anticipated for use. The project would then be demolished and attempts made to recycle equipment or have it re-purposed. Any items deemed to be not recyclable would be demolished and sent to an appropriate waste disposal facility in accordance with all applicable laws. Once the site is leveled to the ground and any potential hazardous items removed, the area would then be stabilized and seeded.

4906-4-07 Air, Water, Solid Waste, and Aviation Regulations

(A) AIR, WATER, SOLID WASTE, AND AVIATION REGULATIONS

(B) AIR QUALITY

(1) Preconstruction

(a) Ambient Air Quality

(i) Ambient Background Concentrations

Monitoring data collected by OHIO EPA, Pennsylvania Department of Environmental Protection (PADEP) and West Virginia Department of Environmental Protection (WVDEP) are available for determining representative ambient background concentrations for the Facility area. Data collected from air quality monitoring sites are used, in part, to demonstrate compliance with the NAAQS, when project emissions exceed significant impact levels (SIL) for any of the following criteria air pollutants: O_3, SO_2, PM_{10}, $PM_{2.5}$, NO_2, CO, and Pb. The project potential emissions of Pb were below the Significant Emission Rate for PSD, and therefore, PSD review was not required for Pb.

The Facility is within an area classified as "attainment" (of the NAAQS) for all criteria pollutants pursuant to Title 40 of the Code of Federal Regulations (CFR) Part 81.

In the Air Quality Impact Assessment (AQIA) submitted in March 2017, the results of the preliminary impact analysis for O_3, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ demonstrated that all of the pollutants were below their respective SILs. Therefore, demonstration of compliance with National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) increment were complete and no further analysis was required. Ambient background concentration data from the air monitors was not needed, since it was not necessary to perform cumulative modeling analysis. The AQIA also demonstrated that pre-construction monitoring was not required for this project.

(ii) Ozone Analysis

Ozone impact analysis was evaluated qualitatively in the AQIA based on ambient background concentrations. Currently, there are no ozone monitors in Harrison County. The two nearest monitors are approximately 30 kilometers (km) and 36 km from the Facility in the east south east (ESE) and east north east (ENE) directions, respectively. Based on the 5-year wind rose of the meteorological data near the Facility, these monitors are in downwind direction from the Facility and are expected to be impacted by the emission from the project. **Table 7-1** summarizes the

background concentrations for these ozone monitors and compares them to the NAAQS. The monitoring station locations are discussed below.

Table 7–1
Background Ozone Monitoring Data

Monitor	Distance from Facility (km)	Direction from Facility	Averaging Period	Rank	Average Ozone Concentration (2014-2016) (ppb)	NAAQS (ppb)
Warwood Water Plant; WV. ID 54-069-0010	30.7	ESE	8-Hour	4th High	68.0	70.0
Steubenville, OH. ID 39-081-0017	36.1	ENE	8-Hour	4th High	65.0	70.0

(b) 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 exhaust temperature was modeled as ranging from 172 to 211°F. The stack was modeled with a height of 165 feet and 23 feet in diameter. The exhaust flowrate varied from approximately 33 to 70 feet per second. **Table 7-2** details the expected control efficiency, power consumption and operating costs for each air pollution control equipment proposed for the Facility. A detailed discussion of each control technology is presented in further detail in this section.

Table 7–2
Expected Efficiency, Power Consumption and Operating Costs of Air Pollution Control Equipment

Pollutant	Control	Control Efficiency / Emission Limit	Power Consumption	Operating Costs
SO_2/H_2SO_4	Pipeline quality natural gas	N/A	N/A	N/A
Particulate Matter	Pipeline quality natural gas	N/A	N/A	N/A
NOx	DLN/SCR	70-90 % / 2.00ppmvd @15%O2, 24-hour rolling average	0.5 MW per unit/HRSG due to increased GTG	Estimated annual operating cost of $2.1 MM per unit

Pollutant	Control	Control Efficiency / Emission Limit	Power Consumption	Operating Costs
			exhaust pressure from flue gas pressure drop loss of the SRC catalyst	based on 1600 lb/hr of 19% aqueous ammonia solution full load consumption.
CO	Good combustion practice and oxidation catalyst	90+ % / 2.00ppmvd @15%O2, 24-hour rolling average	0.5 MW per unit/HRSG due to increased GTG exhaust pressure from flue gas pressure drop loss of the CO catalyst	N/A
VOCs	Good combustion practice and oxidation catalyst	2.00ppmvd @15%O2, 24-hour rolling average		
Greenhouse Gases	Good combustion practice and energy efficiency	1000 lb/MWh; rolling 12-month	N/A	N/A

N/A = not applicable

SO_2/H_2SO_4

SO_2 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 0.0025 lb/MMBtu and an H_2SO_4 emission limit of 0.0022 lb/MMBtu is proposed as best available control technology (BACT) for the CTGs (both with and without duct burning). This level of emissions will be achieved by combusting pipeline quality natural gas with a maximum sulfur content of 0.6 grains per 100 standard cubic foot by weight. This emission level is consistent with the limits and control technologies in BACT determinations for

previously licensed similar facilities. There will not be any additional post-combustion air pollution control for these pollutants.

Particulate Matter

Particulate Matter (PM) emissions result from trace quantities of ash (non-combustibles) in the fuel and formation of ammonium sulfate salts from unreacted ammonia from the selective catalytic reduction (SCR) system. PM emissions for the CTGs and duct burners 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 0.008 lb/MMBtu (both with and without duct burning) is BACT. There will not be any additional post-combustion air pollution control for these pollutants.

NOx

NOx emissions are formed in the turbine combustion chamber during high temperature natural gas use primarily as a result of the reaction between nitrogen and oxygen present in the combustion air (thermal NOx). The combustion turbines and duct burners will be DLN (Dry Low NOx) combustors which are integrated within the CTGs. The DLN combustion controls NOx formation by pre-mixing natural gas and air immediately prior to combustion. Pre-mixing inhibits NOx 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 NOx. 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 NOx will be reduced to nitrogen gas and water. The SCR system will reduce NOx concentrations to 2.0 ppmvd 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 ppmvd at 15 percent O_2 for all load conditions and ambient temperatures.

NOx 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 initial period of the 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 NOx.

CO

CO 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 ppmvd at 15 percent O2 (on a 24-hour rolling average basis) in the exhaust gas under all steady-state operating conditions.

CO emissions will increase during limited periods of start-up and shutdown due to less efficient combustion at these loads. Additionally, the oxidation catalyst is not operational during start-up and shutdown until the turbine exhaust reaches the operating temperature window required by the catalyst. The use of an oxidation catalyst system is BACT for combustion turbines.

VOCs

VOCs emitted from the combustion turbines and duct burners 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 2.0 ppmvd at 15 percent O_2 (on a 24-hour rolling average basis) in the exhaust gas under all steady-state operating conditions.

VOC emissions will increase during limited periods of start-up and shutdown due to less efficient combustion at these loads. Additionally, the oxidation catalyst is not operational during start-up and shutdown until the turbine exhaust reaches the operating temperature window required by the catalyst. The use of an oxidation catalyst system is BACT for combustion turbines.

Greenhouse Gases

The principal GHGs associated with the Facility are CO_2, methane (CH_4), and nitrous oxide (N_2O). Because these gases differ in their ability to trap heat, 1 ton of CO_2 in the atmosphere has a different effect on global warming than 1 ton of CH_4 or 1 ton of N_2O.

GHG emissions from the proposed Facility are primarily attributable to combustion of fuels in the CTG units. The Facility will utilize good combustion practices, natural gas (a low-carbon fuel) and energy efficiency to minimize GHG emissions. BACT for CO_2 has been determined to be 1000 lb/MWh. Numerical BACT limits for CH_4 and N_2O were not identified; however, good combustion practices will minimize emissions of these pollutants.

(c) Regulatory Applicability

PSD 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 the 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. Harrison County, Ohio has been designated or is treated as in attainment for all criteria pollutants. Because the area is in 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, the 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 NOx, $PM_{2.5}$, PM_{10}, CO, and VOC, 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 (SER) 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 emission rates include: NOx (40 tpy), CO (100 tpy), PM_{10} (15 tpy), $PM_{2.5}$ (10 tpy), SO_2 (40 tpy), VOC (40 tpy), the regulated non-criteria pollutant H_2SO_4 (7 tpy), and GHG (75,000 tpy).

On April 2, 2007, the U.S. Supreme Court found that GHG, including CO2, are air pollutants covered by the Clean Air Act. On May 13, 2010, the USEPA issued a rule (the "Tailoring Rule") that established an approach to GHG emissions from stationary sources under the Clean Air Act. This final rule "tailored" the requirements of the Clean Air Act permitting program to limit which facilities will be required to obtain PSD permits. Under this rule, PSD permitting requirements were implemented for new construction projects that exceed 100,000 tpy of GHG emissions. In addition, a PSD Significant Emission Rate of 75,000 tpy was established that required PSD review for GHG for projects that were subject to PSD review for other (established) PSD pollutants.

However, on June 23, 2014, the Supreme Court ruled that USEPA did not have the authority to "tailor" the PSD regulations. The Supreme Court ruled that USEPA did not have the authority to classify a new or existing sources as "major" solely on the basis of GHG emissions. This ruling effectively eliminated USEPA's 100,000 tpy major source threshold for GHG under both the PSD and Title V Operating Permit regulatory programs. However, the Court found that USEPA did have the authority to require a source already subject to PSD requirements for one or more other regulated PSD pollutants to meet BACT requirements for GHG emissions. This effectively leaves the 75,000 tpy GHG threshold in place for triggering a PSD "major modification" for GHG.

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 directory 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 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 requirement. 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 3734-31-17 – 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.

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 A

This encompasses the general NSPS regulations and includes the convention monitoring, recordkeeping, and reporting requirements.

40 CFR 60 Subpart KKKK

This 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 operating on natural gas with a rated heat input greater than 850 MMBtu/hr, NO_X emissions are limited to:

- 15 ppmvd 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 are limited to one of the following:

- 110 ng/J (0.90 lb/MW-hr) gross output; or
- 26 ng/J (0.060 lb/MMBtu) heat input (HHV)

The Facility will use an SCR system to reduce NO_x emissions to 2.0 ppmvd at 15 percent O_2 and natural gas to limit SO_2 emissions to 0.0025 lb/MMBtu. As such, the Facility will meet the emission limits under Subpart KKKK.

Additionally, the provisions of this subpart address monitoring requirements, allowing for use of a 40 CFR Part 75 certified NO_x CEMS, such as this Facility will use.

40 CFR 60 Subpart Dc

This 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 80 MMBtu/hr, and is, therefore, subject to the standard. For units operating on 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.

40 CFR 60 Subpart IIII

This 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.

To comply with Subpart IIII, new emergency stationary CI engines with a displacement less than 30 liters per cylinder must meet the emission standards per 40 CFR 60.4205(b). The applicable limits for a 1860-hp (1387 kW) new emergency stationary CI engine are EPA's Tier 3 limits as follows:

- 6.4 grams per kilowatt-hour (g/kWh) (4.8 grams per hp-hour [g/hp-hr]) VOC + NO_x
- 3.5 g/kWh (2.6 g/hp-hr) of CO
- 0.2 g/kWh (0.15 g/hp-hr) of PM

The Facility will install an emergency generator meeting these emission standards.

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, Table 4 provides the following emission limits:

- g/kWh (3.0 g/hp-hr) of VOC + NO_x
- 0.2 g/kWh (0.15 g/hp-hr) of PM

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

40 CFR 60 Subpart TTTT

This is applicable to owners and operators of electric utility generating units. NSPS Subpart TTTT requires steam generating units and stationary combustion turbines constructed after January 8, 2014 with a base load rating greater than 250 MMBTU/hr to meet a carbon dioxide (CO_2) emission limit. The emission limits specified by this regulation are dependent upon the fuel used and whether the unit is a base load unit or a non-base load unit. Since the unit will operate as a base load unit, it is required to meet a CO_2 emission standard of 1,000 pound CO_2 per megawatt hour. The CTGs will meet this emission standard.

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 (Formaldehyde) will exceed the major source threshold of 10 tpy. In addition, potential emissions of combined HAPs will exceed the major source threshold of 25 tpy. Therefore the area source NESHAP standards under 40 CFR Part 63 are applicable to this Facility.

40 CFR 63 Subpart YYYY

This applies to Stationary Combustion Turbines and thus potentially impacts the operation of the two proposed CTGs. A new or reconstructed stationary GT that is a lean premix gas-fired stationary GT or diffusion flame gas-fired stationary GT must comply with the Initial Notification requirements set forth in 40 CFR 63.6145 but need not comply with any other requirement of this subpart until EPA takes final action to require compliance and publishes a document in the Federal Register (40 CFR 63.6095(d)).

40 CFR 63 Subpart ZZZZ

This applies to Stationary Reciprocating Internal Combustion Engines (RICE) and is applicable to the proposed 1860-hp emergency generator and the 320-hp emergency fire pump at the Facility. The 1,860 HP emergency engine is a new emergency stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions. Per 40 CFR 63.6590(b)(1)(i), the source only has to make the initial notification requirements of §63.6645(h) and is not subject to any other requirements of this subpart or of 40 CFR 63 Subpart A.

The 320 HP fire water pump engine is a new emergency stationary RICE with a site rating of less than 500 brake HP located at a major source of HAP emissions. Per 40 CFR 63.6590(c), the source must meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR Part 60 Subpart IIII.

40 CFR 63 Subpart DDDDD

This applies to Industrial, Commercial, and Institutional Boilers and Process Heaters located at major sources of HAP. The auxiliary boiler will be subject to the requirements of this subpart as an industrial boiler designed to burn "gas 1" fuels (the auxiliary boiler will exclusively burn pipeline-quality natural gas). In order to comply with this subpart, a tune-up will be conducted annually on the auxiliary boiler. Additionally the Facility will comply with all notification, reporting, and recordkeeping requirements under Subpart DDDDD.

Accidental Release Prevention

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

Acid Rain Program

The Facility will be subject to the Acid Rain Program based on the provisions of 40 CFR 72.6(a)(3) because the combined cycle gas turbine units are considered utility units under the program definition and they do not meet the exemptions listed in 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. An acid rain permit application was submitted for this Facility in February 2017.

Cross-State Air Pollution Rule

The EPA signed the CSAPR Update on September 7, 2016 to address the 2008 Ozone NAAQS. In the signed rule, Ohio was one of the 22 "Group 2" states affected by the CSAPR Update that will have lower ozone season NO_x emission budgets for the state's electricity generating units in order to meet the 2008 Ozone NAAQS. The updated emission budgets become effective beginning May 2017 in the CSAPR Update. Since the CSAPR Update has not been published in the Federal Register, it is not addressed in this application. If the CSAPR Update is published, Harrison Power will comply with the applicable requirements.

Applicable OHIO EPA Rules

This includes the following:

- OAC Rule 3745-17-07(A)(l), which limits visible pa1ticulate emission limitations for stack emissions to 20 percent opacity as a six-minute average;
- OAC Rule 3745-17-10(B)(l), which limits PM from gaseous fuel-burning equipment to 0.20 lb/MMBtu;
- OAC Rule 3745-18-06(F), which limits SO_2 emissions;
- OAC Rule 3745-21-07, which limits organic materials from stationary sources;

- 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 3745-71, which limits lead emissions;
- OAC Chapter 3745-77, which requires a Title V permit;
- OAC Chapter 3745-100, which requires toxic chemical release reporting;
- OAC Chapter 3745-103, which requires an acid rain permit;
- OAC Chapter 3745-104, which regulates the prevention of accidental release; and
- OAC Chapter 3745-114, which regulates toxic air contaminants.

(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 – PTI 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) 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 7-1** provides a map showing the location of the Facility in relation to the monitoring stations selected to identify ozone background levels for the Facility, along with other identified major point sources in the area. Additional ambient air monitoring stations in the area surrounding the Facility are not planned for this project.

(f) Demonstration of Regulatory Compliance

The PTI for the Facility was submitted to OHIO EPA in February 2017. This document addressed compliance with the requirements identified. Demonstration that the Facility will meet the range of applicable standards, identified above was addressed in that application. An Air Quality Impact Analysis was submitted in March 2017 demonstrating that modeled impacts fully comply with all applicable NAAQS and PSD increments. A variety of compliance demonstration procedures in the form of testing, monitoring, recordkeeping, and reporting will be conducted to ensure operational compliance with all applicable air rules, standards, and permit conditions. These procedures will be performed in accordance with federal NSPS and MACT standards for electric utility generating units (NSPS Subpart TTTT), combustion turbines (NSPS Subpart KKKK and MACT Subpart YYYY), boilers (NSPS Subpart Dc and MACT Subpart DDDD), and emergency generators and emergency fire pumps (NSPS Subpart IIII and MACT Subpart ZZZZ).

(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, NOx, and PM. These contaminants are not expected to cause any significant impacts in the project area or beyond the Facility boundary.

(3) Operation

Description of Air Quality Monitoring Plans

Existing ambient air quality data are available for the Facility area or from other representative locations and the modeling confirmed impacts are below the significant monitoring concentrations (SMC). Therefore, there are no plans to perform ambient air quality monitoring during operations. However, 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.

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 (2010 through 2014) 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 7-3**. The maximum impacts are below both the PSD Significant Impact Levels (SILs) for all criteria pollutants and averaging times. 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.

Table 7–3
Maximum AERMOD Predicted Impact Concentrations

Pollutant	Averaging Period	Rank Basis for SIL Assessment	Maximum Impact (µg/m3)	SIL (µg/m3)	SIA (km)	SMC (µg/m3)	PSD Class II Increment (µg/m3)
NO_2	1-hr	H1H (5-year average)	4.83	7.5	N/A	None	None
	Annual	H1H	0.99	1	N/A	14	25
CO	1-hr	H1H	335.39	2000	N/A	None	None
	8-hr	H1H	145.68	500	N/A	575	None
PM_{10}	24-hr	H1H	1.41	5	N/A	10	30
	Annual	H1H	0.16	1	N/A	None	17(3)
$PM_{2.5}$	24-hr	H1H (5-year average)	1.09	1.2(2)	N/A	None (1)	9
	Annual	H1H	0.16	0.3(2)	N/A	None(1)	4
SO_2	1-hour	H1H (5-year average)	1.66	7.9	N/A	None	None
	3-hour	H1H	1.55	25	N/A	None	512
	24-hour	H1H	0.46	5	N/A	13	91
	Annual	H1H	0.04	1	N/A	None	20

1. *SIL and SMC for $PM_{2.5}$ for preliminary impact analysis were vacated and remanded on January 22, 2013.*
2. *OHIO EPA Engineering Guide 69 lists the $PM_{2.5}$ SIL as 1.2 Γg/m^3 for 24-hour and 0.3 Γg/m^3 for 24-hour annual*
3. *USEPA has revoked the annual PM_{10} NAAQS but the annual increment is still in effect.*

In its memorandum dated March 1, 2011 (“Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour NO2 NAAQS”), USEPA recommended that compliance demonstrations for the 1-hour NO2 NAAQS address emission scenarios that can logically be assumed to be relatively continuous or which occur frequently enough to contribute significantly to the annual distribution of daily maximum 1-hour concentrations.

Emissions that occur during start-up and shut-down (SUSD) were assessed to determine the frequency, and duration of the emissions. The duration of each SUSD event is less than one hour,

and the total annual duration of SUSD events is less than 160 hours (<2% of annual hours) per year. Furthermore, these SUSD events will not occur on a predictable schedule. Therefore it is reasonable to conclude that the SUSD scenarios are neither frequent nor continuous and should not be included in the compliance demonstrations for NAAQS with short-term averaging periods (1-hour, 3-hour, 8-hour, and 24-hour). Air quality impact analysis was therefore not conducted for the SUSD scenarios.

For demonstration of compliance with the annual average standards, the SUSD emissions were included with emissions from the normal operating scenario and the annualized emissions were used in the modeling.

Isopleth plots showing the spatial pattern of calculated concentrations by pollutant and averaging time are provided in **Figures 7-2 through 7-25**. The mapping scale for the figures was selected to best graphically depict the isopleths, Facility fence boundary and surrounding area, and a waiver has been requested from the mapping scale requirements of Rule 4906-4-07(B)(3)(b).

Potential Failure of Air Pollution Control Equipment

The pollution control equipment consists primarily of the DLN combustors, SCR to control NOx emissions and oxidation catalysts to control CO and VOC emissions. This equipment has been proven to be reliable, safe and effective. The DLN combustors are integrated 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 will also be 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 NOx 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 QUALITY

The average water demand is 147,888 gallons per day. During certain "heating days", the plant will operate misters that will increase the water demand requirements to 351,216 gallons per day maximum (if the misters operate 24 hours per day, typically they will operate 16 hours).

Average industrial effluent is anticipated to be about 116,208 gallons per day. The proposed industrial effluent outfall location for the Facility connects to Sally Buffalo Creek. To meet its water needs, the project is expected to utilize water from the Village of Cadiz.

(1) Preconstruction Water Quality

Required Permits

HPL will obtain a general NPDES permit for stormwater discharges during construction. An industrial discharge permit will be obtained for discharging into Sally Buffalo Creek.

Location of Data Sources

Stormwater and industrial effluent quantities will have negligible effects on water quality due to the use of best management practices (BMPs) and pretreatment techniques. No new sources will be used by the project, and so no monitoring or gauging stations were used to collect preconstruction survey data and therefore mapping of the monitoring and gauging stations is not applicable.

Description of Data Sampling Stations and Reporting Procedures

This section does not apply due to the absence of monitoring stations.

Water Quality of Receiving Stream

Industrial effluent will be discharged into Sally Buffalo Creek in accordance with NPDES requirements. Sally Buffalo Creek is located in the Middle Fork Short Creek watershed and is listed as a Warmwater Habitat stream (WWH). A 2010 OHIO EPA analysis of Sally Buffalo Creek determined that the creek received a "fair" biological score. This is due to abandoned mine drainage in the area, and an elevated amount of total dissolved solids. OHIO EPA's monitoring location is in **Figure 7-27**.

Stormwater discharge will be discharged into the pond located on the western side of the project area. Stormwater discharge will incorporate BMPs. Water quality will not be impacted.

Water Discharge Permit Information

No water discharge permitting is required before construction commences.

(2) Construction Water Quality

Monitoring Equipment

During construction, the only water discharges will be stormwater runoff. Any sanitary waste will utilize portable units brought to the Facility by a contractor. No monitoring or gauging stations will be used during construction and therefore mapping is not applicable.

Aquatic Discharges

There are no anticipated impacts on aquatic resources during construction.

Mitigation Plans

Approved BMPs will be utilized to minimize erosion during construction. Stormwater is not anticipated to cause off-site impacts

Flow Pattern and Erosion Changes

The project will use existing drainage patterns, which will prevent a change in flow pattern.

Monitoring Equipment for Control of Effluent

Since no water discharges are anticipated to occur in association with project construction with the exception of stormwater runoff, no monitoring stations are proposed. One facility treated water discharge monitoring station is located in the northeastern corner of the project area. This station will only be utilized during operations to monitor industrial effluent. **Figure 3-4c** shows the location of the station, in addition to two air monitoring locations.

(3) Operation Water Quality

Monitoring Equipment Locations

The project will utilize approved BMPs to avoid water quality impacts. The project will discharge industrial effluent into Sally Buffalo Creek according to NPDES requirements. No monitoring stations have been established for operations at this time for stormwater.

Water Pollution Control Equipment and Treatment Process

Water pollution control equipment that will be used during operation includes any treatment processes or systems as required by the NPDES, in addition to the following:

- A detention pond located on the western portion of the property for stormwater;
- Oil water separator;
- Common collection sump for pH control; and
- Plant drains will consist of power cycle condensate drains, filtered water drains, boiler blowdown and demineralization reverse osmosis (RO) system rejection water.

Permit Issuance

An industrial NPDES permit was submitted to OHIO EPA on September 15, 2017, to discharge industrial effluent from the Facility into Sally Buffalo Creek. Pre-treatment for sanitary waste was included in this submission. It is expected that the NPDES with be approved by the end of 2017.

A permit for the management of stormwater during construction will also be obtained from Ohio EPA. A Stormwater Pollution Prevention Plan will be developed to manage stormwater runoff; this plan will be submitted to the OPSB staff prior to the start of construction.

Quantitative Flow Diagram

Project water balance is depicted in **Figures 7-26A and 7-26 B**. Items required by the OPSB rules but not applicable to a natural gas fired power plants are not shown. Items which are not applicable to this project include leachates from fuels and solid wastes and run-off from soil and other surfaces. Leachates from fuels and solid wastes result from the use of coal fired power plants and associated ash systems and not natural gas fired power plants. Run off associated with power plant project sites are typically associated with the project Storm Water Pollution Prevention Plan (SWP3) or Storm Water Quality Management Plan (SWQMP) and are not typically shown on the water balance as it involves storm/rain water.

Water Conservation

The project design utilizes water conservation techniques. For the main heat sink of each Unit's steam cycle, an Air Cooled Condenser will be used instead of a water cooled condenser or wet cooling tower. Also, for each Unit's auxiliary equipment cooling, an air cooled "Fin Fan" cooler will be used as the heat sink for the associated component (closed) cooling water loop. Therefore, during typical operation of the Facility's Units, the only water required will be minor water makeup flow(s) due to steam cycle blowdown and/or operational (seals, etc.) leakage. As noted in section 6.2, during certain "heating days", the evaporative coolers at the inlet of each Gas Turbine may be used, which will temporarily increase the usage of water in order to offset reduction in efficiency and output of the Gas Turbines during periods of high ambient air temperatures.

(D) SOLID WASTE

(1) Preconstruction

The Facility area is currently undeveloped. 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 by licensed contractors in accordance with applicable regulatory requirements and managed in licensed facilities. Facility construction is estimated to take approximately 32 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.

(E) AVIATION

(1) Surrounding Air Facilities

Harrison County Airport is located approximately one mile to the south of the project area. It is a public use airport owned by the Harrison County Airport Authority and has one paved runway. There are no other air strips in the 5 miles surrounding the project. Jefferson County Airpark is the next closest significantly used public airport, at approximately 20 miles away. The Jefferson County Airpark has one paved runway. The Harrison County Airport is shown on **Figure 3-2**. R & F Heliport is located approximately three miles to the northeast of the project area and is associated with R & F Coal. Harrison Community Hospital has a helipad located approximately two miles to the east of the project area. Public meetings were held on May 18, 2017, and July 27, 2017 with associated public notices, to notify the local community of project plans. In addition, a letter sent to the airport is included in **Appendix I.**

(2) Federal Aviation Administration Filings

A project must file with the Federal Aviation Administration (FAA) if it has a structure over 200 feet tall. This project has two stacks that are 165 feet tall and therefore is not required to file with the FAA. However, because construction will utilize cranes, the project will file with the FAA for the construction cranes.

4906-4-08 Health and Safety, Land Use and Ecological Information

(A) HEALTH AND SAFETY

(1) Equipment Safety and Reliability

Equipment Safety

The power plant will include a National Fire Protection Association (NFPA) compliant fire protection system which will provide protection for the Facility and the public. The power plant safety systems will shut down the combustion turbines, heat recovery steam generators and steam turbine generators during emergency conditions and will provide protection for the Facility and the public.

Fire Protection System, Fire Protection Water Supply Pumps

Common to both Units and the Facility, two 100% capacity Fire Protection (FP) pumps will be provided. One will be driven by an A/C electrical motor and the other will be driven by a diesel engine. A "jockey" pump, driven by an A/C electrical motor, will also be provided to maintain pressure in the fire water loop piping when the main FP pump is not operating. The FP pumps, as well as the supporting items for the diesel engine (fuel tank, battery/starter, etc.) will be sized per the applicable NFPA and/or local code(s), whichever is the most conservative. All three pumps will be designed and manufactured by the supplier to meet the applicable NFPA and/or local code(s), and as such, will be designated as Underwrites Laboratories Inc. (UL) listed and Factory Mutual Research (FM) approved. All three FP pumps will be provided as part of a skid within an overall fire pump enclosure, which will be heated, ventilated, and have fire protection per NFPA and/or local code(s), whichever is the most conservative. The diesel engine will be designed to operate on Ultra Low Sulfur Diesel (ULSD) fuel.

Tank for Storage of Fire Protection Water

The volume of water to be stored for use by the Facility's Fire Protection system (common to both Units and the Facility) will be determined by the applicable NFPA and/or local code(s), whichever is the most conservative. The required volume (gallons) will be stored in a "reserved Fire Water volume" within a larger Water tank common to the suction of Fire Protection pumps and the suction of pumps of other systems. The suction(s) / inlet(s) to the Fire Protection pumps will be located near the bottom of the tank while the suction(s) / inlet(s) related to all the other (non-Fire Protection) pumps will be located at higher elevations, creating a "reserved Fire Water" volume between the elevations of the pump suction(s).

Fire Protection (Water) System

Common to both Units and the Facility, the fire pumps will provide water to an underground fire water "loop", with associated hydrants for use by local fire department trucks, as well as

branches to supply fire water to local systems within the Facility. These local systems include the steam turbine bearings / lube oil of each of the two Units, as well as the normally occupied buildings of the Facility. Oil filled transformers will be isolated with fire rated walls and distance as allowed by code.

Fire Protection for Gas Turbines / Compartments

The Gas Turbines and their associated compartments (normally unoccupied) will be provided with fire protection systems by the GT vendor, as required to meet the applicable NFPA and/or local codes.

Natural Gas (Fuel Gas) Trip Stop Valve and Associated Pressure Limiting Components

The fuel gas system within the Facility will be designed per ASME B31.1 and/or local codes as applicable. In order to safely stop all flow of fuel gas to the Facility a fail-safe trip stop valve (common to the supply to both Units) will be provided in the supply branch to the Facility from the natural gas pipeline. In addition to several automatic safety signals from the Gas Turbine(s), Fire Protection system controller(s), etc., which will automatically close the trip stop valve, there will also be a manual pushbutton in the plant's control room and a manual pushbutton local to the Trip Stop Valve which will close the valve. To ensure safe control of fuel gas pressure within the plant's fuel gas system piping, ASME B31.1 also requires tandem (in series) pressure reducing valves as well as an appropriately sized relief valve downstream. Each of these tandem pressure reducing valves will be sized to reduce the supply pressure if the other were to fail open. It is noted that the scope of supply for some or all of these valves may be by the natural gas (pipeline) owner versus the owner of the Facility. If so, the valve(s) provided by the pipeline owner may be physically located beyond the boundary of the Facility.

Relief Valves

As required by ASME Boiler & Pressure Vessel code and/or local codes, the respective systems and/or components of the Units (including steam systems, high pressure water systems, fuel gas system, and auxiliary systems with liquid/vapor interfaces) will have the applicable relief valves, designed to prevent ruptures of piping and/or vessels due to over pressurization events.

Equipment Reliability

Fire Pumps

As described earlier, each of the three pumps will be specified and designed to meet the relevant NFPA, Underwriter's Laboratory (UL), and Factory Mutual (FM) codes and standards, as well as any applicable local codes. In order to achieve the requirements to be "UL Listed" and "FM Approved", the pumps will be proven / tested for reliability. The quality / typical constituents of the water to be as fire water (to fill tank) will be provided to the pump vendor to ensure compatibility / long life of the pumps' wetted components. Additionally, by purchasing the set of pumps as integrated "skids" within an enclosure / building, the related pump accessories will be

designed and fabricated within a “shop” environment, further enhancing reliability of the pumps / fire protection system.

Water Tank

The tank will be inherently reliable as a source of water for the fire protection system. The tank may be of welded construction or riveted construction and will be filled and checked for leaks prior to placing it into service for the Facility. The tank will be filled from a local municipal potable water source, ensuring clean water will be stored / available for the fire protection system, providing further reliability.

Fire Water Loop

Pipe, valves, hydrants, and associated components of the fire water loop / system will be designed for fire protection service, with consideration of the quality / constituents of the fire water. The items will be specified, as applicable, for either outdoor or indoor service to further enhance reliability of these components. All components will be rated for the Design Pressure and Design Temperature of the Fire Pumps / Fire Protection system.

Gas Turbine / Compartment Fire Protection

These systems will be designed by the Gas Turbine vendor for high reliability, due to their crucial nature to the protection of the related equipment.

Natural Gas supply, Trip Stop Valve, Relief Valve

As described above, the requirements from ASME B31.1 for these components / subsystem of the fuel gas system ensure an inherently reliable and safe system, from the perspective of both redundancy / failure and prevention of over pressurization of fuel gas pipe / components downstream.

Relief Valves

Manufacturers of relief valves must meet numerous and strict criteria from the ASME code in order to sell relief valves. These valves are therefore inherently reliable for performing their intended safety function, prevention of over pressurization.

Other Equipment

Equipment will be specified and built according to established codes and standards used in the Power industry, such as NFPA, ANSI, ASME, NEC, IBC, etc.

Generation Equipment Safety Standards

No safety manuals are available for the generation equipment. To assure all manufacturers and suppliers meet the stringent industry safety standards, the following codes and standards apply to all equipment and services provided for the facility.

• ASME	American Society of Mechanical Engineers
• ASME, Section I	Rules for Construction of Power Boilers
• ASME, Section VIII, Division 1	Rules for Construction of Pressure Vessels
• ASME, Section IX	Welding, Brazing, and Fusing Qualifications
• ASME TDP-1	Prevention of Water Damage to Steam Turbines Used for Electric Power Generation: Fossil-Fuel Plants
• ASME PTC 4.4	Gas Turbine Heat Recovery Steam Generators
• ASME PTC 19.1	Test Uncertainty
• ASME PTC 19.3 TW	Thermowells
• ASME PTC 22	Performance Test Code on Gas Turbines
• ASME STS-1	Steel Stacks
• ASME B31.1	Power Piping
• ABMA	American Boiler Manufacturer's Association
• AISC	American Institute of Steel Construction
• ANSI	American National Standards Institute
• ASTM	American Society of Testing Materials
• AWS	American Welding Society
• FAA	Federal Aviation Administration
• FM	Factory Mutual Engineering Association
• IBC	International Building Code
• ISA	Instrument Society of America
• NEC	National Electric Code
• NEMA	National Electrical Manufacturer's Association
• NFPA	National Fire Protection Association
• OSHA	Occupational Safety Health Act
• SAMA	Scientific Apparatus Makers Association as PMC 22.1
• SSPC	Structural Steel Painting Council
• UA	United Association of Steamfitters – Pipefitters
• UL	Underwriters Laboratories

The combined cycle Units and associated balance of plant equipment that will be installed for the Facility will be similar to components installed at numerous combined cycle facilities completed over the past several decades in the USA. The design of each respective vendor's respective equipment, whether a Gas Turbine Generator, Steam Turbine Generator, or a pump, fan, etc.,

will include "built in" safety margin(s). Where necessary per applicable code and/or per good engineering judgement, safety measures will be designed into the overall Facility, including the layout of its equipment and structures. Therefore, the design of the Facility will be very safe for both workers at the Facility and the general public external to the Facility.

The Engineering Procurement & Construction (EPC) firm for the Facility will have a site specific safety plan (including emergency response) during construction and commissioning, as further discussed below, After completion of construction / commissioning / testing, the Owner of the Facility will have a site specific safety plan and/or an emergency response plan for the operational time of the Facility going forward.

Restricted Public Access

The Facility will have permanent security fencing installed around the perimeter of the power block. Facility access will be controlled by 24 hour/day manned security at one controlled access point to the power block.

During the construction phase, temporary fencing for material laydown and parking areas will be provided where necessary to control public access. Temporary laydown areas will be gated and controlled through-out the work day schedule, locked during off-work hours.

Safety Planning

An Emergency Response Team (ERT) will be established at the Facility. The Team will be able to handle incidents that require medical care as well as all other incidents as identified in the Emergency Response Plan (ERP). The ERT will also be involved anytime transportation off-site is required for medical treatment. The Facility project Staff will select the members of the ERT and supply them with training, tools, and supplies needed to accomplish their task. At minimum, a medical jump bag (EMT/trauma bag) and automated external defibrillator (AED) shall be provided and available. ERT response shall be prompt within 3-4 minutes in areas where serious, life-threatening injuries or illness (e.g. suffocation, sever bleeding, falls, electrocution, or amputation) are possible or reasonably anticipated. Local emergency responders will be consulted prior to the ERT's (with Project Staff concurrence) development of the procedures they will use for responses. After construction / commissioning / testing has completed, the ERT will be continued by HPL and their staff for the operational life of the Facility.

During the construction phase of the Facility (including through commissioning / testing):

- An alarm system will be established as part of the Emergency Preparedness and Contingency Plan to alert all employees at the Facility in the event of an emergency. The alarm system will include lights, horns, sirens, or other appropriate devices to ensure that every person at the Facility is aware of emergencies.

- Project Fire Protection & Prevention will be reviewed in its entirety as required to ensure that minimum compliance requirements are maintained. Additionally, a Facility specific Fire Protection and Prevention Plan will be produced and distributed prior to mobilization to the work area. Updates to the Fire Protection and Prevention Plan shall be made for each additional work area that is added as the project is progressed.

- To prevent ignition hazards, electrical wiring and equipment shall be installed in accordance with the National Electrical Code and National Fire Protection Association (NFPA) standards. Smoking shall be prohibited in areas where fire hazards may exist, and "No Smoking" signs shall be posted.

- A fire extinguisher rated not less than 2A shall be provided for each 3,000 square feet of building area and in each yard storage area. Travel distance to any fire extinguisher shall not exceed 100 feet from any protected area.

- Extinguishers rated not less than 10B will be provided between 25 feet and 75 feet of any area in which more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are used or stored.

- Extinguishers will be conspicuously located where they will be readily accessible and immediately available in case of a fire. Their locations will be conspicuously marked. Extinguishers will be installed on hangers or in the brackets provided and will not be more than 5 feet from the floor. Extinguishers weighing more than 40 pounds will be installed so that the top is not more than $3^1/_2$ feet from the floor.

As part of and prior to HPL accepting “Care, Custody, and Control” of the Facility, the HPL will develop (for their ongoing use during Facility operation) their own specific procedures similar to those the EPC firm had (described above). Like the construction phase, the local emergency responders will be consulted with by the HPL as part of the development of the procedures. Additionally, the alarm system and the ERT / procedures (or their equivalent) will be maintained by the HPL. These will remain in place during the ongoing operational life of the Facility. The design of the permanent Facility (fire protection equipment / alarm system, location of fire extinguishers, electrical wiring / cabling, etc.) will be per the applicable codes in support of the ongoing operation of the Facility.

(2) Impact of Air Pollution Control Equipment Failures

While failures of air pollution control equipment at the Facility are considered to be unlikely and/or infrequent, if any were to occur the probable impact on the population is expected to be extremely low.

Each of the two Units of the Facility incorporates the following air pollution control equipment (or inherent design / operational practice):

Table 8–1
Air Pollution Control Equipment

Pollutant / Source	GTG / Duct fired HRSG	Auxiliary Boiler	Emergency Diesel Generator	Diesel Fire Pump
PM_{10} / $PM_{2.5}$	Note 1. Good combustion practices with natural gas fuel (low sulfur)	Note 1. Good combustion practices with natural gas fuel (only trace quantities of ash / non-combustibles, and low sulfur)	Note 1. Good combustion practices with low sulfur fuel (ULSD)	Note 1. Good combustion practices with low sulfur fuel (ULSD)
NO_x	DLN burners in GTG and Ductburner, as well as SCR / Ammonia injection system, Good combustion practices	DLN burners	Note 1	Note 1
So_x	Note 1. Pipeline Quality Natural Gas fuel (low sulfur)	Note 1. Natural gas fuel (low sulfur)	Note 1. low sulfur fuel (ULSD)	Note 1. low sulfur fuel (ULSD)
SAM (H_2SO_4)	Note 1. Good combustion practices with Natural gas (low sulfur fuel)	Note 1. Good combustion practices with low sulfur fuel	Note 1. Good combustion practices with low sulfur fuel (ULSD)	Note 1. Good combustion practices with low sulfur fuel (ULSD)
Ammonia “slip”	Computer control of Ammonia injection system, CEMS monitoring downstream of SCR	Note 1	Note 1	Note 1
CO	Oxidation catalyst and good combustion practices (GTG and duct burner)	Note 1. Good combustion practices	Note 1	Note 1
VOC or OC	Oxidation catalyst and good combustion practices (GTG and duct burner)	Note 1. Good combustion practices	Note 1	Note 1
HAPs	See SAM and Ammonia Slip, otherwise Note 1	Note 1	Note 1	Note 1

Pollutant / Source	GTG / Duct fired HRSG	Auxiliary Boiler	Emergency Diesel Generator	Diesel Fire Pump
Greenhouse gases	Good combustion practices and energy efficiency. Note 2	Good combustion practices. Note 1	Note 1	Note 1
Lead	N/A – Note 3	N/A - Note 3	Note 1	Note 1

**Note 1: No additional control of this pollutant for this source / equipment beyond its inherent (physical) design*

**Note 2: High efficiency operation (low heat rate) is inherent to the design / equipment of the combined cycle Units of the Facility.*

**Note 3: Lead is only applicable for equipment burning diesel fuel*

As mentioned several times in the preceding table, "Good combustion practices" is a combination of the inherent design of the key combustion equipment and/or their subcomponents / sensors as well as the associated controlling logic in order to maintain the correct air-to-fuel ratio to promote complete combustion. "Good combustion practices" applies at all times (normal operation as well as Startup/Shutdown). Dry Low NO_x burners are specific examples of key combustion equipment for the GT and the Auxiliary Boiler. While the inherent physical design (shapes, contours, flow paths, etc.) cannot "fail", ongoing maintenance (inspection, cleaning, calibration, etc.) will be required for the respective combustion equipment / subcomponents throughout the life of the plant. In order to stay within compliance of the Facility's air permit and/or other permits, these ongoing maintenance activities will be required. Therefore, there is no expected conceptual failure of "Good combustion practices", and therefore there is no expected impact to pollution levels for the general population.

There are two physical catalysts internal to the HRSG. One catalyst is related to the SCR / Ammonia injection system designed to reduce NO_x produced by either the combustion of fuel in the Gas Turbine or the combustion of fuel at the duct burners with the HRSG. The second catalyst is designed to reduce Carbon Monoxide (CO) and/or Volatile Organic Compounds (VOC)—also referred to as unburned carbon produced by either the Gas Turbine or the duct burner. The catalyst of the SCR is designed to enhance a chemical reaction between ammonia and NO_x to produce Nitrogen and water. There is a system ancillary to each HRSG which injects vaporized aqueous ammonia into the GT exhaust stream upstream of the catalyst, as well as some aqueous ammonia components common to both Units (storage tank, pumps, etc.). The CO / VOC catalyst works passively in the GT and/or duct burner exhaust stream, without the need for any chemicals to be injected upstream. Either of the catalysts could fail due to physical "plugging" or "poisoning" of its

respective surface area / reactive sites due to dust, dirt, and particulate matter in the exhaust stream. The SCR catalyst / function could also fail due to improper operation / failure of the ammonia injection system. In the case of any of these types of failures, the level of NO_x, CO, or VOC would immediately trend upward in the exhaust gas stream which is continuously monitored by the CEMS on each respective HRSG stack. As part of compliance with each Unit's Air Permit, the plant staff would respond quickly and appropriately to any such excursions in NO_x, CO, or VOC, including reduction of power and/or shutdown of the Unit(s) if necessary. As with the discussion above concerning "good combustion practices", the Units will have ongoing maintenance activities to minimize the potential for these types of failures / emission excursions. While there could be a short period at a higher rate of emissions (mass / time), the time of operation in this situation would be accounted for in the overall emission rate per year. Therefore, there is no expected impact to pollution levels for the general population.

Concerning the natural gas fuel, it is possible, but very unlikely, that the gas from the pipeline supply to the Gas Turbine / duct burner and Auxiliary boiler could be out of specification with regards to having a sulfur content that is too high. This would be the result of components / equipment upstream of the plant, and therefore is not considered a failure of control equipment of the plant. However, if the natural gas was high in sulfur content, the increase in SO_x from the Gas Turbine / duct burner would be measured / reported by the CEMS, and the plant personnel would respond as mentioned above. While there could be a short period at a higher rate of emissions (mass / time), the time of operation in this situation would be accounted for in the overall emission rate per year. Unlike the HRSG stacks, the Auxiliary boiler stack does not have a CEMS, so an increased sulfur level in the natural gas would not be directly detected if the Auxiliary boiler were in service with a high sulfur content fuel. Since the Auxiliary boiler is only operated when both Units are not operating, and one Unit is going to be started, the time when the Auxiliary boiler could be burning high (out of specification) sulfur natural gas is considered to be low. Additionally, once the respective GT was started, the out of specification sulfur (and/or high SO_x) would be identified by the CEMS and appropriate actions would be taken by plant staff, including any calculations of increased SO_x emissions that would have assumedly been released from the Auxiliary Boiler's time of operation. While there could be a short period at a higher rate of emissions (mass / time), the time of operation in this situation would be accounted for in the overall emission rate per year. Therefore, there is no expected impact to pollution levels for the general population.

Concerning the ULSD fuel, it is possible, but very unlikely, that the fuel from the supplier and subsequently used by either the Diesel Generator of the Diesel Fire Pump could be out of specification with regards to having a sulfur content that is too high. This would be the result of components / equipment of the fuel supplier, and therefore is not considered a failure of control equipment of the plant. Due to the strict regulations regarding the production and sale of ULSD

fuel, the probability of the ULSD being out of spec, particularly on sulfur content, is considered to be negligible. Therefore, there is no expected impact to pollution levels for the general population.

(3) Noise

Noise is defined as unwanted sound and the word *Noise* represents the subjective human response to the physical phenomenon of sound. A variation in pressure above and below atmospheric pressure is called sound pressure, in units of pascals (Pa). The minimum sound pressure that the ear may detect is 20 μPa, while the greatest sound pressure before pain is experienced is 60 Pa.

Sound Pressure Level

A large linear scale would be required to cover the whole dynamic range of human hearing; however, the human brain is not designed to encompass the range in a linear way; therefore, a logarithmic scale is more suitable for expressing the human subjective response as the logarithmic scale provides a convenient way of comparing sound pressure of one sound with another. The sound pressure level is defined by $L_p = 10 \log_{10} (P_{rms}/P_{ref})^2 = 20 \log_{10}(P_{rms}/P_{ref})$.

where P_{rms} is the root mean square sound (rms) pressure,

and P_{ref} is the reference rms sound pressure (20 μPa) .

A source radiating acoustic pressure, P_{rms}, of 1 Pa, will generate a sound pressure level of 94 decibels (dB). Sound level meters measure the sound pressure levels, L_p, (SPL), which has the units of decibels. **Table 8-2** shows the corresponding sound pressure (Pa) and sound pressure levels (dB) for few sources.

Table 8–2
Sound Pressure and Sound Pressure Levels of Some Sources

Type of Sound Source	A-Weighted Sound Pressure Level in dB re 20 μPa	Sound Pressure in Pa
Firearms, at shooter's position	140	200
Rock concert	120	20
Newspaper press	100	2
Milling Machine	80	0.2
Conversation at 1 m	60	0.02
Whispered speech in quiet room	40	0.002
Audiometric Test Room	20	0.0002
Hearing Threshold	0	0.00002

Frequency

Frequency is defined as the number of cycles per unit of time and is typically measured in units Hertz (Hz), or cycles per second. A young person with normal hearing can perceive sound in the frequency range of 20 Hz – 20,000 Hz, defined as the normal audible frequency range. However, the human ear is most sensitive to frequencies ranging between 500 Hz to 4000 Hz. Typically, the noise assessment of industrial noise sources includes the evaluation of nine (9) octave band center frequencies (31.5 Hz – 8000 Hz).

A-weighting & Subjective Human Response to Sound Pressure Levels

To assess the human response to noises, certain frequencies are corrected using a frequency weighing known as A-weighting procedure. This is because A-weighting curve provides a good approximation of human ear response to low level sound such as typical environmental noise. Frequency components between 1,000 Hz – 5,000 Hz are hardly effected, but the adjustment is rather large at low frequencies (-70 dB at 10 Hz).

The most common metric used for measuring the sound pressure levels is A-weighted equivalent continuous sound level (L_{Aeq}). L_{Aeq} is used as a prime descriptor to assess most types of sounds heard in a community. The L_{eq} is an average of sounds measured over time. **Table 8-3** shows the A-weighted sound pressure levels of typical sources and the corresponding human subjective response.

Table 8–3
Subjective Response to Sound Pressure Levels

Sound Pressure Level, dB (re 20 µ Pa)	Description of Sound Source	Typical Subjective Description
140	Moon launch at 100 m; artillery fire, gunner's position	
120	Ships engine room; rock concert, in front and close to speakers	Intolerable
100	Textile mill; press room with presses running; punch press and wood planers, at operator's position	Very Noisy
80	Next to busy highway, shouting	
60	Department store, restaurant, speech levels	Noisy
40	Quiet residential neighborhood, ambient levels	Quiet
20	Recording studio, ambient levels	
0	Threshold for hearing for normal young people	Very quiet

Applicable Noise Regulations

No federal, state, county or city noise regulations are applicable to the Harrison Power project. OPSB rules requires that the project application must include a comprehensive noise evaluation that includes assessment of predicted facility noise emissions with existing ambient sound levels. The OPSB does not have standard numerical decibel limits to assess the noise at nearby noise sensitive areas (NSAs); however, the project has a design goal of limiting the project noise within 5 dBA of the existing ambient sound levels.

Ambient Sound Levels

An environmental noise survey was conducted around the project site to establish the background ambient sound levels. Eight (8) measurement locations, including noise sensitive receptors and property boundary locations, were selected for this measurement program. The noise sensitive receptors include residential properties, schools, churches, or any other noise sensitive locations within a 1 mile radius of the facility. **Table 8-4** provides a brief description of the selected measurement locations.

Table 8–4
Ambient Sound Level Measurement Locations

Location	Coordinates	Description
#1 (<0.5 m	N 40°15'01.96", W 81° 00'30.83"	Harris Pond House (<0.5 miles from project)
#2	N 40°14'50.17", W 81° 00'25.44"	House to the southeast of the site on hill (<0.5 miles from project)
#3	N 40°14'55.86", W 81° 01'07.68"	Lower southwest corner of the project site
#4	N 40°15'15.74", W 81° 01'10.88"	Markwest Facility Entrance: 43071 Industrial Park Road, Cadiz OH 43907
#5	N 40°15'37.68", W 81° 00'55.59"	Trailer Park
#6	N 40°15'30.25", W 81° 00'07.64"	South property boundary of proposed High School Location
#7	N 40°15'7.58"N, W 80°59'53.92"	Neighborhood – Harris Hill Drive
#8	N 40°15'9.01"N, W81°00'13.47"	House to the east of the site on the hill (<0.5 miles from project)

Ambient Noise Survey Procedure

Short-term attended sound level measurements were conducted at each location. Measurements were done in a period with minimal background activity around the area to capture realistic

background ambient sound levels. Each measurement was conducted for a minimum duration of 30 minutes and was repeated three times to arrive at a good representation of the ambient sound level. These intervals were done at both daytime and nighttime.

Sound level measurements were done with instruments that meet the Acoustical Society of America (ANSI) S1.4, Type 1 specification. The meters were calibrated before and after surveys, and have current laboratory certification. The microphones were fitted with windscreens to minimize measurement contamination from wind-induced pseudo noise. The microphone was placed at a height of five (5) feet from ground level.

Recorded data shall include overall A-weighted L_{eq} sound levels. Meteorological conditions were also monitored during the survey period and were generally favorable during the survey period. **Table 8-5** shows the ambient sound levels measured at the selected locations.

Table 8–5
Ambient Sound Levels

Location	Description	Survey Date/Time	L_{eq} (dBA)	Wind Speed (mph)	Notes
#1	Harris Pond House	06/20/2017 6:03 pm	42	1-2	Mainly birds chirping in the background
		06/21/2017 6:45 am	46	0-1	Birds chirping in the background
		06/21/2017 1:45 pm	42	1-2	NA
#2	House to the southeast of the site on a hill	06/19/2017 5:00 pm	67	6-7	Dogs barking nearby
		06/21/2017 12:24 pm	44	2-3	Dogs barking nearby
		06/22/2017 5:45 am	47	0-1	NA
#3	Lower southwest corner of project area	06/20/2017 12:00 pm	68	3-4	NA
		06/21/2017 5:20 am	62	1-2	Truck Traffic
		06/21/2017 7:00 pm	56	5-6	NA
#4	Markwest Entrance	06/20/2017 11:20 am	69	2-3	NA

Location	Description	Survey Date/Time	L_{eq} (dBA)	Wind Speed (mph)	Notes
		06/21/2017 6:00 am	65	1-2	Truck unloading
		06/21/2017 6:20 pm	60	6-7	NA
#5	Trailer Park	06/19/2017 10:50 am	49	4-5	NA
		06/20/2017 7:35 am	47	3-4	NA
		06/21/2017 5: 45 pm	50	3-4	NA
#6	Proposed High School Location	06/19/2017 11:50 am	55	1-2	Crane operating nearby, truck traffic etc.
		06/20/2017 6:40 am	61	0-1	Motorcycle Noise
		06/21/2017 1:05 pm	60	2-3	NA
#7	Neighborhood – Harris Hill Drive	0620/2017 5:20 pm	51	6-7	Nearby landowners talking/conversations.
		06/21/2017 7:20 am	48	0-1	Truck traffic, birds chirping etc.
		06/21/2017 2:25 pm	46	1-2	NA
#8	House to the East of the site on the hill	06/19/2017 5:00 pm	53	1-2	Truck traffic
		06/21/2017 1:05 pm	52	2-3	Dogs barking, Lawnmower
		06/22/2017 5:45 am	47	1-2	Dogs barking nearby

Results indicate the ambient sound levels around the project site ranges between 42 dBA – 68 dBA. Sound levels were impacted by the truck traffic and from barking dogs at a few locations. The lowest ambient sound level, 42 dBA, was measured at Location #1 – Harris Pond House.

Project Noise Criteria

Results of ambient noise survey indicate that the lowest ambient sound level was measured at Location #1, around the Harris Pond residence. **Figure 8-1** shows the Noise Monitoring Locations. An ambient sound level of 42 dBA was measured at this location. Note that this location is the closest residential receptor to the facility and since the lowest ambient sound level was recorded at this location, the project has adopted a design goal for noise emissions from the Facility to not exceed the existing ambient sound levels at Location #1 by more than 5 dBA, i.e., future noise emissions shall not exceed 42 + 5 = 47 dBA at Location #1.

Construction Noise

Construction noise is expected to be typical of the construction of similar industrial and power generating facilities. Nighttime construction is expected to be limited and the construction activities are expected to be focused during the daytime hours. Typical construction schedule is expected to occur during the weekdays; however, construction work may continue over the weekend to finish an ongoing activity.

Note that the project noise criteria discussed above is typically applicable to the operational noise from the facility; however, a construction noise assessment has been done to assess the extent of impact, if any, during the different construction phases of the project. Typical construction phases include: 1) Site Clearing and Preparation; 2) Excavation Foundation and Installation; 3) Steel Erection; 4) Mechanical & Electrical Installation; 5) Equipment Installation & Finishing. **Table 8-6** summarizes the construction noise levels during the different phases. Blasting activities are not anticipated.

Table 8–6
Predicted Construction Noise Levels (Leq, dBA)

Construction Equipment	Usage Factor (%)	Equipment Noise Level at 50 feet, L_{max} (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)							
				#1	#2	#3	#4	#5	#6	#7	#8
Site Clearing and Preparation											
Front Loader	40	79	90	54	48	49	54	50	47	45	42
Backhoe	40	78									
Dozer	40	82									
Tractor	40	84									
Scraper	40	84									
Grader	40	85									
Truck (2)	40	91									
Paver	50	77									
Excavation Foundation and Installation											
Auger Drill Rigs (4)	20	85	91	55	49	50	55	51	48	46	43
Jack Hammer	20	89									
Truck (2)	40	91									
Front Loader	40	79									
Backhoe	40	78									
Dozer	40	82									
Tractor	40	84									
Generator	50	81									
Pump	50	81									
Air Compressor	40	78									
Shovel	20	87									

Construction Equipment	Usage Factor (%)	Equipment Noise Level at 50 feet, L_{max} (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)							
				#1	#2	#3	#4	#5	#6	#7	#8
Steel Erection											
Derrick Crane	16	85	80	44	38	39	44	40	37	35	32
Concrete Pump	20	82									
Welder/Torch	40	73									
Mechanical & Electrical Installation											
Air Compressor	40	78	93	57	51	52	57	53	50	48	45
Derrick Crane	16	85									
Pump	50	81									
Welder/Torch	40	74									
Pneumatic Tool (3)	50	85									
Jack Hammer	20	89									
Truck (2)	40	91									

Construction Equipment	Usage Factor (%)	Equipment Noise Level at 50 feet, L_{max} (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)	Composite Sound Level at Site and Other Locations, Leq (dBA)							
				#1	#2	#3	#4	#5	#6	#7	#8
Equipment Installation & Finishing											
Air Compressor	40	78									
Derrick Crane	16	85									
Pump	50	81									
Welder/Torch	40	74									
Pneumatic Tool (3)	50	85									
Jack Hammer	20	89	94	58	52	53	58	54	51	49	46
Front Loader	40	79									
Backhoe	16	85									
Dozer	40	82									
Tractor	40	84									
Scraper	40	84									
Grader	40	85									
Truck (2)	40	91									
Paver	50	77									

Results indicate that construction noise levels are expected to range between 32 dBA – 58 dBA at the eight selected locations, including from the nearest property boundary and at sensitive receptor sites. Construction sound levels were calculated assuming that all the sources depicted in **Table 8-6** are in operation simultaneously. The construction noise sources were modeled as a single point source in the SoundPLAN model. The model includes site topography as the elevation varies for different receptors located around the site.

Construction noise is typically worse during the pile driving operations of the project; however, in this case considering the proximity of residential receptors and sensitivity towards noise, auger cast drill rigs would be used to drive the piles. Auger cast piles are much quieter in operation in comparison to the noisy impact hammer pile driver operation.

Construction traffic will not have an adverse impact on the sensitive receptors identified, and it will be consistent with normal traffic levels. Construction noise may be audible at the nearby receptor locations, especially during the periods of low ambient noise; however, since the construction noise is temporary, the predicted construction noise levels are not expected to have any adverse or long term impact on the acoustic background of the project site

Construction Noise – Responsible Measures to Limit Noise

Noise during the construction can also be limited by incorporating measures other than the noise control at the source. Reasonable efforts will be invested in implementing these measures to ensure minimal noise annoyance from nearby residential receptors.

- Replace noisy operations with quieter options such as welding instead of riveting and mixing of concrete off-site rather than on-site.
- Select quiet equipment available for the operation. For example, select electrical equipment instead of diesel engines and hydraulic equipment instead of pneumatic tools. As long as the functionality of the operation is unaffected, quieter option shall be preferred.
- Schedule noise generating activities during the day when the ambient background level is high. For example, any operation of heavy machinery shall be scheduled during the daytime hours when the ambient is high rather than at nighttime when the ambient is expected to be minimum.
- Locate the noise generating equipment away from the sensitive noise receptors. Diesel generators, if used, can be located in a way that are shielded by temporary control rooms and temporary storage containers. Blocking the clear line-of-sight between the source and receptor also reduces the propagation of sound levels.
- Actively communicate with the residential receptors to learn about any noise complaints. Take measures to reduce the duration of unfavorable noise activities to as low as possible.

Schedule any unavoidable loud noise events followed by a comprehensive communication effort with the community. The same loud noise event is expected to create less annoyance if the residents are aware of the schedule. On the other hand, a surprise loud event without prior notification may invoke a strong reaction.

Operational Noise

Since the lowest ambient sound level was measured at Location #1 – Harrison pond residence (See Table 8-5 for a list of locations), the project has adopted a design goal such that noise from the proposed facility shall not exceed (42 + 5) 47 dBA at Location #1. Because the ambient sound levels measured at all other locations were much higher, Location #1 ambient sound level defines the limiting case for noise mitigation design.

Noise Propagation Model

A noise propagation model was developed for the proposed power plant using SoundPLAN software. Sound power levels from vendor data and CB&I's database were used to develop the model. The acoustical model has also been used to establish far-field performance targets for major equipment to achieve compliance with pertinent noise ordinances. Note that the model includes only project noise sources and excludes the contribution from non-project noise sources.

The outdoor noise propagations calculations are based on ISO 9613, *Part 1: "Calculation of the absorption of sound by atmosphere", (1993) and Part 2: General Method of calculation", (1996).* The ISO 9613 standard predicts far-field sound pressure levels under meteorological conditions favorable to sound propagation. **Table 8-7** below shows the modeling parameters used to predict far-field sound levels.

Table 8–7
Modeling Parameters

Item Description	Model Input
Temperature	50°F
Relative Humidity	70 %
Wind Conditions	Downwind, from plant towards receptor
Site Terrain/Elevation	Google Earth
Ground Absorption	0.5
Number of Reflections	3
Plant Operating Condition	Normal, Typical excluding startup, shutdown and any other upset scenarios

Each noise sources is modeled based on its noise emission pattern. Major equipment such as HRSGs and turbine buildings are modeled as industrial buildings with facades as noise generating sources. Each façade is assigned a sound power level. The sound levels radiated by building walls is determined by calculated room effect of noise sources contained in the building.

Stack exit is modeled as point source, which radiate sound spherically. Surfaces and opening are modeled as area sources. Water treatment and control room buildings and other are modeled as obstacles. Site terrain is modeled based upon the elevation data from Google Earth.

Sound Power Levels

Equipment sound power levels were calculated and estimated from vendor data and reference data from similar projects. Calculations were performed for each sources in full octave bands between 31.5 Hz and 8000 Hz. Sound power levels represent typical normal operating

conditions. **Table 8-8** shows the equipment noise contribution levels at 400 feet derived from equipment sound power level

Table 8–8
Equipment Noise Contribution Levels @ 400'

Noise Source	Octave Band Center Frequency, Hz									dBA
	31.5	63	125	250	500	100	200	400	800	
Power House Building Walls & Roof	74	75	65	49	32	22	11	8	3	52
GT Inlet Filter Face (no acoustic hood)	62	55	51	44	40	41	46	54	45	56
HRSG (Stack & Body)	66	70	69	61	46	35	21	10	10	56
Air Cooled Condenser	71	69	63	54	52	53	43	39	37	56

Notes:

Additional equipment such as BFW pumps and ACC auxiliary equipment placed inside enclosures

Balance of Plant (BOP) Equipment such as Ammonia Injection Skids, Duct Burners, Transformers to meet 85 dBA @ 3 feet noise limits. Minimal contribution towards far-field noise expected from BOP equipment.

Inherent Mitigation Features in Facility Design

The noise propagation model incorporates the following mitigation measures inherent in the facility design:

An acoustical powerhouse building (over GT & ST) with silenced ventilation.

- 7-9 shows the required sound transmission loss values and absorption coefficient values for the acoustical building.
- Ventilation inlets on powerhouse building located towards the west and north walls to limit the noise propagation towards sensitive receptors located east from the site. Ventilation louvers to mitigate the breakout noise from the building.
- An acoustic silencer for the Gas turbine inlet filter house. Standard 8 feet silencer design typically provided by OEM used in the model.
- Low-noise fans for the air cooled condenser. 95 dBA sound power level (per fan) used in the model.
- Acoustical sheds for boiler feed water pumps.
- Acoustic lagging for the fuel gas piping and gas metering equipment.

- 3-sided concrete blast walls around the steam turbine and gas turbine transformers.
- Use of silencers for safety relief valves and other high pressure steam release systems.

Table 8–9
Building Wall & Roof Acoustical Performance

Octave Band Center Frequency (Hz)									
	31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Wall/Roof Transmission Loss, dB	6	9	14	22	34	42	53	56	57
Absorption Coefficient	0.2	0.3	0.5	0.8	0.9	0.9	0.8	0.6	0.5

Noise Propagation Model Results

Table 8-10 shows the predicted sound levels from the facility under normal operating conditions. Comparison of predicted sound levels with measured ambient sound levels suggests that the facility design, with its inherent noise mitigation features, is sufficient to limit the noise propagation from the facility to achieve and exceed the project's design goal for operational noise and result in a predicted operational noise level of 42 dBA at Location #1, which is the nearest property boundary to the Facility. **Figure 8-2** shows the A-weighted noise propagation contour and indicates anticipated received sound levels from the Facility at noise sensitive locations within one mile the proximity of the Facility site.

Additionally, since the predicted noise levels are within 3 dBA of the existing ambient sound levels, facility noise is expected to have minimal impact on the acoustic environment of the project site. In addition, traffic related to operations should be consistent with normal traffic levels and not create any adverse impact on identified sensitive receptors.

Table 8–10
Comparison of Predicted Sound Levels with Lowest Ambient Sound Levels

Location #	Predicted Sound Level, dBA	Lowest Ambient Noise Level, dBA	Meets Design Goal to – Not to exceed ambient by more than 5 dBA
#1	45	42	Yes
#2	38	44	Yes
#3	45	56	Yes

Location #	Predicted Sound Level, dBA	Lowest Ambient Noise Level, dBA	Meets Design Goal to – Not to exceed ambient by more than 5 dBA
#4	48	60	Yes
#5	41	49	Yes
#6	37	55	Yes
#7	36	46	Yes
#8	36	47	Yes

(4) Water

The project will have an average water demand of 147,888 gallons per day, and an average discharge of about 213,120 gallons per day. Water will be supplied to the project by the Village of Cadiz without adverse effect to others. HPL intends to discharge industrial effluent into the Sally Buffalo Creek watershed. Stormwater will run into a basin located west of the project area. Stormwater and industrial effluent permitting will be developed for the project and submitted for approval to the pertinent authorities.

Potable water distribution is provided from the municipal water supply and will include bathrooms/showers, hot water heater, laboratory Equipment and sinks, emergency showers and battery room sinks and miscellaneous wash-down stations as described below and with domestic water distribution system suitable to serve approximately thirty (30) people. As a result, there are no anticipated impacts to public or private water supplies in the unexpected event of equipment failure. Further, there are no water protection areas proximate to the Facility.

The facility potable water supply piping system will be designed to the Uniform Plumbing Code and Local State and County requirements. The interconnection to the county potable water supply will include a double check valve back flow prevention system and isolation valves to protect the main county potable water supply system from possible contamination. The project will comply with Ohio EPA drinking water standards.

Site storm water drainage is accomplished by a combination of underground piping, catch basins, overland flow, swales and ditches or storm sewers and inlets as necessary. Storm water runoff from the new power generating facility is routed to new storm water management pond(s). The new storm water management/infiltration pond(s) is designed to meet the requirements of the NPDES Stormwater Permit and the Agreement, including Applicable Law.

Channels and ditches will generally have a trapezoidal cross section and be designed to reduce the potential for erosion. Culverts are reinforced concrete pipes; the main plant road crossings and under other plant access roads are CHDPE (corrugated HDPE). An inlet and storm system is provided in areas, where ditches and culverts are not acceptable. The Facility is not located within a floodplain, and flooding is not expected to be a concern. It should be noted that all swales are erosion control protected by grass with man-made material or rip rap.

Although no aquifers or wells will be directly affected by the Facility, HPL has included in this application **Figure 8-3** which shows aquifer information and existing wells.

(5) Geology

Site Geology

The western portion of the project area includes a pond at the bottom of a moderately sloping basin that is located at an elevation of 1,155 feet. The eastern portion of the project area has mildly sloping hills and ranges from an elevation of 1,175 feet to 1,240 feet. Laydown areas are relatively flat. There are no known geological inadequacies that are expected to impact construction or operation of the Facility. A figure showing the Facility can be viewed in **Figure 3-4a**. A County-wide Geotechnical Report is included in **Appendix H**. A waiver request from Rule 4906-4-08(A)(5)(c) has been submitted to waive the submittal of plans for test borings.

A subsurface exploration was perform on property 1 mile from the site. This report summarized the area as having reclaimed strip mine spoils. The mine spoils consisted of various amounts of shale and sandstone fragments in a brown and gray lean clay matrix. It is assumed that this property will encounter similar reclaimed strip mine spoils.

Soils and Soil Suitability

An analysis of soils in the project area was done on the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web site. The area is comprised of Morrison channery silty clay loam, 0 to 8 percent slopes (MoB) and Morrison channery silty clay loam, 8 to 25 percent slopes (MoD). A soil map is included as **Figure 8-4**. There are no slopes in the project area that have slopes greater than 12 percent.

MoB covers about 58 percent of the project area. MoB is typically found at a depth of more than 80 inches and is found on ridges, shoulders, and summits. It is well drained, and does not have the frequency to pond or flood. It is not considered hydric.

MoD covers about 39 percent of the project area. MoD is typically found at a depth of more than 80 inches and is found on hillslopes, backslopes, summits, and shoulders. It is well drained and does not have the frequency to pond or flood. It is not considered hydric. **Table 8-11** includes a summary of the soil properties and characteristics from the USDA web site.

Table 8–11
Soil Properties and Characteristics

Soil Series	Depth (in.)	Permeability (in./hr.)	Soil pH	Potential Frost Action
Morrison channery silty clay loam, 0 to 8 percent slopes (MoB)	0-1 1-3 3-80	0.00 to 0.14 in/hr	4.3 7.5 7.6	Moderate
Morrison channery silty clay loam, 8 to 25 percent slopes (MoD	0-3 3-80	0.00 to 0.01 in/hr	7.5 7.5 7.6	Moderate

Based on a review of geological information, geological issues are not anticipated to restrict development at the Facility. Design and site preparation will utilize results of the geotechnical study. Soil will be seeded and restored back to existing quality following construction. An Erosion and Sediment Control Plan will be developed for the Facility, which will detail soil restoration activities.

Plans for Test Borings

A waiver request from Rule 4906-4-08(A)(5)(c) has been submitted to waive the submittal of plans for test borings. Under the sought waiver, HPL will submit its plan for test borings, including appropriate closure plans, to the OPSB's staff no more than thirty (30) days prior to the commencement of the field work and after the Facility layout has been finalized. Within sixty (60) days following the receipt of all relevant data from the borings, HPL will provide the OPSB with subsurface soil properties, static water level, rock quality description, percent recovery, and depth and description of bedrock contact.

(6) High Winds

No adverse consequences are expected from high wind conditions (over 24.7 miles per hour). The average wind speed for 2016 reported by the National Oceanic Atmospheric Administration National Centers for Environmental Information and based on readings from the National Weather Service station at the Pittsburgh International Airport in Coraopolis, Pennsylvania (Station #94823) was 7.2 mph. This station is in general proximity to the Facility site and can be considered representative of the Facility Site. In addition, wind speeds recorded during the ambient background study did not exceed 7 miles per hour at any of the eight locations where wind speeds were sampled.

(7) Blade Shear Impacts

This section does not apply to this project since it does not include any wind turbines.

(8) Ice Throw Impacts

This section does not apply to this project since it does not include any wind turbines.

(9) Shadow Flicker Impacts

This section does not apply to this project since it does not include any wind turbines.

(10) Interference with Radio/TV Reception

This section does not apply to this project since it does not include any wind turbines.

(11) Interference with Military/Civilian Radar Systems

This section does not apply to this project since it does not include any wind turbines.

(12) Interference with Microwave Communication Paths

This section does not apply to this project since it does not include any wind turbines.

(B) ECOLOGICAL RESOURCES

(1) Existing Ecological Resources

Mapping

Figure 8-5 shows the boundary of the Facility (including the area one half-mile outside the Facility boundary), with information including: the location of wood lots or vacant fields; wildlife areas, nature preserves and other conservation areas; surface bodies of water, including wetlands, ditches, streams, lakes, reservoirs and ponds. A soil map is included as **Figure 8-4**. According to the National Resources Conservation Service's Web Soil Survey website, two mapped soil units were present within the area of investigation, Morristown channery silty clay loam 0-8% (MoB) and Morristown channery silty clay loam 8-25% (MoD). Both soils present are rated as nonhydric. Water (W) was also noted as being present by the Soil Survey.

MoB is found on hills. The natural drainage class is well drained. The soil not have the frequency to flood or pond. The NRCS does not rate this component as hydric.

MoD is found on hills. The natural drainage class is well drained. The soil does not have the frequency to flood or pond. The NRCS does not rate this component as hydric.

An NRCS soil survey is located in the wetland report in **Appendix E**. There are no slopes in the project area that are above 12 percent within the project boundary. The steepest slope measured in the project boundary is located within MoB soils, with a slope of 11%, and is located to the

east of the pond leading up toward the existing access road. The steepest slope measured in the laydown areas was 10%, located within MoD soils.

No wildlife areas, nature preserves or other conservation areas are present on the Facility or within one half-mile from the Facility. The closest conservation area is the Jockey Hollow Wildlife Area which is located approximately 6.5 miles southwest of the Facility. This 3,469 acre wildlife area is covered by second growth hardwoods and conifers which cover most of the area are interspersed with brushy coverts and grassland. CONSOL Energy, Inc. owns 1,490 acres of the area and has an agreement with the Division of Wildlife to allow public access for wildlife-related activities. Hunting of small and big game species is regulated with a proper hunting license during regulated hunting seasons. Four ponds lie within the wildlife area's boundary. The ponds contain several species of fish including largemouth bass, channel catfish and bluegill. Fishing is permitted in any pond found within the wildlife area with a valid fishing license.

Literature Survey

A National Heritage Data Request form was submitted to the Ohio Department of Natural Resources (ODNR). The response letter from the ODNR indicated that no records of rare or endangered species in the project area, including a one mile radius, in Cadiz Township, Harrison County, Ohio. The ODNR is also unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, parks or forests or other protected natural areas are located within a mile of the project area.

Coordination with the ODNR is located in **Appendix E.**

Field Survey Results

An environmental field vegetative and surface water survey was conducted for the Facility in November of 2016. This survey identified and described vegetative communities and a delineation of wetlands and streams. Vegetative communities present within the project area include open rolling hills, meadows, formerly used grazing lands and wetlands. The Facility area consists of maintained fields. Land surrounding the project area consists of forest with scattered fields and industrial properties. Land within one-quarter mile of the Facility and construction laydown areas is similar in character with fields, rolling meadows, and developed industrial areas. A map showing delineated resources is included in **Figure 8-6.**

Typical vegetation species data were recorded. Only herbaceous vegetation was observed in the work area. This vegetative layer includes plants less than 6 feet in height. No other vegetative species were observed.

Upland Communities

The Facility is very uniform when it comes to the plant communities. The landscape shows past farming activities took place and humans alteration of the landscape, though the land is not classified as agricultural land. The majority of the Facility, approximately 70 acres is comprised of an open field plant community. The area appears to be mowed annually or semi-annually. The construction laydown area is also dominated by open field plant community which appears also to be mowed on an annual or semiannual basis.

The portions of the Facility and constriction laydown areas are well maintained and vegetation is typically less than six inches in height. The maintained open fields for the Facility and laydown areas are supporting typical herbaceous species (see **Table 8-13**).

Wetland Communities

No wetlands were delineated and identified within the proposed construction laydown areas. However, five wetlands were identified and delineated within the Facility. Three of these wetlands were located in the northeastern and northwestern portions of project area and consist of a palustrine emergent (PEM) vegetative community, as described in detail in **Appendix E**. One wetland, also noted as PEM, was identified to the north of the pond located on site. The existing pond serves as a reclamation pond to the western side of the project area.

These on-site wetlands to the northeast and northwest have been influenced by past farming activities and other human disturbances. These wetlands for the area are generally low quality. The wetland to the western portion of the project area is listed under the National Wetland Inventory as a freshwater pond (PUBGx). The pond serves as a reclamation pond and was created and influenced by human activity. **Table 8-13** lists the species observed with the on-site PEM wetlands. The three wetlands in the northeast section of the project area will be impacted by the project and will need to be permitted. The pond will be used as a stormwater basin, and the wetland to the north of the pond will not be impacted.

Riparian Areas

No streams were identified within the construction laydown areas. Although four unnamed streams were observed within the Facility area. The streams identified within the Facility include four ephemeral channels. An ephemeral stream only conveys runoff from a storm event or snow melt, precipitation is the primary source of water for these streams. Ephemeral streams are permanently located above the water table and most often are dry.

The on-site streams are generally small in size and are of low quality. The streams are predominantly headwater streams that have formed as erosion channels. The streams feed the pond on the northern and southern sides, and two of the streams originated toward the eastern edge of the property, continuing east out of the project area boundary. The total length of streams

within the area of investigation was 479.94 linear feet. **Table 8-12** outlines the physical characteristics of the on-site streams. Additional information is provided in **Appendix E**.

Table 8–2
Physical Characteristics of Streams within the Project Area

Stream Label	Flow Regime	Predominate Substrate
S-1	Ephemeral	clay, gravel, grass
S-2	Ephemeral	clay, gravel, grass
S-3	Ephemeral	clay, gravel, grass
S-4	Ephemeral	clay, gravel, grass

Vegetative Species Survey

Various species were identified in the project area, which could be categorized as upland or wetland species. **Table 8-13** notes both upland and wetland vegetative species recorded within the project area and laydown areas. The wetland report can be viewed in **Appendix E.**

Table 8–13
Upland and Wetland Vegetative Species

Common Name	Latin Binomial	Stratum
American Purple Vetch	*Vicia Americana*	Herbaceous
Broom Sedge	*Andropogon virginicus*	Herbaceous
Common Yarrow	*Achillea millefolium*	Herbaceous
Common Dandelion	*Taraxacum officinale*	Herbaceous
Orchard Grass	*Dactylis glomerate*	Herbaceous

Table 8–12
Vegetation Recorded Within Emergent Wetlands

Common Name	Latin Binomial	Stratum
Fox Sedge	*Carex vulpinoidea*	Herbaceous
Common Yarrow	*Achiliea millefolium*	Herbaceous
Common Burdock	*Arctium minus*	Herbaceous
White Clover	*Trifolium repens*	Herbaceous
Deer Tongue	*Dichanthium clandestinum*	Herbaceous
Daisy Fleabane	*Erigeron annuus*	Herbaceous
Broom Sedge	*Andropogon virginicus*	Herbaceous
Spike Rush	*Eleocharis palustris*	Herbaceous

Common Name	Latin Binomial	Stratum
Shallow Sedge	*Carex Lurida*	Herbaceous
Crooked Stem Aster	*Aster prenanthoides*	Herbaceous
Lady Thumb Smartweed	*Persicaria maculosa*	Herbaceous
English Plantain	*Plantago lanceolate*	Herbaceous
Waterweed	*Elodea Canadensis*	Herbaceous
Green Algae	*Pediastrum boryanum*	Herbaceous
Rock Fir Moss	*Huperzia porophila*	Herbaceous

Wildlife Species Survey

An assessment of wildlife species and habitat was conducted in June 2017 for the Facility and construction laydown areas. The species survey included the project area and an area about quarter of a mile around the Facility and construction laydown area. Wildlife species were identified by visual observations, tracks and scat. **Table 8-14** lists the species observed during the field observation.

Table 8–14
Wildlife Species Observed on and Adjacent to the Project Area and Construction Laydown Area

Common Name	Latin Binomial
Killdeer	*Charadrius vociferous*
Damselfly	*Zygoptera*
Grasshopper	*Caelifera*
Whitetail Deer	*Odocoileus virginianus*
Eastern Turkey	*Melegris*
Wood Mouse	*Apodemus sylvaticus*
Garter Snake	*Thamnophis*
Raccoon	*Procyon lotor*
Field Sparrow	*Spizella Passeridae*
American Crow	*Corvus brachyrhynchos*
American Toad	*Bufo americanus*
Fowlers Toad	*Bufo fowleri*
Woodchuck	*Marmota monax*
Eastern Cotton Rabbit	*Sylvilagus floridanus*
Eastern Chipmunk	*Tamias striatus*

Common Name	Latin Binomial
Mourning Dove	*Zenaida macroura*
American Robin	*Turdus migratrius*
Beef Cattle	*Bos taurus*

Additional Ecological Studies

No additional studies were performed by the applicant.

(2) Ecological Resource Impacts During Construction

Impact of Construction on Undeveloped Areas

The ecological impact study conducted for the Facility and Construction Laydown Areas have relied upon field surveys conducted in June 2017, as well as existing information obtained from state agencies. The Facility has been very carefully sited to eliminate the need for clearing trees. Wetlands 1, 2 & 4 will be impacted during the construction of the Facility, as they are located within the Facility footprint. Permanent impacts to wetlands total 0.44 acres. A nationwide permit will be completed and filed with the state, and wetland impacts will be mitigated in accordance to the permit requirements.

During construction limited recreational or commercial species are likely to be present. The game species include whitetail deer and eastern turkey, which will temporarily avoid the work area.

Impact of Construction on Major Species

Impacts to endangered or threatened species are not anticipated, based on correspondence from the ODNR and United States Fish and Wildlife Service (USFWS). Impacts on recreational or commercial species are also not anticipated. Cattle that were previously located on site will be relocated during construction and operations.

The habitat to be altered for the species is not anticipated to have an impact on species populations. To view acreage of aquatic impacts, see **Appendix E**. Clearing and grubbing will not occur in areas delineated as wetlands, with the exception of wetlands that will be permanently impacted.

Mitigation for Short-Term and Long-Term Construction Impacts

The following measures are proposed to ensure short-term and long-term construction impacts to ecological resources remain minimal. Because the acreage of wetlands impacted is below the de minimus threshold, no mitigation is required. Should the acreage of impacts change according to design plans, mitigation needs will be readdressed. The wetlands and streams that are not

proposed to be impacted will be marked with orange construction fencing to protect them from entry of construction equipment and material storage or disposal. Also, little to no tree clearing is anticipated for this project. The following items will allow for site restoration:

- **Restoration Plan:** A restoration plan will be developed, which will include details on the removal and disposal of materials used for temporary access roads and construction staging areas. A Stormwater Pollution Prevention Plan (SWPPP) will be developed for this project, which will further detail removal plans.
- **E&S Control Plan:** A detailed Erosion and Sediment Control Plan (E&S plan) will be developed prior to initiating Facility construction. This plan will detail silt socks, stormwater collection ponds or any other controls to limit off-site transport of sediment and to provide protection to demarcated surface waters. In addition, a Notice of Intent will be filed with the OHIO EPA for coverage under the NPDES General Construction Stormwater Permit.
- **Revegetation**: Areas impacted by construction and grading activities will be revegetated as soon as possible following completion of construction to stabilize exposed areas of soil in accordance with Ohio EPA regulations. The species of vegetation proposed for seeding will be chosen to ensure compatibility with the surrounding land use classifications. Measures will be taken to prevent the spread of invasive species through the revegetation process.
- **Dust Control:** Water sprayers or other dust suppression methods will be employed on areas of exposed soils to minimize the potential for dust generation.

No avoidance measures were recommended by the ODNR for this project.

(3) Ecological Resource Impacts Post-Construction, Operation, and Maintenance

Impact of Operation on Undeveloped Areas

Facility operation is expected to result in a localized increase in lighting and noise in the immediate surrounding area. It is anticipated that the wildlife species will become acclimated to the normal Facility operations over time.

Impact of Operation on Major Species

Based upon correspondence from the state and federal agencies, and on site surveys, state- and federally-threatened or endangered terrestrial and aquatic species or their habitats will not be impacted by Facility operations. 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 and has been slated for industrial development. **Figure 7-6** shows ecological impacts.

Wetland and Stream Protection

Wetlands and streams that will not be impacted and are located near construction activities will be protected by appropriate BMPs, which will be established during the design of the E&S Plan. No herbicides are expected to be used during this project.

Post-Construction Monitoring of Wildlife Impacts

Currently, the project has no plans for post-construction monitoring of wildlife impacts.

(C) LAND USE AND COMMUNITY DEVELOPMENT

(1) Land Use Information and Impacts

Mapping

Figure 3-3 illustrates land use surrounding the Facility. As can be seen, the majority of the land uses on the project area consists of Manufacturing District land.

Structure Locations

There are no structures within a 1,000-foot buffer of the project or access road or within a 250-foot buffer of the project or access road. A table of structures within 1,000 feet and 250 feet from the site is therefore not needed. The closest recreational use is Sally Buffalo Park, a public Facility located approximately 0.75 of a mile to the north. The nearest school is Harrison Central Jr./Sr. High School, located approximately 1.75 miles from the Facility. Harrison Central Jr. / Sr. High School is a public, coeducational school. In 2016 school year, 672 students attended Grades 7-12 and approximately 70 staff and teachers taught within the high school. The other two schools with the district are Harrison East Elementary Schools, which is located approximately 7 miles from the Facility and Harrison North Elementary School is located approximately 11 miles from the Facility. In December 2015, Harrison Hills School District approved a 4.98 million dollar deal to construct a new 190,000 sq. foot elementary school. The school is going to be relocated approximately 1.1 miles from the Facility and house approximately 1,550 students from the county-wide district. As of July 2017, construction of the new school has not begun.

Land Use Impacts

The Facility's impact on surrounding land will be very minimal. As shown in **Figure 8-8**, the Facility is comprised of primarily Manufacturing District land. The MarkWest processing plant and Residential District land occupies the parcel to the north of the Facility. Industrial Park Road sits to the west. Approximately 34 acres categorized as Manufacturing District land will be permanently impacted by the project.

Figure 3-3 shows structures and land use within a mile of the Facility. The surrounding land within a 1 mile radius is very comparable to the immediate vicinity of the Facility. About 80% of the land is vegetated or water land use. Residential property is dispersed throughout the area.

Commercial property and development exists to the northwest of the Facility, the MarkWest Processing Plant. St. Teresa of Avila Catholic Church is the closest place of worship to the Facility, approximately 1.45 miles to the northeast. No worship places are located within a 1 mile radius. Sally Buffalo Park is the only recreational land use located within a 1 mile radius. The park is approximately 0.55 miles to the north.

Structures to be Removed or Relocated

No structures will be removed or relocated due to the construction of the Facility.

(2) Land Use Plans

There are no planned or concurrent or secondary commercial uses of the Facility other than the proposed Facility.

No adverse impacts to regional development will occur because of this project. The Facility is being located on land designated as a manufacturing district. The Facility fits into the city's zoning plan and current development. Harrison County has experienced a slow but steady population decline over the past few decades. According to the CIC, county population peaked at 18,150 in 1980, which has declined by 2,850 to 15,300 (a decline of 16 percent). The projected population is as follows: 15,300 in 2020; 15,100 in 2030; and 15,100 in 2040.

(D) CULTURAL AND ARCHAEOLOGICAL RESOURCES

(1) Cultural Resource Mapping

A Phase I Archaeological Survey was not required for the Harrison Power Project because the proposed construction activities take place within a reclaimed strip mine; therefore, there was no probability for finding intact archaeological resources within the boundaries of the project area.

Cultural resource investigations began with a literature search, including an examination of historic mapping along with files at the Ohio State Cultural Resource GIS Data Base, including the Ohio Archaeological Inventory (OAI) forms, Ohio Historic Inventory (OHI) forms, National Register of Historic Places (NRHP) files, and National Historic Landmarks (NHL) list. **Figure 8-8A, 8-8B, and 8-8C** show landmarks, districts, sites, buildings, structures, and objects eligible for NRHP registration within a five mile radius. There are no formally adopted land and water recreation areas, recreational trails, scenic rivers, scenic routes or byways within five miles of the Facility.

(2) Cultural Resource Impacts

Project Area

There are no previously recorded archaeological, historic, or recreational resources located within the direct project area.

One-Mile Radius

Within a one-mile radius of the project area, one previously recorded archaeological site was identified. The unnamed site, 33HN0083, was recorded as an open site of unknown type and unknown cultural affiliation. There are no previously recorded historic cemeteries within a one-mile radius. There are no previously surveyed historic resources determined eligible for or listed on the NRHP within a one-mile radius.

Five-Mile Radius

Within a five-mile radius of the project area, there are a total of 34 previously recorded archaeological sites. Eleven of the sites were recorded as historic sites. Three sites were recorded as multicomponent prehistoric and historic sites: One was an unknown prehistoric and unknown historic cultural affiliations; one was a Late Archaic, Early Woodland, and unknown historic cultural affiliations; and one was an Early and Late Archaic, Early Woodland, and unknown historic cultural affiliations. All three of these multicomponent sites were open, unknown site types. The remaining 20 sites were prehistoric sites. One site, the Old Town (cemetery) (33HN0207), was recorded as a Late Archaic cemetery site. One unnamed site, 33HN0075, was recorded as a Late Woodland and Late Prehistoric open site of unknown type. One site, Hanna Coal Company Village Site (33HN0001), was recorded as a site of unknown type and unknown cultural affiliation. The remaining 17 prehistoric sites within a five mile radius were recorded as open sites of unknown type and unknown cultural affiliation.

There are a total of 23 previously recorded historic cemeteries within the five-mile radius. These cemeteries range in date from 1807 to 1887. The condition of these 21 historic cemeteries includes destroyed (1), endangered (3), extinct (1), gone (1), highly maintained (5), moderately maintained (6), neglected (3), and condition unreported (1).

There are a total of 21 previously surveyed buildings that are eligible for the NRHP within a five-mile radius of the project. The majority of these properties are located within the village of Cadiz along West Market Street, East Market Street, South Main Street, North Main Street, and Lincoln Avenue. In addition, there are three previously surveyed buildings that are listed on the NRHP within a five-mile radius of the project: the Harrison County Courthouse, Franklin College Building No. 5, and Harrison National Bank (**Figures 8-8A, 8-8B, and 8-8C**).

No impacts are anticipated as a result of the proposed facility on the above described landmarks, and therefore no plans to avoid or mitigate any adverse impacts are required. A Section 106 Project Summary Form was submitted to the OHC by APTIM on February 7, 2017 (**Appendix F**). In a letter dated March 21, 2017, the OHC responded and indicated the proposed undertaking will not affect properties listed on or eligible for the National Register of Historic Places and no further work would be required.

(3) Recreation Areas

An analysis of ODNR-listed parks confirmed that there are no state parks within a five mile buffer of the Facility. There are two recreation areas within five miles of the project area. One recreation area, Sally Buffalo Park, is located approximately a mile from the project area. Sally Buffalo Park is comprised of two lakes and a community center. One recreational facility, Cadiz Country Club, is located approximately 1.4 miles east of the project area. There will be no adverse impact to either of these facilities.

(4) Visual Impacts

A viewshed analysis was completed for the five-mile radius (**Figures 8-8A, 8-8B, and 8-8C**). Resources identified are clustered in a town that currently has existing viewshed impacts. Accordingly; no additional impacts from this project are expected. Because of existing viewshed impacts, topography, and distance, no impacts from the project to existing viewsheds are anticipated in a ten-mile radius of the project. Visual impacts are not anticipated for any formally adopted land and water recreation areas, recreational trails, scenic rivers, scenic routes or byways, and registered landmarks of historic, religious, archaeological, scenic, natural, or other cultural significance within five miles of the project area.

The site is located in a sloping open field. There will be little to no tree clearing or landscape alterations that will further impact visibility. Facility lighting and paint colors will be selected and designed to minimize visual impacts.

Several photo simulations are located from different vantage points in **Figure 8-9**. These vantage points were selected to address visual impacts to sensitive receptors. These simulations indicated that due to topography and vegetation, no significant impacts would occur.

(E) AGRICULTURAL DISTRICTS AND POTENTIAL AGRICULTURAL IMPACTS

No agricultural district land is located within the boundaries of the Facility or Laydown Areas. Areas immediately surrounding the facility are listed as Residential District land by the Village of Cadiz. The project area itself is located on Manufacturing District land. Though the land was previously used as grazing land, it is not classified as Agricultural Land according to the Village of Cadiz.

(1) Agricultural Land Mapping

Figure 3-3 illustrates land located within and proximate to the boundaries of the proposed Facility and Construction Laydown areas. Land use is labeled on this figure. No agricultural district land is located within the boundaries of the Facility and Construction Laydown properties.

(2) Potential Impact to Agricultural Lands

Acreage Impacted

No agricultural land or agricultural district land will be impacted by construction and operation of the Facility.

Potential Construction, Operation and Maintenance Impacts

No impacts to field operations, drainage or irrigation systems with agricultural district land will occur as a result of construction. No agricultural lands were identified on the Facility or Construction Laydown Areas and certain measures will be taken to ensure no impacts will occur to adjacent properties. Since the Facility is being built on an area that is not active agricultural land, the construction of the Facility will not eliminate land that has been in agricultural use or from use in the future. The Construction Laydown Areas are listed as Residential District land by the Village of Cadiz.

Agricultural Mitigation Practices

No impacts will occur as a result of construction, operation or maintenance of the proposed Facility on agricultural district lands since no such lands are identified on the Facility Site. All land within the Construction Laydown Site is not within an agricultural district and will therefore be returned the landowner per the landowner's requirements. Where field tile disruptions are necessary; repair, relocation, or suitable drainage alternatives will be provided as agreed to by the landowner.

Potential Impact to Agricultural Lands

No agricultural land or agricultural district land will be impacted by construction and operation of the Facility.

Potential Construction, Operation and Maintenance Impacts

No impacts to field operations, drainage or irrigation systems with agricultural district land will occur as a result of construction. No agricultural lands were identified on the Facility or Construction Laydown Areas and certain measures will be taken to ensure no impacts will occur to adjacent properties. Since the Facility is being built on an area that is not active agricultural land, the construction of the Facility will not eliminate land that has been in agricultural use or from use in the future. The Construction Laydown Areas are listed as Residential District land by the Village of Cadiz.

Agricultural Mitigation Practices

No agricultural land will be impacted by this project and will therefore not require mitigation.

Summary: Application Narrative electronically filed by Mr. Ryan D. Elliott on behalf of Harrison Power LLC