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SINCE 1898

Highland – Shenango 345 kV Transmission Line Extension to, and Installation of, Niles Substation Project

Letter of Notification Application to the Ohio Power Siting Board
for a
Certificate of Environmental Compatibility and Public Need

Prepared for

American Transmission Systems, Incorporated,

a FirstEnergy Company

Ohio Power Siting Board Case Number 13-0191-EL-BLN

BMcD Project No. 68608

September 2013

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Burns & McDonnell Engineering Company, Inc. Kansas City, Missouri

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SINCE 1898

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ACRONYM LIST

ATSI	American Transmission Systems, Incorporated
BES	Bulk Electric System
BMcD	Burns & McDonnell Engineering Company, Inc.
CECPN	Certificate of Environmental Compatibility and Public Need
CEI	The Cleveland Electric Illuminating Company
CETL	Capacity Emergency Transfer Limit
dBA	A-weighted decibel
DR	Demand Response
DSM	Demand Side Management
EMF	electric and magnetic fields
ERAG	Eastern Reliability Assessment Group
FERC	Federal Energy Regulatory Commission
FES	FirstEnergy Solutions Corporation
kV	kilovolt
LON	Letter of Notification
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
MW	megawatt
ODNR	Ohio Department of Natural Resources
ODNR-DOW	Ohio Department of Natural Resources – Division of Wildlife
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OPSB	Ohio Power Siting Board
ORAM	Ohio Rapid Assessment Method
OSHA	Occupational Health and Safety Administration

PJM	PJM Interconnection
PRD	Price Responsive Demand
QHEI	Qualitative Habitat Evaluation Index
PUCO	Public Utility Commission of Ohio
ROW	Right-of-way
RTEP	Regional Transmission Expansion Plan
RTO	Regional Transmission Organization
SVC	Static Var Compensators
TEAC	Transmission Expansion Advisory Committee
TO	Transmission Owner
TP	Transmission Planner
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

11-01 (A) REQUIREMENTS

4906-11-01 (A) Requirements

A letter of notification filed with the board shall contain the information described in paragraphs (B) to (E) of this rule. If the applicant requests expedited processing of the letter of notification, in addition to filing the letter with the docketing department, the applicant shall also serve a copy of the letter of notification directly with the board's executive director or the executive director's designee at or before the filing of the expedited letter of notification by hand delivery or overnight courier service.

11-01 (A) REQUIREMENTS

The following information is being provided in accordance with the procedures in Ohio Administrative Code (OAC) Rule 4906-11-01 Letter of Notification Requirements of the Rules of the Ohio Power Siting Board (OPSB).

11-01 (B) GENERAL INFORMATION

4906-11-01 (B) General information containing the following information:

(1) The name of the project and applicant's reference number, if any, names and reference number(s) of resulting circuits and a brief description of the project, and why the project meets the requirements for a letter of notification.

(2) If the proposed letter of notification project is an electric power transmission line or gas or natural gas transmission line, a statement explaining the need for the proposed facility.

(3) The location of the project in relation to existing or proposed lines and stations shown on the maps and overlays provided to the public utilities commission of Ohio in the applicant's most recent long-term forecast report.

(4) The alternatives considered and reasons why the proposed location or route is best suited for the proposed facility. The discussion shall include, but not be limited to impacts associated with socioeconomic, natural environment, construction, or engineering aspects of the project.

(5) The anticipated construction schedule and proposed in-service date of project.

(6) An area map of not less than 1:24,000 scale clearly depicting the facility's centerline with clearly marked streets, roads, and highways, and clearly written instructions for locating and viewing the facility.

(7) A list of properties for which the applicant has obtained easements, options, and/or land use agreements necessary to construct and operate the facility and a list of the additional properties for which such agreements have not been obtained.

11-01 (B) GENERAL INFORMATION

(1) PROJECT DESCRIPTION

(a) Name and Reference Number

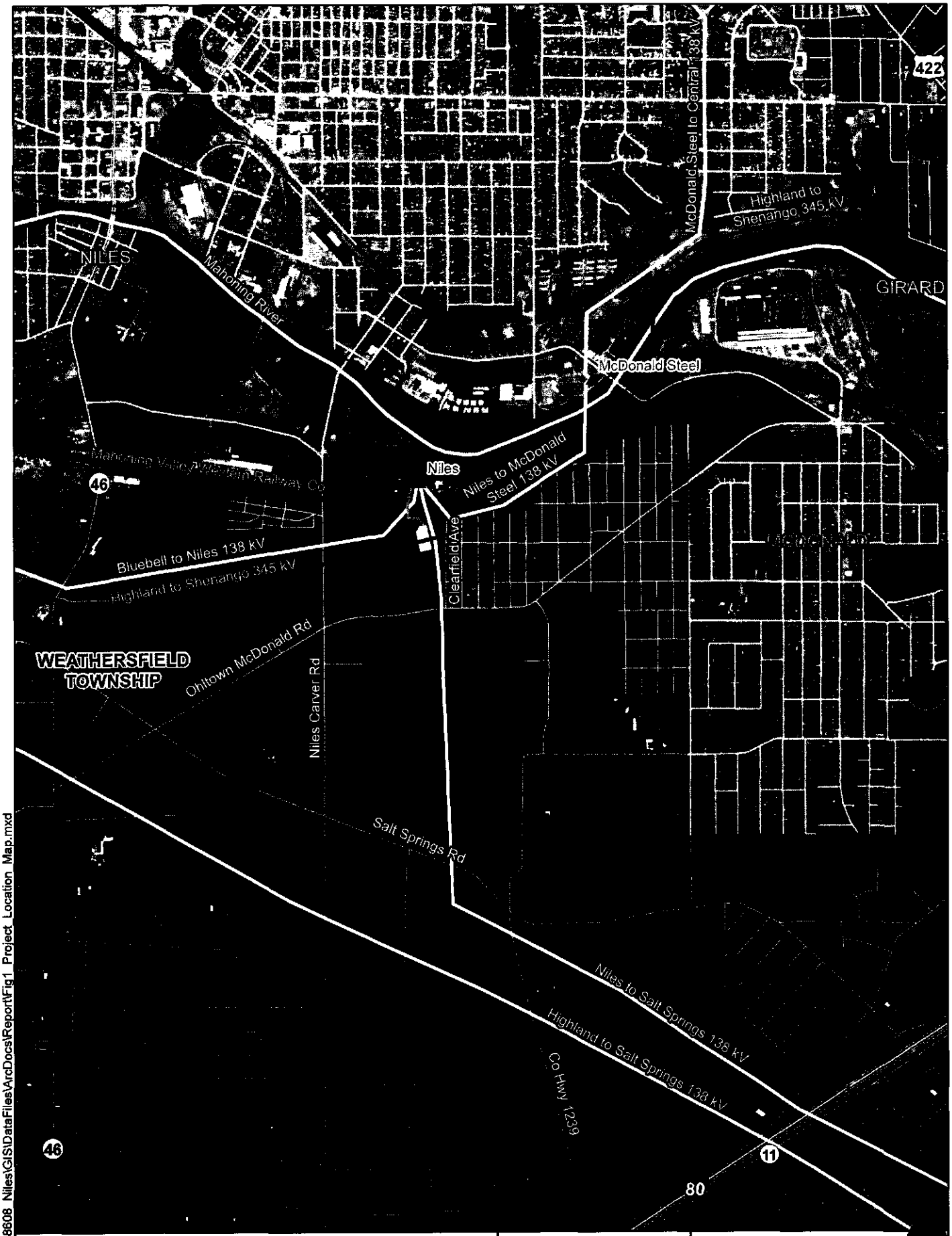
Name of Project: Highland – Shenango 345 kilovolt (kV) Transmission Line Extension to, and Installation of, Niles Substation Project

2013 LTFR Reference: This Project is identified on pages 101 and 130 of Ohio Edison Company, The Cleveland Electric Illuminating Company, The Toledo Edison Company and American Transmission Systems, Incorporated's 2013 Electric Long-Term Forecast Report ("LTFR") submitted to the Public Utility Commission of Ohio in Case Number 13-0925-EL-FOR.

(b) Brief Description of Project

American Transmission Systems, Incorporated ("ATSI" or the "Applicant"), a FirstEnergy Company, is seeking a Certificate of Environmental Compatibility and Public Need ("Certificate") to construct the Highland – Shenango 345 kV Transmission Line Extension to, and Installation of, Niles Substation Project (Project). This Letter of Notification ("LON") application for the Project includes the construction of the Highland – Shenango 345 kV transmission line extension to the new Niles Substation, construction of the Niles 138 kV interconnect line from the new Niles Substation to the existing Niles Substation, and construction of the new Niles Substation.

As proposed and described in this LON application, the new Niles Substation is proposed to be constructed in Weathersfield Township in Trumbull County, Ohio, and will transform voltage from 345 kV to 138 kV. The Project will extend a loop from the existing Highland – Shenango 345 kV line approximately 150 feet to the new Niles substation, creating Highland – Niles and Niles – Shenango 345 kV circuits. The project will also extend a new 138 kV substation bus, designed as a 138 kV transmission line, from the new substation approximately 775 feet to the existing Niles Substation located adjacent to the Niles Generating Station. Both the new and existing substations will be named Niles. The general location of the Project is shown in Figure 1. The route for the extended Highland – Shenango 345 kV transmission line and the site of the new Niles Substation are located on Ohio Edison-owned property (a FirstEnergy Company). The route for the new 138 kV transmission bus extension is located on Ohio Edison property, across a Mahoning Valley Western Railway Company railroad corridor, and on the Niles Generating Station property.



Legend

- 138kV Interconnect
- Existing 138kV
- Existing 345kV
- Existing Substation
- Substation Site
- City Boundary

N

0 1,000 2,000

Feet

ATSI.

American Transmission Systems, Inc.

a subsidiary of FirstEnergy Corp

Figure 1
Project Location Map
345kV & 138kV Transmission Line
Extensions to
Niles Substation Project
American Transmission
Systems, Inc.

Path: R:\First Energy\68608_Niles\GIS\DataFiles\ArcDocs\Report\Fig1_Project_Location_Map.mxd

An approximate alignment has been developed for the Niles 138 kV interconnect line. However, the route may be adjusted due to engineering considerations during detailed design of the line. The approximate route, located in Weathersfield Township, extends north from the northern side of the proposed Niles Substation and extends for approximately 350 feet on Ohio Edison-owned property. The route continues north for approximately 150 feet across the Mahoning Valley Western Railway Company rail corridor. The route extends further north for another 275 feet and terminates on the west side of the existing Niles Substation (Figure 2).

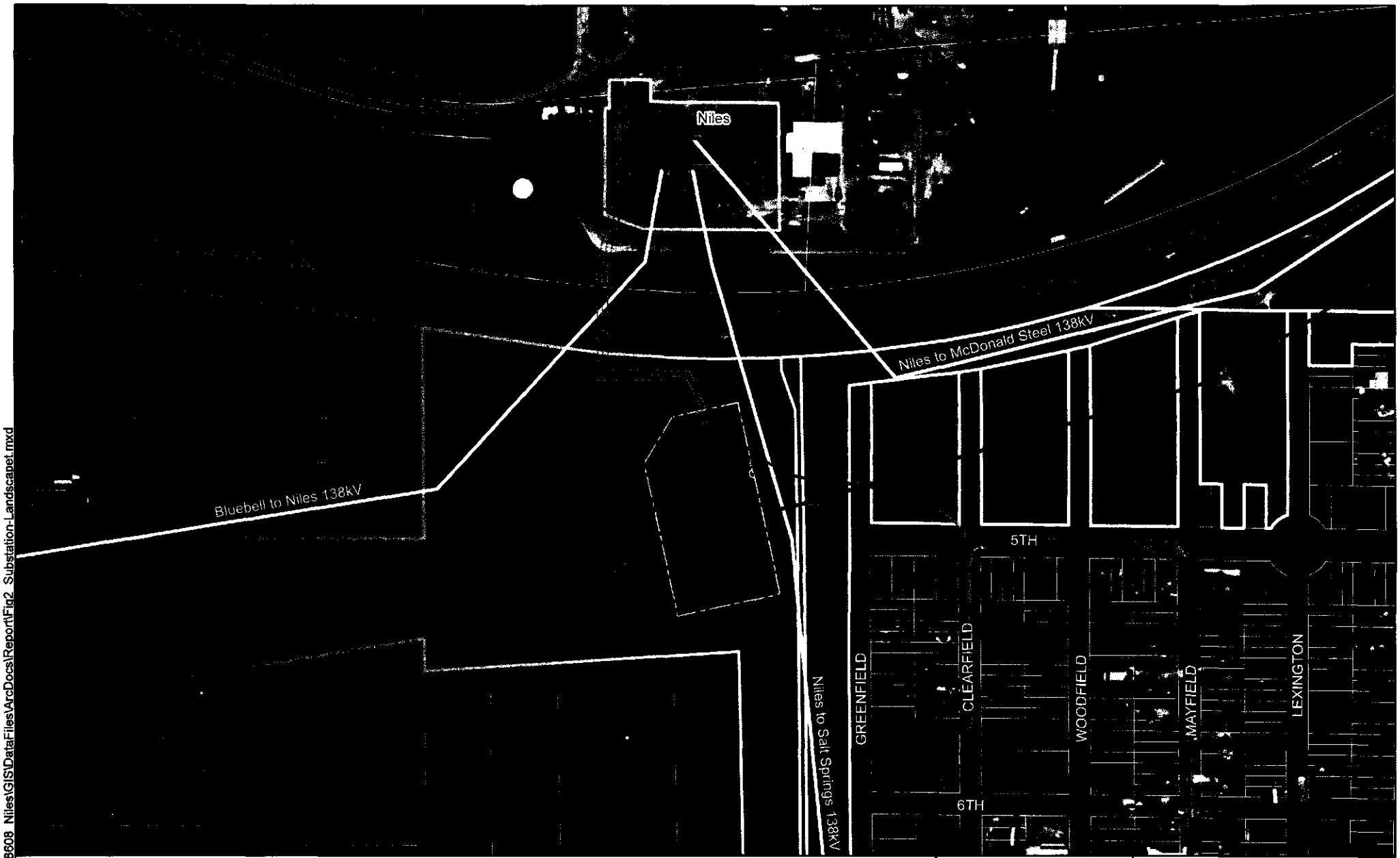
(c) Why the Project Meets the Requirements for a Letter of Notification

The Project meets the requirements for a Letter of Notification because the Project is within the types of project defined by Items (1)(a), (1)(c), and (1)(g) of the Interim Application Requirement Matrix for Electric Power Transmission Lines in the Finding and Order issued on September 4, 2012 in Case No. 12-1981-GE-BRO, as modified and expanded by the Second Finding and Order issued in that case on December 17, 2012, both of which modified Appendix A of Rule 4906-1-01 of the Ohio Administrative Code. This item states:

> *(1) Rerouting or extension or new construction of single or multiple circuit electric power transmission line(s) as follows:*
>
> *(a) Line(s) three hundred kilovolts (kV) and above, and not greater than 0.1 mile in length.*
>
> *(c) Line(s) one hundred twenty-five kV and above, but less than three hundred kV, and not greater than 0.2 miles in length.*
>
> *(g) Line(s) that are necessary to maintain reliable electric service as a result of the retirement or shutdown of an electric generating facility located within the state.*

The proposed Project consists of the following:

1. Approximately 150 feet of new 345 kV line will be constructed as part of the Highland – Shenango 345 kV transmission line extension to the new Niles Substation, creating Highland – Niles and Niles – Shenango 345 kV circuits.
2. Approximately 775 feet of new 138 kV line will be constructed to interconnect the new Niles Substation to the existing Niles Substation.
3. Installation of the new Niles Substation, a new 345 kV to 138 kV transmission substation.
4. The Project is being constructed to maintain reliable electric service as a result of the shutdown of electric generating facilities in Ohio.



N

0 150 300 Feet

Legend

- Residence
- 138kV Interconnect
- Fenceline
- Substation Equipment
- Access Road
- Parcel Ohio Edison
- Parcel

ATSI®
American Transmission Systems, Inc.
a subsidiary of FirstEnergy Corp.

Figure 2
Substation Location Map
345kV & 138kV Transmission Line
Extensions to
Niles Substation Project
American Transmission Systems, Inc.

Path: R:\First Energy\08608_Niles\GIS\DataFiles\ArcDocs\Report\Fig2_Substation-Landscapet.mxd

(2) NEED FOR THE PROJECT

The extension of the Highland – Shenango 345 kV Transmission Line to, and installation of, the new Niles Substation, and the installation of a 138 kV connection between the new Niles Substation and the existing Niles Substation as described in this Application, are needed to reinforce ATSI's Bulk Electric System (BES) in the Akron, Cleveland, and Youngstown areas ("Project Study Area").

As explained in this Section of the Application, ATSI's 345 kV and 138 kV transmission systems in the Project Area ("Project Study Area Transmission System") currently face significant operating limitations which include the existence of thermal constraints and low voltage conditions. Deactivation of generation in and around the Project Study Area will exacerbate voltage limitations, and will create additional thermal loading limitations on the 345 kV and 138 kV systems as additional power is transmitted into the Project Study Area to compensate for retired generation. This Project, in conjunction with others identified and directed by PJM Interconnection (PJM), is designed to correct these operating limitations and to ensure reliable energy delivery in the Project Study Area.

The Project Study Area Transmission System has been evaluated using the PJM 2013 and 2015 Load Forecasts from the forecast report dated January 26, 2012. These evaluations are discussed later in this Application. A series of generation units located inside the Project Study Area have requested deactivation and the evaluations demonstrate the Project Study Area Transmission System will experience thermal overloads under various planning scenarios, including single and multiple contingency conditions (i.e. the loss of two or more facilities), upon the deactivation of these facilities.

For the proposed Project, the critical individual contingency conditions include the loss of the:

1. Evergreen – Highland #1 138 kV Line;
2. Evergreen – Highland #2 138 kV Line;
3. Highland – Mahoningside 138 kV Line;
4. Highland – Salt Springs 138 kV Line; or
5. Evergreen – Niles 138 kV Line

Combining outage pairs of these critical contingency conditions results in thermal overloads within the Project Study Area which are corrected by the Project's construction. These results will be discussed in greater detail in the "Load Flow Studies" topic in this section of the Application.

The proposed Project is the best option to resolve capacity limitations, thermal overloads, and voltage violations based on existing infrastructure, and to reinforce the ATSI transmission system. Construction of the Project, along with several other projects identified by PJM, will provide a new, reliable electric supply to the Project Area Transmission System and thereby correct for the lost capacity in the area. PJM has considered this Project as part of its continuing review of the transmission system within the ATSI footprint. See, The Transmission Expansion Advisory Committee (TEAC) Recommendations to the PJM Board as summarized in the PJM Staff Whitepaper, dated May 2012 (PJM Staff Whitepaper).[1] The PJM Staff Whitepaper contains additional information regarding the need for this Project, and other projects within the ATSI footprint, as directed by PJM. Moreover, the additional capacity provided to the Project Study Area from this Project when considered in conjunction with the other PJM identified projects, will support forecasted load growth and interconnection of potential new loads.

Background on Current Transmission System in Project Study Area

The Project Study Area Transmission System is part of the transmission grid and, through various substations, provides electric supply to a large portion of The Cleveland Electric Illuminating Company (CEI), Ohio Edison Company (Ohio Edison) and Penn Power (Penn Power) service territories. This area of CEI, Ohio Edison, and Penn Power service territories is referenced in this Application as the Project Study Area.

Under the normal configuration, the Project Study Area Transmission System supplies power to distribution and customer substations. The substations in the Project Study Area serve more than 1,700,000 customers. The Project Study Area Transmission System when it was installed was developed for area needs as they existed at that time (primarily residential and industrial customers) and relied heavily on generating units located in close proximity to the load center. The 345 kV and 138 kV Project Study Area Transmission System was expanded over time to both accommodate growth in the Project Study Area, and to better integrate the CEI, Ohio Edison, and Penn Power systems into the larger interconnected transmission grid system. However, the Project Study Area Transmission System relies on generating units located inside the load center to both meet local electrical demand and provide voltage stability through dynamic reactive power response. The amount of dynamic reactive power available in any area is defined as the difference between the actual reactive output of dynamic reactive devices (i.e.

[1] PJM Staff Whitepaper: http://www.pjm.com/~/media/committees-groups/committees/teac/20120614/20120614-pjm-board-whitepaper.ashx

generating units, Synchronous Condensers, Static Var Compensators (SVC), etc.) and the maximum capability of the dynamic reactive devices, which is commonly referred to as dynamic reactive reserve. When dynamic reactive reserve is exhausted, the Project Study Area Transmission Systems becomes at risk for low voltage and voltage collapse.

The retirement of the majority of Cleveland Area coal-fired generating plants, in addition to the Niles Generating Plant, means that the Project Study Area Transmission System must import more power from outside the local load center, and rely on some retired units being converted from generating units to synchronous condensers, to maintain a level of dynamic reactive power response. Much of the power being imported into the Project Study Area over the Project Study Area Transmission System moves over the ATSI transmission system which ultimately connects to neighboring utilities. These facilities have import capacity limitations – imports that exceed these limitations result in thermal overloads on these facilities as well as within the Project Study Area being served. Additionally, with increased loading on the transmission lines that move power into the Project Study Area, there are increased power losses. These power losses also contribute to a reduction in dynamic reactive reserves in the Project Study Area, as reactive power is consumed by the transmission system.

Increased consumption of electricity in the affected area also strains the transmission system. Expansion of the metropolitan areas into the surrounding rural areas has led to a significant increase in new homes, schools, and service-type business particularly in the Project Study Areas; as well as increased commercial and industrial businesses that have come into the area or expanded their facilities and operations. Each new home, and new or expanded business, adds to the load on the Project Study Area Transmission System, which therefore adds to the amount of power that must be imported into the Project Study Area. Even without the retirement of the generation units in the area, the Project Study Area Transmission System was approaching the limits for which it was designed. The retirement of the generating units therefore contributes to the need for this Project. The core issue is that unless a new supply of electric energy is brought into the area, the existing Project Study Area Transmission System is unlikely to be able to support a reliable electric system capable of delivering needed electricity to Project Study Area businesses, homes and communities, and no additional capacity will be available for new homes or businesses in the area.

Because the Project Study Area Transmission System is approaching its operating limits, in order to accommodate electric contingencies - as well as new load (i.e. homes, businesses, and industrial facilities) that come on-line prior to the completion of the Project, operating guidelines are in place on affected circuits in the area. Operating guidelines may include manual load reductions (forced outages) in the

Project Study Area should they be required as voltages in the Project area begin to deteriorate. This may be necessary to ensure the reliable operation of the Transmission System as it relates to voltage stability.

How the Proposed Facility Meets Project Study Area Need in Light of Generation Retirement

The installation of the new Niles Substation, the Highland – Shenango 345 kV Transmission Line Extension to the Niles Substation and the installation of a 138 kV transmission line between the new Niles Substation and the existing Niles Substation are needed to support recent and future increases in electric load and maintain voltage levels in the Project Study Area Transmission System. Specifically, the proposed Project, along with other identified projects are intended to reinforce the interconnected transmission system following the announced retirement of 18 units at coal-fired power plants in the ATSI territory – located in both Ohio and Pennsylvania – that will occur by 2015. Additionally this Project, as well as the other projects identified by PJM and FirstEnergy, are needed to ensure compliance with North American Electric Reliability Corporation (NERC) planning criteria for the 345 kV and 138 kV transmission systems, PJM planning criteria,[2] and the FirstEnergy transmission planning criteria. Ultimately, this Project, as well as the other projects, are needed to ensure continued provision of safe and reliable electric service in the Project Study Area.

The proposed Project will add a new 345 kV to 138 kV transformation source and path for energy flows into the Project Study Area. This pathway for the increased importation of power into the Project Study Area will provide the following benefits to the Project Study Area Transmission System:

1. Add voltage support to the 138 kV system from a stronger 345 kV system.
2. Decrease power flows on thermally overloaded 138 kV existing infrastructure.
3. Reduce reactive power losses on existing transmission lines; improving system voltages.
4. Maintain voltage stability with increased short circuit strength and reduce the impact of large motor starts in an industrial area.

[2] PJM's planning criteria utilizes the most stringent of the applicable NERC, PJM or local (transmission owner) criteria. PJM Manual 14-B at page 20.

System Conditions and Local Requirements

This section describes the facilities and equipment that comprise ATSI's transmission facilities located in the Project Study Area. Further it describes the existing violations of contingency planning and power flow criteria in the Project Study Area. Finally, this section describes the projected conditions on the system after the Project is placed in-service.

Transmission System Facilities – Project Study Area

The Project Study Area Transmission System is a part of the transmission grid and, through various substations, provides electric supply to CEI, Ohio Edison, and Penn Power service territories. The area served by the Project Study Area Transmission System generally includes the northeast corner of Ohio and is referenced here as the Project Study Area.

System Conditions in the Project Study Area

FirstEnergy Solutions Corporation (FES) and neighboring generation owners have submitted plans to PJM to retire generation units in the ATSI footprint. FES has submitted a deactivation request for generation units in the Cleveland Area at Ashtabula (Unit #5), Lakeshore (Unit #18), and Eastlake (Units #1-5). The PJM - FE Deactivation Report containing the entire list of deactivations can be found online.[3]

PJM has also indicated that Niles Generating Units #1 and #2 will be shut down. The announced retirement of these generating units will create reliability issues and will contribute to lower reliability in the Project Study Area. The Project Study Area Transmission System was originally designed, and has evolved with, large generating plants located in close proximity to the area of greatest load density. The existing number of interconnections between the Project Study Area, remaining generation in the Project Study Area, and the remainder of the ATSI transmission system and neighboring transmission systems are insufficient to support the Project Study Area without the local generation.

Thus, in the event of a contingency, or multiple contingencies, the Project Study Area has fewer resources to bolster the transmission system, making it more vulnerable as capacity in the area is reduced. The proposed Project will bring another source of electric energy supply into the Project Study Area at 345 kV to provide additional support to the Project Study Area Transmission System.

[3] http://pjm.com/planning/generation-retirements/~/media/planning/gen-retire/20120425-fe-jan-2012-generator-deactivation-request-study-results-required-upgrades.ashx

Under normal operating conditions, with the generation retirements as proposed, the existing system cannot support the load as forecasted. System upgrades are required in order to operate the system under normal operating conditions. Additional system upgrades are required to operate under contingency conditions. In the Project Study Area, upon the retirement of the generation and without the implementation of system upgrades, there are certain single and multiple contingencies which cannot be supported without the interruption of load.

Load growth will exacerbate capacity, voltage and thermal limitations in the ATSI footprint which includes the Project Study Area. Per the PJM 50/50 forecast, over a 10 year period, the forecast averages a one percent load growth per year[4]. Per the PJM forecast, load growth in the ATSI footprint which includes the Project Study Area, is projected to be approximately 1.5 percent per year over the next 3 years under current economic conditions.

Load served in the Project Study Area is closely tied to the observed voltage on the Project Study Area Transmission System. The relationship between load and voltage is analyzed using planning tools which simulate the response of system voltage to increases in system load under contingency conditions. Typically, voltage levels at monitored locations will decrease as system load is increased. Increases in load being served and subsequent increases in reactive power losses on transmission lines moving power into the Project Study Area results in depletion of dynamic reactive reserves. The decrease in voltage due to increases in load and losses is gradual until dynamic reactive reserves are exhausted, at which point voltage decay accelerates and eventually collapses. Planning analysis performed on the Project Study Area indicates that potential voltage collapse under contingency conditions is expected as the identified generation retires, if no system reinforcements are implemented. The reinforcement projects identified and directed by PJM in the TEAC Recommendations to the PJM Board, PJM Staff Whitepaper [5]ensure system voltage stability for forecasted system load levels.

Transmission System Facilities in the Area of Niles Substation

ATSI's bulk transmission system in the Project Study Area consists of 345 kV and 138 kV source transmission lines coming into the area from the West, Southwest, Southeast and East. There are no lines

[4] http://www.pjm.com/planning/resource-adequacy-planning/load-forecast-dev-process.aspx

[5] PJM Staff Whitepaper: http://www.pjm.com/~/media/committees-groups/committees/teac/20120614/20120614-pjm-board-whitepaper.ashx

coming in from the North because the Project Study Area is bordered on the north by Lake Erie. Power enters the Project Study Area primarily through the 345 kV circuits and 138 kV circuits, with limited support from networked 69 kV area transmission circuits.

The lines that comprise the 345 kV and 138 kV Project Area Transmission System are the "backbone" for electric delivery to the Project Study Area. Under normal operating conditions prior to the announced generation retirements, these 345 kV and 138 kV transmission lines, 69 kV area transmission lines, as well as the generation units situated within the area, were the source of power for the Project Study Area. This means that all of the energy consumed by the residential, commercial and industrial customers in this area is delivered from these lines and generators. With the retirement of the generation units, as announced, the local generation is significantly reduced. Once the announced retirements occur, the remaining major generation in close proximity or within the area is located at Perry Nuclear Power Plant and West Lorain Generating Station to the north. The total combined capacity of these remaining units is approximately 1,800 megawatts (MW). Also to the southeast of the Project Area are the Beaver Valley, Mansfield and Sammis stations which have a combined capacity of 6,140 MW. The modeled loads in the CEI footprint are approximately 4,600 MW and, combined with the loads in the Ohio Edison footprint, the approximate load is 10,800 MW. As such, even without normal load growth, the retirement of the generation units will create a need to import more power into the Project Study Area. The increased importation of power into the Project Study Area will increase thermal loading on the transmission lines, increase real and reactive power losses due to increased thermal loading, and diminish dynamic reactive reserves due to increased losses.

Because under current conditions, all electric energy for the business, homes and communities supplied through ATSI's facilities in the Project Study Area can enter into the Project Study Area only through these existing transmission lines, and these source lines serve a large geographic area that has grown over time, the retirement of generation within the Project Study Area will create a need for additional transmission capability to meet the need to import more power into the Project Study Area. The existing lines and related substations are not sufficient to serve the area load per planning criteria and, as such, it is now necessary to build this Project to provide additional import capability.

The existing Niles substation is located adjacent to the existing Niles Power Plant in Weathersfield Township, Trumbull County, Ohio near the city of Niles, Ohio. The proposed Project is located in close proximity to the existing Niles substation and the existing Niles Power Plant. Additionally, the proposed new Niles substation will be near, or will be connected to, the following transmission lines.

The existing 345 kV source transmission lines in the Project Study Area are:

- Highland – Shenango 345 kV Line (to be looped into Niles Substation)
- Highland – Hanna 345 kV Line
- Highland – Bruce Mansfield 345 kV Line
- Highland – Sammis 345 kV Line

The existing 138 kV source transmission lines in the Project Study Area are:

- Niles – Evergreen 138 kV Line
- Niles – Bluebell 138 kV Line
- Niles – Salt Springs #1 138 kV Line
- Niles – Salt Springs #2 138 kV Line
- Niles – Garden 138 kV Line

Recent and Projected Load in the Project Study Area

During recent years, electric demand in the Project Area increased by approximately one percent per year, even during the recent economic downturn. During certain periods prior to the economic downturn, electric demand grew at an average rate of 1.5-2.0 percent.

The ATSI service area, which includes the Project Study Area, reached an all-time system peak of 14,032 MW on July 21, 2011. The system peak represents the hour of highest energy consumption on the ATSI Transmission System. The system is planned in a manner that can accommodate the forecasted system peak, not just typical day to day usage. The 2011 actual system peak load for ATSI was approximately 850 MWs higher than the 2010 actual peak load.

Table 1: Historical Peak Data

Year	CEI (MW)	OE (MW)	ATSI (MW)	CEI	OE	ATSI
2000	4,280	5,228	12,079			
2001	4,446	5,866	13,145	3.9%	12.2%	8.8%
2002	4,561	6,370	13,299	2.6%	8.6%	1.2%
2003	4,160	5,825	12,165	-8.8%	-8.6%	-8.5%
2004	4,126	5,303	12,310	-0.8%	-9.0%	1.2%

2005	4,522	5,945	13,578	9.6%	12.1%	10.3%
2006	4,674	6,024	13,804	3.4%	1.3%	1.7%
2007	4,471	5,955	13,536	-4.3%	-1.1%	-1.9%
2008	4,295	5,579	12,972	-3.9%	-6.3%	-4.2%
2009	4,117	5,264	12,310	-4.1%	-5.6%	-5.1%
2010	4,418	5,631	13,177	7.3%	7.0%	7.0%
2011	4,649	6,185	14,032	5.2%	9.8%	6.5%
Average				0.9%	1.9%	1.5%
Average (2001-2007)				0.8%	2.2%	1.8%
Average (2009-2011)				2.8%	3.7%	2.8%

Without construction of the Project, the Project Study Area Transmission System, already at or near maximum capacity during contingencies, faces increasing risk for voltage violations and thermal violations. In addition to resolving current contingency loading conditions, the Project will provide an additional capacity margin as determined by voltage stability analysis for serving new and existing customers, and will be networked with the remainder of the 345 kV Project Area Transmission System, providing for greater reliability throughout the Project Area.

Review of Planning Criteria

The following explanation of various contingency planning criteria is provided as context for the discussion of contingency planning criteria violations that will occur in the Project Study Area without the addition of the Project.

The bulk electric transmission system, or BES, is defined as all lines operated at voltages of 100 kV or higher, plus transformers with high-side and low-side winding voltages both greater than 100 kV. The ATSI BES must meet all applicable NERC, PJM, and FirstEnergy transmission planning criteria that apply to transmission systems. PJM is the registered Transmission Planner (TP) for the ATSI system and ATSI is required to utilize the PJM Planning process to test for and meet all applicable BES criteria.

PJM Planning Process

PJM's Regional Transmission Expansion Plan (RTEP) identifies transmission system upgrades and enhancements to provide for the operational, economic and reliability requirements of PJM customers. PJM's region-wide RTEP approach integrates transmission with generation and load response projects to meet load-serving obligations. PJM currently applies planning and reliability criteria to identify transmission constraints and other reliability concerns. Transmission upgrades to mitigate identified

reliability criteria violations are then examined for their feasibility, impact and costs, culminating in one plan for the entire PJM footprint.

The rules and procedures for the RTEP process are set forth in Schedule 6 of the PJM Operating Agreement. In accordance with those rules, PJM prepares a plan for the enhancement and expansion of transmission facilities in the PJM region. Additionally, the PJM manuals describe the details of the RTEP process. In particular, PJM Manuals address PJM's regional planning process. PJM's RTEP Process preserves the reliability of PJM's interstate transmission system to ensure that power continues to flow reliably to customers and to ensure robust, competitive power markets.

PJM Reliability Review

The following overview is based on publicly available information, including information from the PJM and other PJM documents and data. To the extent that there is a difference between this overview and the processes and procedures described the PJM Tariff or other PJM documents and data then the PJM Tariff or other PJM documents or data control.

General Description of the PJM Reliability Assessment Process

The PJM Reliability Assessment Process consists of several tests to ensure all generation capacity is deliverable to load in PJM without violating any system thermal or voltage limits. If violations are found, mitigation projects are put in place to resolve the issue(s). Limits used in the analysis are consistent with the requirements of NERC standards FAC-010 and FAC-014. The methodology used to determine system operating limits is included in PJM Manual M-14B Generation and Transmission Interconnection Planning.[6]

PJM conducts this detailed review annually for the near-term, which consists of a detailed reliability analysis review of the current year plus 5 years in the future. The study years prior to the 5-years-out reliability assessment are considered the "in-close" years and have already had analyses conducted in previous years' study cycles. In addition, for each of these "in-close" years, PJM updates and issues addenda to address changes as necessary throughout the year. For example, planned generation modifications or changes in transmission topology can trigger restudy and the issuance of a baseline

[6] http://www.pjm.com/planning/rtep-development/expansion-plan-process.aspx

addendum. This is referred to as a "retool study" (e.g., generators which drop from the interconnection queue cause restudy and an addendum to be issued for affected baseline analyses).

Each year during the establishment of the assumptions for the new annual baseline analysis, updated assumptions of load, transmission topology, and installed generation are assessed for the "in-close" range of years to validate the continued applicability of each of the "in-close" baseline analyses and resulting upgrades (including any addenda). Adjustments to the "in-close" analyses are performed as deemed necessary by PJM. Consequently, PJM annually verifies the continued need for modification of past recommended upgrades through its retool studies, reassessment of current conditions and any needed adjustments to analyses. All criteria thermal and voltage violations resulting from the near term analyses are identified using power flow analysis.

The seven steps in an annual near-term reliability review are as follows:

I. Develop a Reference System Power Flow Case

II. Baseline Thermal

III. Baseline Voltage

IV. Load Deliverability - Thermal

V. Load Deliverability - Voltage

VI. Generation Deliverability - Thermal

VII. Baseline Stability Analysis

These reliability related steps are followed by a scenario analysis that ensures the robustness of the plan by looking at impacts of variations in key parameters selected by PJM. Each of these steps in the RTEP process is described in more detail in PJM Manual M-14B Generation and Transmission Interconnection Planning.

I. Developing the Reference System Power Flow Case

The reference power flow case and the analysis techniques comprise the full set of analysis assumptions and parameters for reliability analysis. Each case is developed from the most recent set of Eastern Reliability Assessment Group (ERAG) system models. PJM revises this model as needed to incorporate all of the current system parameters and assumptions. These assumptions include current loads, installed generating capacity, transmission and generation maintenance, system topology, and firm transmission transactions.

The results of capacity market auction(s) are used to help determine the amount and location of generation or demand side resources to be included in the reliability modeling. Generation or demand side resources that are cleared in the capacity market auction are included in the reliability modeling. Generation or demand side resources that either do not bid or do not clear in any capacity market auction are not included in the reliability modeling. All such modeling comports with the capacity construct provisions approved by the Federal Energy Regulatory Commission (FERC).

Subsequent to sub-regional stakeholder modeling reviews facilitated by PJM, PJM develops the final set of reliability assumptions presented to the PJM TEAC for review and comment, after which PJM finalizes the reliability review reference power flow case.

II. Baseline Thermal Analysis

The baseline thermal analysis is a thorough analysis of the reference power flow to ensure thermal adequacy based on normal (applicable to system normal conditions prior to contingencies) and emergency (applicable after the occurrence of a contingency) thermal ratings specific to the Transmission Owner (TO) facilities being examined. It encompasses an exhaustive analysis of all NERC Category A, B, and C events and the most critical common mode outages. Final results are supported with power flow solutions. The PJM Load Forecast uses a 50/50 distribution from the latest available PJM Load Forecast Report (50 percetn probability that the actual load is higher or lower than the projected load) minus energy efficiency programs. Demand response programs are not considered in the Load Forecast.

For normal conditions (NERC Category A), all facilities are loaded within their normal thermal ratings. For each single contingency (NERC Category B), all facilities are loaded within their emergency thermal ratings. After each single contingency and allowing phase shifter, re-dispatch and topology changes to be made, post-contingency loadings of all facilities are within their applicable normal thermal ratings.

For the more severe contingencies (NERC Category C), along with only transformer tap and switched shunt adjustments enabled, post-contingency loadings of all facilities are within their applicable emergency thermal ratings as required by the PJM or the TO's planning criteria.

NERC Category C3 "N-1-1" analysis is also conducted as part of the annual RTEP process to determine if all monitored facilities can be operated:

1. Within normal thermal and voltage limits after N-1 (single) contingency assuming re-dispatch and system adjustments.
2. Within the applicable emergency thermal ratings and voltage limits after an additional single contingency ("N-1-1") condition.

The "N-1-1" study is conducted on a 50/50 non-diversified summer peak case. All BES single contingencies as defined in NERC category C3 as well as lower voltage facilities that are monitored by PJM Operations are included in the assessment. Non-BES contingencies, defined by TOs, are included to check for greater than 300 MW load loss. Non-BES facilities that are included in the assessment will also have corresponding contingencies defined.

Areas of the system that become radial post-contingency will be excluded from monitoring, with the following exceptions:

1. If the radial system contains greater than 300 MW of load, or
2. Specific local TO planning criteria require that it be monitored.

The PJM NERC Category C3 (or "N-1-1") thermal analysis will test the outage of every single contingency (N-1 condition) for thermal violations. All violations of the applicable thermal ratings are recorded and reported and solutions are developed.

III. Baseline Voltage Analysis

The baseline voltage analysis parallels the thermal analysis. It uses the same power flow and examines voltage criteria for the same NERC category A, B, and C events. Also, voltage criteria are examined for compliance. PJM examines system performance for both a voltage drop criteria (where applicable) and an absolute voltage criteria. The voltage drop is calculated as the decrease in bus voltage from the initial steady state power flow to the post-contingency power flow. The post-contingency power flow is solved with generators holding a local generator bus voltage to a pre-contingency level consistent with specific TO specifications. In most instances, this is the pre-contingency generator bus voltage. Additionally, all phase shifters, transformer taps, switched shunts, and DC lines are locked for the post-contingency solution. SVCs are allowed to regulate and fast switched capacitors are enabled.

The absolute voltage criteria is examined for the same contingency set by allowing transformer taps, switched shunts, and SVCs to regulate, locking phase shifters and allowing generators to hold steady

state voltage criteria (generally an agreed upon voltage on the high voltage bus at the generator location.)

The N-1-1 voltage magnitude test procedure follows a similar method as the thermal test method, except all monitored facilities are monitored for the emergency low limit after the second contingency ("N-1-1" conditions.). Voltage collapse is considered to be a severe reliability violation and, consequently, each "N-1-1" condition that exhibits voltage collapse is investigated, validated, and resolved with remedial actions, or network upgrades.

IV. Load Deliverability Analysis – Thermal

The load deliverability tests are a unique set of analyses designed to ensure that the transmission system provides a comparable transmission function throughout the system. These tests ensure that the transmission system is adequate to deliver each load area's requirements from the aggregate of system generation. The tests develop an expected value of loading after testing an extensive array of probabilistic dispatches to determine thermal limits. A deterministic dispatch method is used to create imports for the voltage criteria test. The transmission system reliability criterion used is 1 event of failure in 25 years. This is intended to design transmission so that it is not more limiting than the generation system which is planned to a reliability criterion of 1 failure event in 10 years.

Each load area's deliverability target transfer level to achieve the transmission reliability criterion is separately developed using a probabilistic modeling of the load and generation system. The load deliverability tests measure the design transfer level supported by the transmission system for comparison to the target transfer level. Transmission upgrades are specified by PJM to achieve the target transfer level as necessary. Details of the load deliverability procedure can be found in PJM Manual M-14B.

The thermal test examines each load deliverability area where the deliverability area is under the stressed conditions of a 90/10 summer load forecast (i.e., a forecast that only has a 10 percent chance of being exceeded) and demand response is implemented (energy efficiency is removed from all areas). The areas not under the test are at the conditions of a 90/10 summer load forecast. The transfer limit to the load is determined for system normal and all single contingencies (NERC Category A and B criteria) under ten thousand (10,000) load study area dispatches with calculated probabilities of occurrence. The dispatches are developed randomly based on the availability data for each generating unit. This results in an expected value of system transfer capability that is compared to the target level to determine system adequacy. As with all thermal transmission tests conducted by

PJM the applicable TO's normal and emergency ratings are applied. The steady state and single contingency power flows are solved consistent with the similar solutions described for the baseline thermal analyses.

V. Load Deliverability Analysis – Voltage

This testing procedure is similar to the thermal load deliverability test except that voltage criteria are evaluated and a deterministic dispatch procedure is used to increase study area imports. The voltage tests and criteria are the same as those performed for the baseline voltage analyses.

VI. Generation Deliverability Analysis – Thermal

The generator deliverability test for the reliability analysis ensures that, consistent with the load deliverability single contingency testing procedure, the transmission system is capable of delivering the aggregate system generating capacity at peak load (50/50 load level in all areas) with all firm transmission service modeled. Energy efficiency is removed from all areas and demand response is not exercised. The procedure ensures sufficient transmission capability in all areas of the system to export an amount of generation capacity at least equal to the amount of certified capacity resources in each area. Areas, as referred to in the generation deliverability test, are unique to each study and depend on the electrical system characteristics that may limit transfer of capacity resources. For generator deliverability, areas are defined with respect to each transmission element that may limit transfer of the aggregate of certified installed generating capacity. The cluster of generators with significant impacts on the potentially limiting element is the area for that element. The starting point power flow is the same power flow case set up for the baseline analysis. Thus the same baseline load and ratings criteria apply. The same contingencies used for load deliverability apply and the same single contingency power flow solution techniques also apply. Details of the generation deliverability procedure can be found in PJM Manual M-14B.

One additional step is applied after generation deliverability is ensured consistent with the load deliverability tests. The additional step is required by system reliability criteria that call for adequate and secure transmission during certain NERC category C common mode outages. The procedure mirrors the generator deliverability procedure with somewhat lower deliverability requirements consistent with the increased severity of the contingencies.

The details of the generator deliverability procedure including methods of creating the study dispatch can be found in PJM Manual M-14B.

VII. Baseline Stability Analysis

PJM ensures generator and system stability during its interconnection studies for each new generator. In addition, analysis is performed on the RTEP baseline stability cases. These analyses ensure the system is transiently stable and that all system oscillations display positive damping. Generator stability studies are performed for critical system conditions, which include light load and peak load for three phase faults with normal clearing, plus single line to ground faults with delayed clearing. Also, specific TO designated faults are examined for plants on their respective systems. Finally, PJM also initiates special stability studies on an as needed basis. The trigger for such special studies commonly includes, but is not limited to, conditions arising from operational performance reviews or major equipment outages or deactivations.

FirstEnergy Planning Process

Voltage Stability Requirements – ATSI's policy is to construct, operate, and maintain the ATSI transmission system such that it can be operated at both the expected peak and at lower load levels such that the system will maintain voltage stability with the most severe combination of a generating unit and a transmission line being removed from service.

Voltage stability is analyzed by evaluating the relationship between the transmitted power (P) and the system voltage (V). The resulting P-V curves are evaluated to identify potential voltage collapse scenarios. This analysis is performed using a system model with an initial load equal to the 50/50 load forecast, incrementing system load (incremental load is to be added at 0.85 power factor, simulating the contingency and then recording voltages at transmission buses). The process of incrementing load, simulating the contingency and recording voltages is repeated until the power flow will no longer converge. The 50/50 summer peak case represents a forecasted load level for ATSI in which there is a 50 percent chance that the actual summer peak load will be higher than the forecasted load and a 50 percent chance the actual peak will be lower.

In order for the system to be considered stable, the system load must be able to be incremented to the 90/10 forecasted peak prior to any voltage instability. The 90/10 summer peak case represents a forecasted load level for ATSI in which there is a 90 percent chance that the actual summer peak will be less than the forecasted load and only a 10 percent chance it will be higher.

Power Flow Criteria – FirstEnergy has developed power flow criteria for the elements of its transmission system that define the maximum normal and emergency rating for major pieces of equipment. The criteria for the major equipment elements of the system are summarized below:

Transmission Lines – Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. The ultimate transmission circuit capacity may be limited by either the line conductor itself or by other elements such as breakers, switches, or relays.

Bulk Power Transformers – Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. Bulk power transformers on ATSI's system typically have 345 kV "high side" and 138 kV "low side" nominal voltages. Normal load ratings for each specific bulk power transformer are developed based on seasonal conditions considering loss of life (i.e. shortening of the useful life of the component) and thermal stresses and should not be exceeded during normal conditions. Transformers loaded above their rating are likely to become overheated, which results in an acceleration of the breakdown of insulating materials in the transformer, which shortens the transformer operating life.

Emergency load ratings specific to each bulk power transformer are also based on seasonal assessments and should not be exceeded during contingency conditions. The emergency ratings are predicated on the peak permissible loading during the period when the emergency condition may occur and would result in increased transformer loading. Emergency condition time frames considered in this analysis may extend for several months to account for situations where the emergency condition is caused by the failure of another bulk transformer or other critical piece of equipment that would require a lengthy time period to repair or replace. Operating measures may be necessary in order to maintain transformer loadings within emergency ratings and might include interruptions to specific customers.

Area Transmission Transformers – Normal and emergency thermal ratings should not be exceeded during normal and contingency conditions, respectively. Area transmission transformers on ATSI's system typically have 138 kV "high side" and 69 kV or less "low side" nominal voltages. Ratings specific to each area transmission transformer are based on seasonal conditions considering loss of life and thermal stresses and should not be exceeded during normal conditions. Emergency ratings specific to each area transmission transformer are also based on seasonal conditions and should not be exceeded during contingency conditions. The emergency rating is tolerated up to 24 hours, assuming a mobile or spare transformer is available and can be installed while awaiting a permanent transformer repair or replacement. Otherwise the emergency rating applied corresponds to the period (months) utilized for bulk transformers. Operating measures may be necessary in order to maintain transformer loadings within emergency ratings and might include certain customer interruptions.

Bus Voltage Criteria – Normal substation bus voltages can range from 0.95 per unit to 1.05 per unit of nominal voltage during on-peak and off-peak conditions. The minimum contingency voltage is 0.92 per unit for all 345 kV, 0.92 per unit for networked 138 kV, and 0.90 per unit for all remaining transmission voltages. The maximum pre-to-post contingency voltage change is 0.08 per unit for 345 kV transmission substations, and 0.10 per unit for the remaining transmission substations.

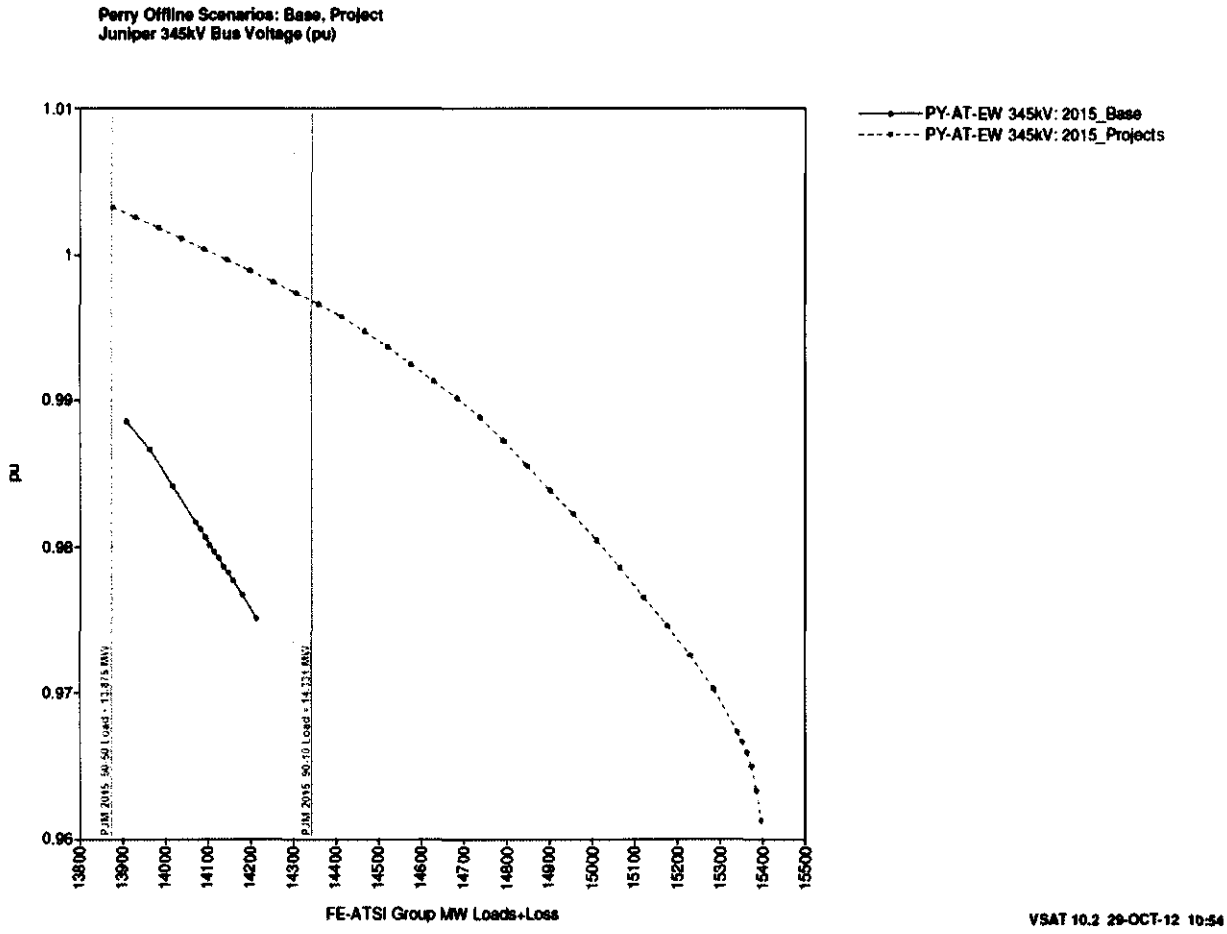
Current and Projected Conditions on the Bulk Transmission System

The effect of recent announced generation retirements and projected load growth on the Project Study Area Transmission System can be measured by means of several different metrics or methodologies. For purposes of this Application, the reliability of the Project Study Area as it relates to voltage stability is used to evaluate present and projected conditions on the Project Study Area Transmission System. Other metrics used to evaluate system performance, such as voltage and thermal performance of the system following announced plant retirements, cannot be addressed until the collapse conditions are mitigated by the Project.

System Conditions – Reliability

The term "reliability" is used to describe outages on the bulk or local electric system, also known as "zero voltage events." As discussed previously, load must be shed to ensure the reliability of the system if system load increases beyond the limits of the P-V curve or exhausts dynamic reactive reserves in the Project Study Area. The addition of the Project ensures that under contingency conditions, load shed is not required to maintain voltage stability at PJM's forecasted 90/10 load level for the 2015 study year. The ATSI system exceeded the forecasted PJM 90/10 load level in both 2010 and 2011. Figure 3 below shows the performance of the 345 kV voltage at Juniper Substation, which was chosen as the monitored bus due to its central location in the Project Area.

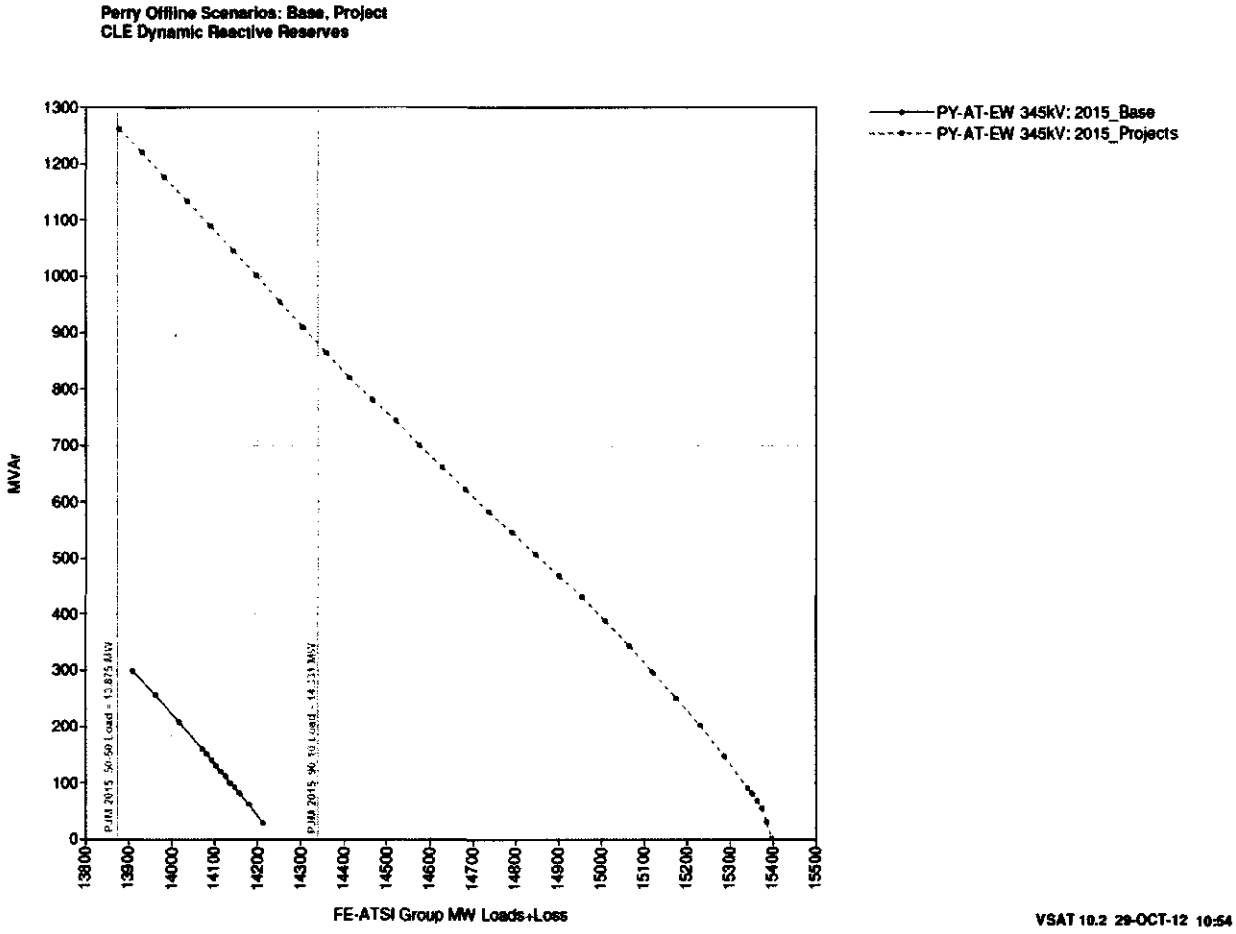
Figure 3: Cleveland Area P-V Analysis: Perry Out and the Loss of the Perry-Ashtabula-Erie West 345 kV Line



The base case system model used for the Project Study Area P-V analysis above is representative of the Project Study Area Transmission System with the addition of projects scheduled to be in-service prior to 2015. The generation retirements, without the proposed portfolio of projects which includes the Niles substation project, would put the Project Study Area at risk of potential voltage collapse for N-1-1 conditions, as shown in Figure 3. Voltage collapse did occur at approximately 14,200 MW, as depicted in Figure 3 above, and is apparent when dynamic reactive reserves in the area have been exhausted, as depicted in Figure 4. The P-V analysis for the Base plot shows that without the portfolio of projects, the contingency combination of the worst generator and transmission line combination fails to reach a valid solution at the 2015 90/10 load level being studied. This is a violation of the FirstEnergy Voltage Stability Requirements Criteria. Note that this plot assumes all high risk peaking units are on-line at maximum output, and the actual dispatch of generation as well as unplanned facility outages on the system will produce less stable results. Conversely, when this Project is integrated with the 2015 projects

detailed on page 5 of the May 2012 TEAC Recommendations to the PJM Board, the system stability increases by 1,200 MW as can be seen in the 2015_Projects plot in Figure 3.

Figure 4: Cleveland Area Dynamic Reactive Reserves: Perry Out and the Loss of the Perry-Ashtabula-Erie West 345 kV Line



Load Flow Studies

ATSI and PJM conducted studies of the Project Study Area Transmission System for the PJM 2013 and 2015 Forecast summer peak load conditions, with varying amounts of generation available and with and without the proposed Project as well as other additional identified projects. These studies included evaluation of the effects of various contingency conditions, such as outage of a transmission line(s), a transformer(s), or multiple elements (N-2 + Contingency), and are described in the following cases. Table 2 below lists the applicable system load levels evaluated in the load flow analysis.

Table 2: PJM Load Forecast

Year	Load Level	Applicable System
2013	13,435 MW	ATSI
2015	13,875 MW	ATSI

NOTE: The process of identifying PJM-required reinforcements to accommodate the announced generation retirements was a collaborative effort between the ATSI and PJM planning organizations. It was determined early in the planning review process that the load flow models would not converge (i.e. reach a valid solution), with all retired units removed from service. An outcome of the analysis using the PJM developed 2013 case was t that Eastlake Units #4 and 5 could be removed from service after the summer of 2012, provided that Eastlake Units #1-3, Lakeshore Unit #18, and Ashtabula Unit #5 remained as Reliability Must Run ("RMR") Units.

Normal Conditions – Under normal operating conditions, with the announced generation retirements, the existing system cannot support the load as forecasted. System upgrades are required in order to operate the system under normal operating conditions. ATSI has proposed, and PJM has confirmed, that the conversion of several generator units at the Eastlake and Lakeshore Plants to synchronous condensers will provide the required dynamic reactive support to the Project Study Area under normal system conditions.

N-1 Conditions – PJM, through various generator retirement studies, has determined that several system reinforcements are required to meet or exceed the applicable PJM and NERC criteria, including N-1 outages. The PJM Staff Whitepaper contains a complete list of the transmission projects required to meet applicable planning criteria.[7]

N-1-1 Conditions – FirstEnergy Planning Criteria states that the ATSI system must remain stable for the worst combination of a generator and a transmission line/facility outage at the forecasted 90/10 load level. As indicated in Figures 3 above, the ATSI Base case which includes the announced generator retirements, fails to meet or exceed the 2015 PJM 90/10 load level. Additionally, as shown in Figure 3, the addition of the Niles Substation, as well as other 2015 projects detailed on page 7 and 8 of the May 2012, TEAC

[7] http://www.pjm.com/committees-and-groups/committees/teac.aspx and http://www.pjm.com/sitecore%20modules/web/~/media/committees-groups/committees/teac/20120614/20120614-pjm-board-whitepaper.ashx

Recommendations to the PJM Board, provides voltage stability beyond the 2015 PJM 50/50 and 90/10 load levels.

The overall PJM contingency analysis results for the generation retirements, which are posted on PJM's website, are as follows.

1. N-1 Common Mode Voltage Violations:
    - Ten low voltage violations on the 138 kV system
2. N-1-1 Thermal Violations:
    - Six 138 kV thermal violations in the Allegheny Power zone
    - Thirty 138 kV and 345 kV thermal violations in the ATSI zone
    - Two 230 / 115 kV thermal violations (transformers) in the Penelec zone
    - Ten 138 kV thermal violations in the AEP zone
3. N-1-1 Voltage Violations:
    - Ninety-two low voltage violations in the ATSI zone
4. Generator Deliverability Violations:
    - Twenty-six 138 kV and 345 kV overloaded facilities in the ATSI zone.
    - One 138 kV overload facility in the Allegheny Power zone.
    - Seven 115 kV and 345 kV overloaded facilities in the Penelec zone.
    - Eight 345 kV and 138 kV overloads in the AEP zone.
5. Load Deliverability Violations:
    - One voltage collapse violation observed in the ATSI zone
    - One 345 kV overload on an AEP/ATSI facility

Installing the proposed Niles Substation and the associated line reconfiguration of the Highland – Shenango 345 kV Line, in addition to a number of other projects identified by PJM, removes the N-1-1 contingency planning violations upon installation (as shown in Table 3 below). Further the Project adds capacity to the Project Study Area Transmission System for future growth. All voltages and loading are within acceptable levels. Any voltage violations that are identified prior to the completion of the

proposed Project will be mitigated with a combination of operating procedures and minor substation upgrades in the appropriate areas of concern.

Table 3: Contingency Thermal Results

Overloaded Facility	Contingency Type	Contingency Description	Rating Used*	PJM 2015 Generation Retirement Results	PJM 2015 Generation Retirement Results with Upgrades
Evergreen-Highland #1 138 kV Line	NERC C3	Outage of Highland-Mahoningside 138 kV & Evergreen-Highland #2 138 kV Lines	SE	118.0%	87.0%
Evergreen-Highland #2 138 kV Line	NERC C3	Outage of Highland-Mahoningside 138 kV & Evergreen-Highland #1 138 kV Lines	SE	118.0%	87.0%
Evergreen-Highland #3 138 kV Line	NERC C3	Outage of Evergreen-Highland #1 138 kV & Evergreen-Highland #2 138 kV Lines	SE	101.0%	74.0%
Ivanhoe-Packard 138 kV Line	NERC C3	Outage of Highland-Salt Springs 138 kV & Evergreeen-Niles 138 kV Lines	SE	102.5%	49.1%
Elm-Packard 138 kV Line	NERC C3	Outage of Highland-Salt Springs 138 kV & Evergreeen-Niles 138 kV Lines	SE	101.3%	45.5%
Highland 345-138 kV TR #3	NERC C3	Loss of Highland 345-138 kV TR #2 & Highland 345-138 kV TR #1	SE	102.0%	69.0%

PJM FirstEnergy's Deactivation Documentation

- First Energy Generator Deactivation Request - January 2012
- Deactivation Study Results and Required Upgrades[8] – April 25, 2012
- PJM Staff Whitepaper, pages 5–8[9]. .
- Transmission Expansion Advisory Committee - April 2012,[10] page 59

Project Impact on Electric System Economy and Reliability

Completion of the Project will resolve planning criteria violations on the Project Study Area Transmission System for the years studied thus far by PJM. ATSI has determined that bringing the Project on-line will not adversely impact any of ATSI's other existing transmission facilities, or the transmission facilities and equipment of neighboring utilities. Overall performance on the Project Study Area Transmission System will be improved significantly as a result of the construction of the Project and other proposed improvements.

The Project will correct overload violations and make the Project Study Area Transmission System more interconnected, allowing ATSI to continue to provide safe, efficient, and reliable electricity to its customers.

(3) LOCATION RELATIVE TO EXISTING OR PROPOSED LINES

The location of the Project relative to existing or proposed transmission lines is described in reference to the FirstEnergy System Facilities map, included as the last page of Chapter 3 of the confidential portion of the Ohio Edison Company, The Cleveland Electric Illuminating Company, The Toledo Edison Company and American Transmission Systems, Incorporated's 2013 Long-Term Forecast Report, submitted to the Public Utility Commission of Ohio (PUCO) in Case No. 13-0925-EL-FOR under Rule 4901:5-5-04(C) of the Ohio Administrative Code. This map shows ATSI's 345 kV and 138 kV existing transmission lines

[8] Deactivation Request and Study Results: http://pjm.com/planning/generation-retirements/~/media/planning/gen-retire/20120425-fe-jan-2012-generator-deactivation-request-study-results-required-upgrades.ashx

[9] PJM White Paper: http://www.pjm.com/~/media/committees-groups/committees/teac/20120614/20120614-pjm-board-whitepaper.ashx

[10] TEAC Reliability Analysis Update: http://www.pjm.com/~/media/committees-groups/committees/teac/20120427/20120427-teac-reliability-analysis-update-conference-cll.ashx

and transmission substations and does not depict the proposed location of the Project. In reference to the map, the proposed Project is located in Trumbull County approximately 2 1/4 inches (11 by 17 inch printed version) from the right edge of the map box and 3 inches (11 by 17 inch printed version) from the top of the map box. The general location of the Project is shown in this Application as Figure 1.

(4) ALTERNATIVES CONSIDERED

In 2012, ATSI and PJM determined that loading and voltages in the Project Study Area Transmission System would exceed system limits due, in part, to the retirement of certain generating units within the ATSI footprint. In order to address this issue, ATSI and PJM initiated work on options for serving existing and projected load in the Project Area. This work included analysis of transmission and non-transmission alternatives. The results of this analysis are described in the following paragraphs.

Analysis of Transmission Alternatives

ATSI and PJM surveyed a range of options and performed extensive analysis on those options that were both short-term fixes and longer-term fixes for the Project Study Area. Initial analysis established that completion of multiple projects is needed to resolve all of the capacity and voltage planning criteria violations on the 345 kV and 138 kV Systems. Moreover, there was not one transmission alternative that resolved these issues completely; rather, a combination of several projects is needed to achieve the necessary results. Alternatives to the proposed Project were rejected for a variety of reasons, including inability to be completed within the desired time frame, inability to mitigate all violations, and cost.

Options analyzed include:

1. Replacement of the Highland 345-138 kV #3 Transformer
2. Rebuilding and reconductoring the following circuits:
    a. Evergreen – Highland #1 138 kV Line
    b. Evergreen – Highland #2 138 kV Line
    c. Evergreen – Highland #3 138 kV Line
    d. Ivanhoe – Packard 138 kV Line
    e. Elm – Packard 138 kV Line

Analysis of Non-Transmission Alternatives

Two different types of non-transmission alternatives were considered: (i) energy efficiency and (ii) demand-side management. As explained in the following paragraphs, although certain features of each

non-transmission alternative were attractive, no single non-transmission alternative resolved all of the capacity, thermal and voltage violations on the 138 kV system. Accordingly, the non-transmission alternatives were rejected.

Energy Efficiency – Conservation and energy efficiency programs involve actions taken on the customer side of the meter that reduce the customers' overall energy requirements (Energy Efficiency). Energy Efficiency actions focus on using energy more efficiently without sacrificing customer comfort or convenience. These actions usually involve installing more efficient equipment or changing processes to conserve energy. Because a utility cannot force customers to participate in Energy Efficiency programs, Energy Efficiency requires customer cooperation. Consequently, Energy Efficiency and conservation programs usually require financial incentives for customers to purchase and install energy efficient equipment and/or educate consumers on the efficient use of energy.

The reduction in peak load as a result of implementing an Energy Efficiency program would be less than what is necessary to relieve the capacity problems on the 345 kV and 138 kV systems. Further, conservation and Energy Efficiency programs will not provide the restructuring of the transmission infrastructure that is needed throughout the greater Toledo area. New transmission lines and a substation, similar to the proposed Project, along with other projects identified by PJM in its analysis, would remain necessary to solve the capacity constraint. Accordingly, the Energy Efficiency option is not sufficient.

Demand-Side Management – Demand-Side Management (DSM) programs generally involve actions taken on the customer side of the meter that have the intention and effect of reducing the customers' requirements during peak times. Because a utility cannot force customers to participate in DSM programs, DSM also requires customer cooperation. DSM programs typically require utility incentives that are provided to consumers in exchange for reduction or curtailment of customer load at specific times (usually system peak times, but also can be used to address locational peak times). Load management and demand response incentives are most often provided and renewed on an annual basis. DSM will not provide the transmission infrastructure needed in the greater Toledo-Cleveland-Akron area, leaving it without a means of maintaining proper system voltages. New transmission lines and a substation, similar to the proposed Project, in conjunction with other projects identified by PJM, would remain necessary to solve the capacity constraint.

Given the need for infrastructure improvements to ATSI's 345 kV and 138 kV systems, DSM would be effective only if it achieved a negative growth scenario. This represents an extremely ambitious objective. Although it is arguably possible for ATSI to develop and launch a large DSM program, the

time frame to address current need, as well as the scale of the program required for success makes it not feasible within the project constraints. Furthermore, it is clear that DSM can make only a small contribution – far less than what is necessary – to relieving the capacity problems on the 345 kV and 138 kV System. Accordingly, a DSM option is not sufficient.

PJM already incorporates Energy Efficiency and Demand Response (DR) into its forecast and analysis. PJM offers three types of Load Response:

- Emergency Capacity (DR)
- Emergency Energy Only
- Economic

Only the Emergency Capacity (DR) product is modeled in PJM planning studies. DR is an emergency procedure initiated by PJM and compliance is mandatory.

PJM anticipates that DR and Energy Efficiency resources that clear through the RPM process will be available for PJM's committed planning year(s). Beyond the commitment period (3 years), DR and Energy Efficiency amounts are held constant. Forecasted DR and Energy Efficiency are summarized in the tables in the PJM Load Forecast Report.

Forecast load levels across PJM are reduced by the amount of Energy Efficiency that cleared in RPM for both load and generation deliverability tests. For DR and Price Responsive Demand (PRD), there is no impact on generation deliverability test (not an emergency condition). For the Capacity Emergency Transfer Limit (CETL) calculation, the forecasted 90/10 load level in the area under test is reduced by the amount of DR and PRD that cleared in RPM, except in situations where 90/10 load minus DR and PRD would be less than 50/50 load. In those instances, 50/50 load levels will be used in the area under test.

New Generation – ATSI does not build or own generation and can only plan for transmission. In 2001, the State of Ohio made a policy decision to deregulate electric utilities. Through this deregulation, the State of Ohio mandated that transmission and generation must remain in legally separate and independent companies. As such, ATSI does not build or own generation and can only plan for transmission.

PJM is a regional transmission organization (RTO), an entity authorized by the federal government to manage the reliability of the electric transmission system and the operation of the wholesale electricity market in a defined control area. PJM's Regional Transmission Expansion Planning process determines what changes and additions to the grid are needed to maintain reliability in the future. The process

systematically evaluates proposed transmission and generation projects to ensure that compliance with reliability criteria is maintained. The process also includes a mechanism to mandate necessary grid improvements. Under PJM agreements, transmission owners are obligated to build transmission projects that are needed to maintain reliability standards that are approved by PJM. Accordingly, the option for ATSI to construct generation is not appropriate.

To ensure the future availability of the generating capacity and other resources that will be needed to keep the regional power grid operating reliably for consumers, PJM developed and implemented the RPM. The PJM process does not include a mechanism to mandate new generation be constructed. The RPM system continues to follow a market approach to obtaining the capacity needed to ensure reliability, but includes incentives that are designed to stimulate investment both in maintaining existing generation and in encouraging the development of new sources of capacity – resources that include not just generating plants, but demand response and energy-efficiency programs. Investors need sufficient long-term price signals to encourage the maintenance and development of generation and other resources. The RPM plan, based on making capacity commitments three years ahead, creates long-term price signals to attract needed investments in reliability in the PJM region. Proposals to construct generation within the PJM market are submitted and reviewed by PJM as part of the Transmission Expansion Planning process defined in M-14 series of PJM manuals.

Transmission Analysis Results

The Project was selected because it is the most efficient path to resolve a portion of the capacity and voltage problems that exist on the 345 kV and 138 kV Systems in the Project Study Area. As noted herein, all of the other transmission and non-transmission alternatives either would not resolve all of the capacity and voltage problems or, if all such problems would be resolved, the alternatives would: (i) cost more money; (ii) have greater environmental and social impacts; or (iii) cost more money and have greater environmental and social impacts.

The Project, in conjunction with others identified by PJM in its analysis, brings benefits to resolving the existing voltage and capacity problems on the 345 kV and 138 kV systems. Specifically, construction of the Project will provide operating flexibility to survive contingency conditions through the PJM Planning process which incorporates NERC, PJM and the Applicants' planning criteria. Moreover, construction of the Project adds another source of power to the Project Study Area affording greater flexibility for future load growth and system maintenance. Finally, the addition of the Project provides the additional operational benefits that accrue by adding another power source from the east side of the Project Study

Area, providing support to the Cleveland, Akron, and Youngstown areas. This support eases overloads caused by single and multiple contingencies in these areas.

Alternative Substation Sites and Transmission Routes Considered

Niles Substation – A siting study was conducted to identify potential sites of adequate size for the new substation within approximately 0.5 mile of the existing Niles substation and within relative close proximity to the existing Highland – Shenango 345 kV transmission line corridor. The siting study was limited to the south side of the Mahoning River to avoid the need for a river crossing by the transmission line and, therefore, the siting study was designed to limited potential environmental impacts associated with a river crossing, such as impacts to floodplains, wetlands, etc. The siting study was also limited to the north side of Ohltown McDonald Road to avoid more dense residential areas to the south. Five sites were initially identified and evaluated as to the site's accessibility, proximity to the existing transmission corridor, distance to the existing Niles Substation, the number of residences within 1,000 feet of the site, and property ownership. These initial sites were located on both the north and south sides of the Mahoning Valley Western Railway Company railroad corridor. Three of the sites were located along the existing transmission line corridor and in relative close proximity to the existing Niles Substation. Two of these sites were located on parcels owned by Ohio Edison, a FirstEnergy company. The two Ohio Edison-owned parcels were considered desirable for potential development of the new substation. The third site along the transmission line corridor was located furthest away from the existing Niles Substation, thus requiring the greatest length of new transmission line, and was located adjacent to a more densely populated residential area, and was therefore eliminated from further consideration. The remaining two sites not located along the transmission corridor were also eliminated from consideration, because they were not owned by Ohio Edison, contained floodplains, and had potential development constraints due to topography. These two sites would require new transmission line ROW on private property to extend the Highland – Shenango line to the new substation.

Of the two Ohio Edison-owned parcels that were considered desirable for substation development, the parcel closest to the existing Niles substation was selected as preferred. This parcel would have the shortest 138 kV interconnect line to the existing Niles Substation, and was large enough in area to allow for evaluation of multiple substation layout configurations.

Two potential substation layouts were developed on the 23-acre parcel owned by Ohio Edison. Both layouts were located along the existing Highland – Shenango 345 kV transmission line that extends east-west across the property. Site A was located in the east portion of the 23-acre parcel, and Site B was located in the west portion of the parcel. A wetland and two streams separated Site A and Site B. Site A

was located closer to residences along Clearfield Avenue compared to Site B; however, it is anticipated that neither site will create significant impacts to residences because of the distance the substation would be located from residences at either location, existing wooded areas for visual buffers, and the occurrence of existing similar types of facilities (i.e. transmission lines, cell towers, railroad, power plant, gas facilities, etc.) in the immediate vicinity of the parcel. Site A was located closer to Clearfield Avenue, and, therefore, an access drive to Site A would be shorter in length than to Site B and would likely have significantly less stream and wetland impacts as compared to the access road for Site B. In addition, preliminary review indicated that Site B had more potential constraints from a grading and site development standpoint. Site B is located in a narrower portion of the 23-acre parcel between the existing transmission lines. As such, grading for Site B would have to extend onto adjacent properties and require additional property acquisition or agreements. Site B would also likely require an additional new easement from a private landowner for the 138 kV interconnect line. Site A would allow for a shorter 138 kV interconnection route, almost entirely on Ohio Edison property. For these reasons, Site A was selected as the preferred location for the new Niles Substation.

Highland – Shenango 345 kV transmission line extension – Routes for the Highland – Shenango 345 kV transmission line extension were developed to both Niles Substation Site A and Site B. Because both sites are located along the existing Highland – Shenango 345 kV transmission line, the extension to the new Niles Substation would only be approximately 150 feet in length and would be entirely on Ohio Edison property. Therefore, only one route for the 345 kV extension was developed to each site. These routes were developed based on engineering considerations for the best tie-in locations to the new substation and existing lines.

Niles 138 kV interconnect line – Because of the short distance from either Site A or B to the existing Niles Substation, only one alternative route was identified for each site. These routes were largely determined based on the location of the interconnection point at the existing Niles substation, the location of existing transmission line structures, the shortest distance between the existing and proposed substations, and property ownership considerations. It was preferred to keep the route on Ohio Edison-owned property to the maximum extent possible. The approximate length for the 138 kV interconnect line from Site A is approximately 775 feet, while it is approximately 1,000 feet from Site B. Neither route crosses a public roadway but both cross the Mahoning Valley Western Railway Company railroad corridor.

(5) CONSTRUCTION SCHEDULE

Construction on the Project is expected to begin on approximately March 1, 2014, and is expected to be completed and placed in-service by June 1, 2015.

(6) AREA MAP

Project Map

Figure 1 is a map depicting the general location of the Project. Figure 2 is a map showing the new Niles Substation, the Highland – Shenango 345 kV transmission line extension, and the Niles 138 kV interconnect line in more detail.

Directions to the Project Area

To reach the Project site from the Cleveland, Ohio area, travel east and south on I-480 for approximately 25 miles from the I-77/I-480 interchange. Take exit 42 to merge onto I-80 east toward Youngstown, and travel approximately 35 miles on I-80. Take exit 223 onto OH-46 toward Niles, and turn left onto OH-46 N/N Canfield Niles Road and continue for approximately 2.1 miles. Turn right onto Ohltown McDonald Road and continue for approximately 1.3 miles. Turn left onto Clearfield Avenue and go approximately 0.2 mile to the end of the road. The proposed Niles Substation site is located approximately 500 feet to the west.

(7) PROPERTY OWNER LIST

The new Niles Substation, the Highland – Shenango 345 kV transmission line extension, and the substation access road will be constructed on Ohio Edison-owned property to be transferred to ATSI. The substation access road will include a portion of two existing "paper streets" that Ohio Edison will request be vacated. This effort will be coordinated with Trumbull County and Weathersfield Township as necessary. The 138 kV substation bus, designed as a 138 kV transmission line, will require an aerial crossing license from the Mahoning Valley Western Railway Company to cross their railroad corridor. This 138 kV transmission line may also require an easement from Orion Power Midwest, an adjacent property owner to Ohio Edison's existing Niles Substation.

11-01 (C) TECHNICAL FEATURES OF THE PROJECT

4906-11-01 (C) Technical features of the project. This description shall contain the following information:

(1) Operating characteristics, estimated number and types of structures required, and right-of-way and/or land requirements.

(2) For electric power transmission lines, the production of electric and magnetic fields during the operation of the proposed electric power transmission line. The discussion shall include:

(a) Calculated electric and magnetic field strength levels at one meter above ground under the lowest conductors and at the edge of the right-of-way for:

(i) Normal maximum loading.

(ii) Emergency line loading.

(iii) Winter normal conductor rating.

(b) A discussion of the company's consideration of design alternatives with respect to electric and magnetic fields and their strength levels, including alternate conductor configuration and phasing, tower height, corridor location, and right-of-way width.

(3) The estimated cost of the project by federal energy regulatory commission account, unless the applicant is not an electric light company, a gas company or a natural gas company as defined in Chapter 4905. of the Revised Code (in which case, the applicant shall file the capital costs classified in the accounting format ordinarily used by the applicant in its normal course of business).

11-01 (C) TECHNICAL FEATURES OF THE PROJECT

(1) OPERATING CHARACTERISTICS

The Project will be designed and constructed to extend the existing Highland-Shenango 345 kV Transmission Line to the new Niles Substation that transforms voltage from 345 kV to 138 kV and to extend a 138 kV substation bus connection from the new substation to the existing Niles Substation. The new Niles Substation and the Highland – Shenango 345 kV transmission line extension will be constructed on Ohio Edison-owned property (Figure 2). New ROW may need to be acquired for the Niles 138 kV interconnect line and the access road to the new substation as discussed in Section 11-01(B)(7).

The proposed Highland – Shenango 345 kV transmission line extension/interconnection will have the following characteristics:

Voltage:	345 kV
Conductor:	2-1590 kcmil 45/7 ACSR "Lapwing"
Static Wire:	7 #8 Alumoweld
Insulators:	Porcelain
Potential Structure Types:	Figure A-1: 345 kV Wood H-Frame Structure

The proposed Niles 138 kV interconnect line will have the following characteristics:

Voltage:	138 kV
Conductor:	954 kcmil 45/7 ACSR "Rail"
Static Wire:	7 #8 Alumoweld
Insulators:	Porcelain
Potential Structure Types:	Figure A-2: 138 kV Wood SC H-Frame Suspension
	Figure A-3: 138 kV Wood SC 3-Pole Deadend

The proposed Niles Substation will have the following characteristics:

The proposed Substation will transform voltage from 345 kV to 138 kV. The Substation will be interconnected to the existing Highland – Shenago 345 kV transmission line, and the Niles 138 kV interconnect line, as presented in this application. The proposed Substation will contain the following major equipment within the fence line:

- One 345/140/13.2 kV 268/358/448 MVA ONAN/ONAF/ONAF autotransformer

- Three 345 kV, 3000 A circuit breakers
- Six 345 kV, 2000 A manual group operated double end-break switches to serve as disconnect switches for the 345 kV breakers
- One 345 kV, 2000 A motor operated double end-break switch to serve as the transformer high-side disconnect
- Three 234 kV MCOV surge arresters on each incoming 345 kV line position for a total of six
- Three 345 kV CVTs on each ring position for a total of six. The 345 kV CVTs shall be ALSTOM T&D-Ritz High Voltage Catalog No. OTCF362SM
- One 3000 A single-frequency line trap on the 345 kV Shenango line position
- One single-frequency line tuning unit and coaxial cable to the 345 kV Shenango line position
- Two 138 kV, 3000 A circuit breakers
- Four 138 kV, 3000 A manual group operated vertical break switches to serve as disconnect switches for the 138kV breakers
- One 138 kV, 3000 A manual group operated vertical break switch to serve as a 138 kV circuit breaker bypass switch
- Two 138 kV, 3000 A motor operated vertical break switches to serve as 138 kV North and South bus disconnects
- Three 98 kV MCOV surge arresters on each incoming 138 kV line position for a total of six
- Three 138 kV CVTs on each of the incoming 138 kV line positions for a total of six. The 138 kV CVTs shall be ALSTOM T&D Ritz High Voltage Catalog no. OTCF1458M
- One prefabricated metal control building approximately 24-ft wide x 40-ft long to house all required relay panels, RTU, AC & DC distribution panels, 125 V DC battery system, human-machine interface (HMI), etc.

The tallest structures within the fence line of the Substation will include the 138 kV dead-end structure and shield mast at approximately 60 feet in height and the 345 kV dead-end structure and shield mast at approximately 110 feet in height.

Appendix B includes a preliminary grading plan for the substation property and includes the extent of grading required for construction of the Niles Substation, the access road, and the structures for the proposed transmission line extensions. Approximately 5.6 acres would be

disturbed for the development of the substation. The grading plan has been developed to minimize impacts to the nearby stream and wetland to the maximum extent practical. As part of the efforts to minimize these impacts, an approximately 90-foot-long retaining wall will be constructed on the east side of the substation to protect the integrity of the existing Niles – Salt Springs Tower 8552. The proposed Substation will require a minimum fenced area approximately 240 feet wide by 450 feet long.

(2) ELECTRIC AND MAGNETIC FIELDS (EMF)

(a) Calculated EMF

The following calculations provide an approximation of the magnetic and electric fields ("EMF") strengths associated with installing the proposed Niles Substation Project. This includes the associated transmission lines as they cross the substation fence. The 345 kV transmission lines that will connect to the Niles Substation are the Highland – Niles 345 kV Transmission Line and the Niles – Shenango 345 kV Transmission Line. The 138 kV transmission line that will connect to the Niles Substation is the Niles – Niles 138 kV Transmission Line. The calculations are based on a model of the substation with the electric fields and magnetic fields calculated along the proposed substation fence line perimeter, including the transmission lines where they cross the substation fence line at locations shown on the Niles Substation grading plan in Appendix B. The EMF calculations were performed using the Electric Power Research Institute ("EPRI") EMF Workstation 2009 program software.

Factors that affect the level of magnetic and electric fields include the variance in the footprint of the facility, daily and projected long-term transmission line and substation loadings, operating voltage, contingency operations, phase configuration, direction of current flows, conductor sag, ground elevation, unbalance conditions, and other nearby magnetic field sources or conductors on neutral current including water mains, metallic fences, and railroad tracks. Electric field computations assume that shrubs, trees, buildings, and other objects are not in proximity to the facilities, as they produce significant shielding effects. Other transmission or distribution facilities in the vicinity of the line may also affect the calculated fields. For example, a double-circuit loop configuration, with current flows in opposite directions, results in a partial reduction (cancellation) of the magnetic field levels. The model and calculations include a number of assumptions including the following:

- Current flows are assumed in the direction expected under normal system operating conditions.

- The location of transmission line poles, attached conductors and static wire, and line phasing are based on preliminary engineering layouts.
- Calculated field levels assume a reference point approximately 3 feet (1 meter) above ground.

Three loading conditions were modeled for the substation and are based on the transmission line loadings for: (1) normal maximum loading, (2) emergency line loading, and (3) the winter conductor rating. The normal maximum loading represents the routine maximum load at which the transmission line would be operated. Daily current load levels would fluctuate below this level. The emergency maximum loading represents the maximum current flow in the transmission line under unusual circumstances and only for a short period of time. The winter normal conductor rating represents the maximum current flow that the conductor used on the Niles project can withstand during winter conditions.

The transmission line loadings used in the calculations are presented in Table 4. The model is based on both the significant substation equipment and the connecting 345 kV and 138 kV transmission lines. The model was used to approximate the electric and magnetic field strengths at the centerline of the transmission lines where they pass over the substation fence as well as around the entire perimeter of the substation fence. The electric and magnetic fields strengths, along the fence perimeter and in a counter clockwise direction, are shown in Appendix C.

Table 4: Transmission Line Loadings Used for EMF Calculations

Line Name		Normal Loading Amps	Emergency Loading Amps	Winter Rating Amps
Highland – Niles 345 kV		271	809	1479
Niles – Shenango 345 kV		122	443	1479
Niles – Niles 138 kV		939	1000	1320

The calculated electric and magnetic fields are shown in Table 5.

Table 5: EMF Calculations

Transmission Lines	EMF Calculations		Electric Field kV/meter	Magnetic Field mGauss
Highland – Niles 345 kV	Normal Loading	Under Lowest Conductors	0.52	6.73
		At ROW Edges	0.08/0.1	4.3/5.2
	Emergency Loading	Under Lowest Conductors	0.52	18.72
		At ROW Edges	0.08/0.1	12.6/13.4
	Winter Rating	Under Lowest Conductors	0.52	34.96
		At ROW Edges	0.08/0.1	23.6/25.0
Niles – Shenango 345 kV	Normal Loading	Under Lowest Conductors	0.55	8.75
		At ROW Edges	0.09/0.4	4.7/6.3
	Emergency Loading	Under Lowest Conductors	0.55	15.58
		At ROW Edges	0.09/0.4	7.90/11.4
	Winter Rating	Under Lowest Conductors	0.55	39.59
		At ROW Edges	0.09/0.4	19.65/28.75
Niles – Niles 138 kV	Normal Loading	Under Lowest Conductors	0.25	22.47
		At ROW Edges	0.04/0.2	20.52/21.7
	Emergency Loading	Under Lowest Conductors	0.25	26.52
		At ROW Edges	0.04/0.2	24.1/25.0
	Winter Rating	Under Lowest Conductors	0.25	55.99
		At ROW Edges	0.04/0.2	54.2/44.8

(b) EMF Discussion

Background Information

Electric and magnetic fields ("EMFs") are naturally occurring in the environment and can be found in the Earth's interior and in the human body. EMFs are generated essentially anywhere there is a flow of electricity, including electrical appliances and power equipment. Electric fields are associated with the voltage of the source; magnetic fields are associated with the flow of current in a wire. The strength of these fields decreases rapidly with distance from the source. EMFs associated with electricity use are not disruptive to cells like x-rays or ultraviolet rays from the sun. These fields are thought to be too weak to break molecules or chemical bonds in cells. Extensive research has been conducted over the past three decades to determine whether EMFs are associated with adverse health effects. A number of independent scientific panels have reviewed the research and have stated that there is no basis to conclude that EMFs cause adverse health effects nor has it been shown that levels in everyday life are harmful.

Developments

As a part of the National Energy Policy Act of 1992, the Electric and Magnetic Fields Research and Public Information Dissemination ("EMF RAPID") program was initiated within the five-year effort under the National EMF Research Program. The culmination of this five-year effort resulted in a final RAPID Working Group report, which was released for public review in August 1998. The Director of the National Institutes of Environmental Health Sciences ("NIEHS") then prepared a final report to Congress after receiving public comments.

The NIEHS' Director's final report, released to Congress on May 4, 1999, concluded that extremely low frequency electric and magnetic fields ("ELF-EMF") exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. The Director further stated that the conclusion of this report is insufficient to warrant aggressive regulatory concern.

Sources for Additional Information

The following websites sponsored by federal agencies or other organizations provide additional information on EMF:

- Centers for Disease Control/National Institute for Occupational Safety and Health: http://www.cdc.gov/niosh/topics/emf/
- National Institute of Environmental Health Sciences ("NIEHS"): http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm

(3) ESTIMATED COSTS

The following are the estimated capital costs by FERC Accounts for the proposed project:

Account		Cost
350	Land Rights	$ 25,000
353	Station Equipment	$ 8,663,000
355	Poles and Fixtures	$ 232,000
356	Overhead Conductors & Devices	$ 116,000
359	Right-of-way Clearing, Roads, Trails or Other Access	
	Total	$ 9,148,000

11-01 (D) SOCIOECONOMIC DATA

4906-11-01 (D) Socioeconomic data. Describe the social and ecological impacts of the project. The description shall contain the following information:

(1) A brief, general description of land use within the vicinity of the proposed project, including: (a) a list of municipalities, townships, and counties affected; and (b) estimates of population density adjacent to rights-of-way within the study corridor (the U.S. census information may be used to meet this requirement).

(2) The location and general description of all agricultural land (including agricultural district land) existing at least sixty days prior to submission of the letter of notification within the proposed electric power transmission line right-of-way, or within the proposed electric power transmission substation fenced-in area, or within the construction site boundary of a proposed compressor station.

(3) A description of the applicant's investigation (concerning the presence or absence of significant archeological or cultural resources that may be located within the area likely to be disturbed by the project), a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

(4) Documentation that the chief executive officer of each municipal corporation and county, and the head of each public agency charged with planning land use in the area in which any portion of the facility is to be located have been notified of the project and have been provided a copy of the letter of notification. The applicant shall describe the company's public information program used in the siting of the proposed facility. The information submitted shall include either a copy of the material distributed to the public or a copy of the agenda and summary of the meeting(s) held by the applicant.

(5) A brief description of any current or pending litigation involving the project known to the applicant at the time of the letter of notification.

(6) A listing of the local, state, and federal governmental agencies known to have requirements that must be met in connection with the construction of the project, and a list of documents that have been or are being filed with those agencies in connection with siting and constructing the project.

11-01 (D) SOCIOECONOMIC DATA

(1) LAND USE

The proposed Project is located in Weathersfield Township, directly south of the City of Niles in Trumbull County, Ohio. Table 6 displays selected demographic data from the U.S. Census Bureau 2000 Census and the 2007-2011 American Community Survey 5-Year Estimates for Weathersfield Township, the City of Niles, Trumbull County, and the State of Ohio.

Table 6: Project Area Demographics

	Weathersfield Township	City of Niles	Trumbull County	Ohio
2000 Population	27,717	20,932	225,116	11,353,140
2011 Population	26,039	19,431	211,403	11,525,536
Percent Change 2000-2011	-6.1%	-7.2%	-6.1%	1.5%
Land area (square miles)	22.05	8.61	618.30	40,860.69
Population Density (persons per square mile)	1,181	2,257	342	282

Source: U.S. Census Bureau, 2000 Census, 2007-2011 ACS 5-Year Estimates, TIGER/Line Shapefiles

Between 2000 and 2011, Weathersfield Township, the City of Niles, and Trumbull County experienced a decrease in population, while the State of Ohio as a whole experienced a slight increase in population over this same time period. The population density in Weathersfield Township is lower compared to the City of Niles, but higher compared to the county and state.

In general, land uses within the Project area include residential and industrial, interspersed with undeveloped forested areas. Several transmission lines and a railroad corridor extend through the area. The Mahoning River is located approximately 0.2 mile to the north of the new Niles Substation site. The new Niles Substation and the Highland – Shenango 345 kV transmission line extension will be constructed on property owned by Ohio Edison. The existing Highland – Shenango 345 kV, Niles – Salt Springs 138 kV, and Niles – Evergreen 138 kV transmission lines cross this property. The remaining portions of the property are undeveloped forested areas. A Mahoning Valley Western Railway Company railroad (two rail lines and a spur) is located adjacent to the north side of the property. The existing Niles Generating Station and existing Niles Substation are located just to the north of the rail lines. There are approximately 18 residences located within 1,000 feet of the proposed Niles Substation fence line, with

the closest residence located approximately 250 feet to the southeast. The identified residences are located to the east of the site along Clearfield and Mayfield Avenues and to the south of the site along Ohltown McDonald Road.

Additional nearby land uses include the Niles Middle School, located approximately one mile northwest of the Project site and Evansville Baptist Church, located approximately one mile to the southwest. Nearby recreational resources include the Niles Greenway, a multi-use paved trail system that extends north-south from Niles to the Trumbull/Mahoning County line. The Niles Greenway is part of the 100-mile Great Ohio Lake to River Greenway project, which will run from Lake Erie in Ashtabula County to the Ohio River in Columbiana County. Public land in the vicinity of the Project area include Warren Wildlife Area (located approximately 2.5 miles northwest of the Project site), Waddell Park (located approximately 2 miles northwest), and Woodland Park (approximately 1.5 miles to the east).

(2) AGRICULTURAL LAND

As a result of the location of the proposed Project site and the developed nature of the surrounding environment, there is little agricultural land in the vicinity of the proposed Project. The nearest agricultural land to the site is located approximately 4,000 feet to the southeast. In 2010, Trumbull County included 960 farms with an average farm size of 130 acres (Ohio Department of Agriculture 2010). The number of farms in Ohio for the same period ranged from 120 in Cuyahoga County to over 1,700 in Wayne County (2010) and the average farm size in the state was 183 acres (2010). The largest harvested crop in Trumbull County in 2010 was hay, followed by corn and soybeans (2010).

Potential impacts to agricultural land as result of the proposed Niles Substation Project are not anticipated. Although development of the proposed Niles Substation site would remove this land from future conversion to agricultural use, the development would be consistent with surrounding and planned land uses in the area.

(3) ARCHAEOLOGICAL OR CULTURAL RESOURCES

A review of archaeological and historical literature related to the Project area was initiated in 2012. The review included examination of the Ohio Historic Preservation Office ("OHPO") site inventory records for identified cultural resources in and around the Project area. The review included information on properties listed on the National Register of Historic Places ("NRHP"), historic districts, previously identified archaeological sites and architectural resources, and cemeteries, as well as information on previous cultural resource investigations conducted in the area. There are 28 NRHP listed properties and six historic districts in Trumbull County, Ohio and a review of the recorded archaeological resources and

historic architectural properties found a few archaeological sites and one previous archaeological study within a one-mile radius of the project site. However, none of these properties are on or adjacent to the Project site. In addition, there are no historic districts or previously identified archaeological sites located on or adjacent to the proposed Niles Substation site.

ATSI submitted a letter to the OHPO on December 12, 2012, describing the Project, the results of the literature review, and requested OHPO comments on the recommended survey methodology for the Project. OHPO provided comments in a letter dated February 21, 2013 (see Appendix D). In the letter, OHPO concurred with the proposed survey methodology for the Niles Substation site and the discussion of the indirect Area of Potential Effect (APE). A visual inspection of the Project site and potential Niles 138 kV interconnect route was conducted on April 1 and 8, 2013, in order to identify existing cultural resources or evidence of the potential for discovering additional cultural resources. No evidence of cultural resources was found during the investigation. Shovel testing was also conducted at the Niles Substation site during the field operations on April 1 and 8, 2013. The shovel testing was conducted to not only identify the presence or the potential for cultural resources, but also identify any areas of previous disturbance. During the shovel testing, several subtle push piles were observed throughout the property, but no evidence of abandoned stream channels was discovered during the investigations and no cultural resources were noted during the subsurface investigation. If buried cultural resources are encountered during the project construction, land-disturbing activities in the immediate area will be halted, and the investigators and the OHPO will be notified. The exposed cultural resources will then be evaluated for their significance.

(4) PUBLIC INVOLVEMENT

(a) Documentation of Letter of Notification Transmittal

This LON is being provided concurrently to the following officials of Weathersfield Township and Trumbull County, Ohio.

Weathersfield Township

Mr. Steven J. Gerberry
Trustee, Weathersfield Township
2155 Squirrel Run Ct.
Mineral Ridge, Ohio 44440

Mr. H. Gilson Blair
Trustee, Weathersfield Township
1717 Laura Lane
Mineral Ridge, Ohio 44440

Mr. Marvin McBride
Trustee, Weathersfield Township
3900 Edwards Street
Mineral Ridge, Ohio 44440

Mr. Fred R. Bobovnyk
Fiscal Officer, Weathersfield Township
1861 Cloverbrook Drive
Mineral Ridge, Ohio 44440

Trumbull County

The Honorable Frank S. Fuda
Trumbull County Commissioner
160 High Street NW
Warren, Ohio 44481

The Honorable Paul E. Heltzel
Trumbull County Commissioner
160 High Street NW
Warren, Ohio 44481

The Honorable Daniel E. Polivka
Trumbull County Commissioner
160 High Street NW
Warren, Ohio 44481

Mr. Randy L. Smith, P.E., P.S.
Trumbull County Engineer
650 North River Road NW
Warren, Ohio 44483-2255

Bill Miller
Director
Trumbull County Planning Commission
347 North Park Avenue
Warren, Ohio 44481

Copies of the transmittal letters to these officials have been included with the transmittal letter submitting this LON to the OPSB.

(b) Public Information Program

In January 2013, public notices were issued for the Project and distributed to the Warren Tribune Chronicle, Toledo Blade, and the Bowling Green Sentinel-Tribune (Appendix E). A public information meeting for the Project was held on January 28, 2013, at McDonald High School in McDonald, Ohio. A comment form, a Project information sheet with a Project area map, and information on the OPSB process were provided to attendees of the meeting. The public meeting provided an opportunity for residents and other interested parties to review Project information displays, discuss the Project with ATSI staff and representatives, and provide comment on the proposed Project. The public meeting was organized in an open house format and consisted of several stations that identified the Project processes. These stations included the following:

1. Welcome station located at the entrance for attendees to sign in
2. Project Need station providing an overall summary and explaining the planning process
3. Site and Route Selection station detailing the siting process and including aerial maps showing the potential substation sites, transmission line routes, and parcel boundaries
4. Right-of-Way station explaining the easement process
5. Environmental station explaining consultations with local, state, and federal agencies
6. Engineering and Construction station highlighting engineering and substations
7. OPSB Process station explaining the application process and how to stay informed

A local reporter attended but no members of the general public attended the public meeting, and no comments were received regarding the Project. In addition to the public meeting, ATSI provided the following means to obtain information about the Project or provide comments: a Project website: https://www.firstenergycorp.com/content/fecorp/about/transmission_projects.html (current link); a phone number: 1-800-589-2837; an email address: transmissionprojects@firstenergycorp.com; and a mailing address: FirstEnergy Corp., Attention: Highland – Shenango 345 kV Transmission Line Extension to Niles Substation Project Team, A-GO-3, 76 South Main Street, Akron, Ohio, 44308. ATSI's Area Manager will continue to advise local officials of the status of the proposed Project as necessary.

(5) CURRENT OR PENDING LITIGATION

There is no known current or pending litigation involving this Project.

(6) LOCAL, STATE, AND FEDERAL REQUIREMENTS

The Applicant anticipates submitting a Notice of Intent (NOI) for coverage under Ohio EPA General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges Associated with Construction Activities. Coverage under U.S. Army Corps of Engineers (USACE) Nationwide Permit 12 for stream impacts associated with Utility Line Activities is also anticipated if substation site grading and temporary access to construct the 138 kV interconnect line will require fill of streams and wetlands on site that may be considered within the jurisdiction of the USACE. In addition, the Applicant will be providing project habitat assessments to the U.S. Fish and Wildlife Service (USFWS) and the Ohio Department of Natural Resources (ODNR) in anticipation of receiving no adverse affect determinations regarding federal and state listed species. Results of the archaeological surveys completed to date will also be provided to OHPO to continue consultation regarding cultural resources. Because no archaeological sites are anticipated to be impacted by the Project, it is anticipated that the OHPO will issue a clearance letter for the Project.

11-01 (E) ENVIRONMENTAL DATA

4906-11-01 (E) Environmental data. Describe the environmental impacts of the proposed project. This description shall include the following information:

(1) A description of the applicant's investigation concerning the presence or absence of federal and state designated species (including endangered species, threatened species, rare species, species proposed for listing, species under review for listing, and species of special interest) that may be located within the area likely to be disturbed by the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

(2) A description of the applicant's investigation concerning the presence or absence of areas of ecological concern (including national and state forests and parks, floodplains, wetlands, designated or proposed wilderness areas, national and state wild and scenic rivers, wildlife areas, wildlife refuges, wildlife management areas, and wildlife sanctuaries) that may be located within the areas likely to be disturbed by the project, a statement of the findings of the investigation, and a copy of any document produced as a result of the investigation.

(3) Any known additional information that will describe any unusual conditions resulting in significant environmental, social, health, or safety impacts.

Effective: 05/07/2009

R.C. 119.032 review dates: 11/30/2013

Promulgated Under: 111.15

Statutory Authority: 4906.03

Rule Amplifies: 4906.03, 4906.06

Prior Effective Dates: 10/10/78, 5/7/79, 3/20/87, 6/5/93, 8/28/98, 12/15/03, 6/17/05, 1/25/09

11-01 (E) ENVIRONMENTAL DATA

As part of the preparation of this Application, ATSI and Burns & McDonnell conducted a detailed desktop review of published ecological information within 1,000 feet of the Project site through the review of aerial photography, U.S. Geological Survey (USGS) maps, USFWS National Wetlands Inventory (NWI) maps, and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey maps.

(1) ENDANGERED, THREATENED, AND RARE SPECIES INVESTIGATION

Letters were submitted to the United States Fish and Wildlife Service ("USFWS") and the Ohio Department of Natural Resources ("ODNR") on July 9, 2012, requesting information on threatened, endangered, or rare species that could occur within the Project area. Responses from USFWS, dated August 20, 2012, and ODNR, dated August 13, 2012, are included in Appendix D. In addition to the information request letters, a Natural Heritage Database review request was submitted to ODNR – Division of Wildlife ("ODNR-DOW") to obtain records of known locations of rare species and significant natural features within the Project vicinity. The Database review indicated that there is one record of a rare species within one mile of the Project site: the northern crayfish (*Orconectes virilis*), a state species of concern.

ODNR-DOW and USFWS agency response letters noted several listed species that are known to or could potentially occur within the Project area. The USFWS noted three federally endangered species as being within range of the Project area; they included the Indiana bat (*Myotis sodalis*), clubshell (*Pleurobema clava*), and snuffbox (*Epioblasma triquetra*).

Additionally, the following state endangered species were included in the ODNR-DOW response; eastern massasauga (*Sistrurus catenatus*) (also currently listed as a federal candidate species), mountain brook lamprey (*Ichthyomyzon greeleyi*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), trumpeter swan (*Cygnus buccinator*), yellow-bellied sapsucker (*Sphyrapicus varius*), and northern crayfish.

Table 7: Listed Species Known or Likely to Occur within Project Area

Species	Federal Status	State Status	Habitat
Indiana bat (*Myotis sodalist*)	Endangered	Endangered	Hibernates in caves and mines. Summers in well-developed riparian woods and upland forests
Clubshell (*Pleurobema clava*)	Endangered	Endangered	Lean, loose sand and gravel in medium to small rivers and streams
Snuffbox (*Epioblasma triquetra*)	Endangered	Endangered	Small to medium-sized creeks in areas with a swift current that provide clean, loose sand, gravel, cobble substrates
Eastern massasauga (*Sistrurus catenatus*)	Candidate	Endangered	Open shallow wetlands, shrub swamps, meadows, and open fields (spring and fall). Drier areas such as upland woodland habitats (summer)
Mountain brook lamprey (*Ichthyomyzon greeleyi*)	N/A	Endangered	Adults are found in clear brooks with fast flowing water and either sand or gravel bottoms. Juveniles or ammocoetes are found in slow moving water buried in soft substrate of medium to large streams.
Black bear (*Ursus americanus*)	N/A	Endangered	Deciduous, coniferous, or mixed forests with a thick understory habitat supporting fruit and nut bearing trees and shrubs
Bobcat (*Lynx rufus*)	N/A	Endangered	Well forested areas often in rugged topography with cliffs, bluffs, and rocky outcrops
Trumpeter swan (*Cygnus buccinator*)	N/A	Endangered	Large marshes and shallow wetlands one to three feet in depth with a variety of aquatic vegetation associated with lakes ranging from 40 to 150 acres in size
Yellow-bellied sapsucker (*Sphyrapicus varius*)	N/A	Endangered	Wet deciduous forests or the margins of bogs where yellow birch, beech and aspen are prevalent
Northern crayfish (*Orconectes virilis*)	N/A	Species of Concern	Streams and rivers with rocky bottoms and fertile, warm, moderately turbid waters with plenty of vegetative cover

Source: USFWS response letter dated August 20, 2012; ODNR response letter dated August 13, 2012

The USFWS August 2012 response letter indicated that the proposed project is within the range of the Indiana bat, and if tree clearing is necessary, they encourage coordination with their office. As indicated in the ODNR-DOW August 2012 response letter, tree clearing activities should not occur between April 1 and September 30 (Indiana bat) or between May 1 and July 1 (yellow-bellied sapsucker), otherwise

additional coordination with ODNR may be necessary. As a result of these responses, tree clearing activities that could impact suitable Indiana bat habitat will be coordinated with the USFWS. Additionally, if tree clearing is proposed during the suggested avoidance times by ODNR-DOW, further coordination with ODNR will be conducted. In the August 2012 response letter, USFWS indicated that they do not anticipate any adverse impacts to the clubshell and snuffbox based on the Project location. Of the species discussed in the ODNR letter, they also did not anticipate adverse impacts to the eastern massasauga, black bear, and bobcat based on Project location. Because the stream located on-site that will incur some direct impacts is ephemeral, it is anticipated that the Project will not adversely affect the mountain brook lamprey and northern crayfish. Best management practices (BMPs) will be used during in-stream construction to limit any impacts downstream. Also based on ODNR-DOW correspondence and the habitat assessment, habitat for the trumpeter swan does not occur at the Project site, thus this species should not be adversely affected by the Project.

Although some short-term construction impacts may occur to common wildlife species, it is anticipated to be minimal and not create adverse impacts to those species. Based on the responses from the ODNR-DOW and USFWS, recommended coordination with the agencies regarding tree clearing, and the results of the habitat assessment performed at the site, impacts to federal and state-listed threatened and endangered species are not anticipated for this Project.

(2) AREAS OF ECOLOGICAL CONCERN

Wetland Delineation

A wetland delineation was completed on the substation parcel site on July 12, 2012, and December 4, 2012, in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region – Version 2.0* (Regional Supplement). A copy of the wetland delineation report will be submitted to the OPSB under separate cover.

The Project area was largely composed of forested areas and maintained rights-of-way. Vegetation in the forested areas consisted of northern red oak (*Quercus rubra*), northern white oak (*Quercus alba*), black cherry (*Prunus serotina*), and glossy false buckthorn (*Frangula alnus*). Vegetation in the maintained right-of-way included broom-sedge (*Andropogon virginicus*), reed canary grass (*Phalaris arundinadea*), and goldenrod (*Solidago* spp.). Typical upland soils were olive brown (2.5Y 4/3) in color and silt loam in texture. Typical wetland soils were dark grayish brown (10YR 4/2) in color and silt loam in texture.

The primary sources of hydrology for the wetlands within the study area are precipitation and ground water. Common indicators of hydrology within the surveyed wetlands included oxidized rhizospheres along living roots, concave geomorphic position, and positive facultative test of hydrophytic vegetation.

The State of Ohio assigns categories to wetlands based on wetland quality (*Ohio Administrative Code Rule 3745-1-54*). Categories range from 1 to 3 with 3 being the highest quality. Category 1 wetlands have "limited quality waters." They may have low species diversity, no significant habitat or wildlife use, limited potential to achieve beneficial wetland functions, and/or a predominance of non-native species. Category 2 wetlands are "good" quality waters that are dominated by native species but generally lack rare, threatened, or endangered species or habitat. Category 2 wetlands are degraded but have a reasonable potential for reestablishing lost wetland functions. Category 3 wetlands have high levels of diversity, a high proportion of native species, and/or high functional values. Each delineated wetland was assigned a category using the Ohio Rapid Assessment Method (ORAM) for Wetland Categorization. The State of Ohio affords different levels of protection to wetlands based on wetland quality.

An assessment of habitat in flowing waters was performed on streams located within the study area using the Ohio Environmental Protection Agency ("OEPA") Qualitative Habitat Evaluation Index ("QHEI"). Information on substrate, in-stream cover, channel morphology, bank erosion and riparian zone, pool/glide and riffle/run quality, and map gradient was collected and recorded on Qualitative Habitat Evaluation Index and Use Assessment Field Sheets. These six metrics were scored individually. A total QHEI site score was determined for each stream by adding the scores of all six matrices.

Five wetlands and four streams were identified during the wetland delineation (Tables 8 and 9). Sample plots were located in the wetlands and adjacent uplands.

Table 8: Delineated Wetlands in Substation Site

Wetland Number	Wetland Type[1]	ORAM Category	Acres of Wetland Delineated
W-1	PEM	1	0.61
W-2	PEM/PUB	1	0.13
W-3	PEM	1	0.06
W-4	PEM	2	0.08
W-5	PEM/PFO	1	0.19
		Total:	**1.07**

1 = symbols for wetland type: PEM = palustrine emergent; PUB = palustrine unconsolidated bottom; PFO = palustrine forested

Table 9: Delineated Streams Crossing the Substation Site

Stream Number	Stream Type	Average width (feet)[1]	Average depth (feet)[1]	QHEI Score	Length of Stream Delineated (feet)
S-1	Ephemeral	2	0.5	40	683
S-2	Intermittent	4	0.5	53	934
S-3	Ephemeral	2	0.5	39	141
S-4	Intermittent	3	0.5	46	553
				Total:	**2,311**

[1]As measured from the ordinary high water mark

Following wetland delineation activities in the study area, a preliminary grading plan was developed for the Niles Substation site. Wetland and stream layers were overlaid on the preliminary grading plan to determine anticipated impacts to wetlands and streams. Based on the preliminary grading plan, it is anticipated that approximately 120 linear feet of stream and 0.02 acre of wetlands would be impacted by the proposed Project. The proposed Project would fill approximately 120 feet of Stream S-1 (QHEI of 40), an unnamed ephemeral stream that flows west and north within the Project area. Vegetation along Stream 1 includes American elm (*Ulmus americana*), glossy false buckthorn, multiflora rose (*Rosa multiflora*), and Nodding wild rye (*Elymus canadensis*). Approximately 0.02 acre of Wetland W-1 (Category 1 wetland) will also be impacted by the proposed Project. Wetland W-1 is a PEM wetland located in the central portion of the Project area; Stream S-1extends through the eastern edge of Wetland W-1.

Other Areas of Ecological Concern

There are no other areas of ecological concern either within the proposed Niles Substation site or within the ROW of the proposed transmission line routes for the Project. The Project will not impact or cross any national or state wild and scenic rivers and will not be constructed within a floodplain. No national or state parks and forests, wilderness areas, wildlife management areas, wildlife refuges, or wildlife sanctuaries are located in the Project area.

(3) ADDITIONAL INFORMATION

(a) Noise

The proposed Project will be equipped with one 345 kV to 138 kV transformer. Operation of the Project is expected to increase noise in some of the areas surrounding the site; however, to minimize impacts, the transformer will be located within the substation layout to minimize impacts to adjacent residences. Corona noise could also be present, but it is generally considered insignificant as the rain and other

outside factors tend to mask the corona noise experienced by anyone near the lines. A preliminary noise study was conducted for the proposed Niles Substation, which included measurements of existing ambient noise conditions at various locations near the substation site. Residential areas are primarily located to the southeast, south, and west of the substation site, with industrial areas immediately north. There are approximately 18 residences and 2 industrial facilities within 1,000 feet of the Project site, with an additional 29 residences located within 1,500 feet. The existing Niles Generating Station, Niles Substation, railroad, transmission lines, and a communications tower are located in the immediate vicinity.

Measurements were taken at five measurement points surrounding the substation parcel in accordance with the American National Standards Institute (ANSI) standards. An ANSI S1.4 Type I noise meter was used to take 5-minute measurements at each measurement point. The sound levels at the five measurement points were measured during four different time periods (5 p.m.-7 p.m., 11 p.m.-1 a.m., 5 a.m.-7 a.m., and 11 a.m.-1 p.m.). Ambient weather conditions were monitored during the measurements. Between the early morning measurements (5 a.m. – 7 a.m.) and the daytime measurements (11 a.m. – 1 p.m.), heavy snow began falling. Most snow melted upon contact, but patchy areas of snow remained during the final set of measurements. The noise reduction impact due to the snow is not assumed to make a significant difference in the measurements taken due to the patchy nature of the accumulations, which resulted in less than an inch of snow on the ground. Meteorological conditions during the other three measurement periods met ANSI standards. Ambient sound levels near the site were typical of rural residential and agricultural areas. Ambient A-weighted sound levels varied from a low of 35 dBA during the nighttime measurements to a high of 72 dBA during the evening measurements. The high value at this measurement point can be attributed to constant traffic noise.

Construction Impacts

Noise emissions can reasonably be expected to occur from the Project during each of the construction, operation, and maintenance phases. Audible noise during site preparation and construction associated with the use of construction equipment will be temporary and localized. There are no expected long-term construction noise impacts. Proper maintenance, operation, and use of equipment with mufflers will lessen the noise impacts during the site clearing and construction phases of the Project. Standard construction techniques will be used, and procedures will be in compliance with applicable Occupational Health and Safety Administration (OSHA) standards. As a result, the construction noise impact on nearby residences is anticipated to be minimal and temporary.

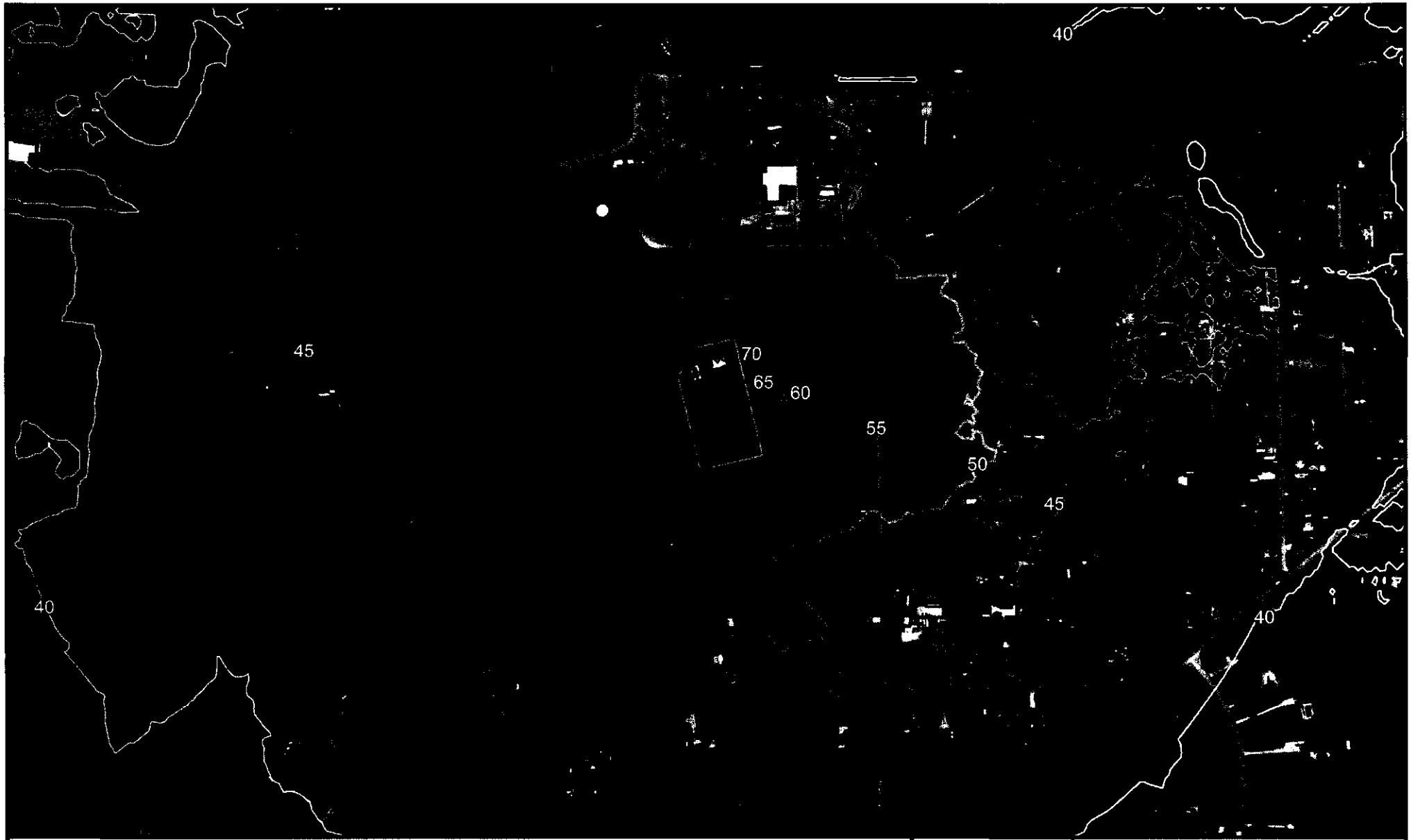
Operation Impacts

The expected sound level from operating the proposed substation in combination with background noise was estimated using an industry-accepted noise modeling software, Computer Aided Design for Noise Abatement (CadnaA), Version 4.3.143 (published by DataKustik, Ltd., Munich, Germany). A sound level profile was calculated from the equations in the Environmental Noise Guide[11] (Noise Guide). Based on vendor guarantees, the maximum sound level from the transformer is expected to be 89 dBA. The sound profile was calculated from the Noise Guide and then scaled to an average sound level of 89 dBA as calculated per IEEE C57.12.90-2006. Appropriate sound generation was applied for sound radiating surfaces, and reflections and shielding were considered when sound encountered a physical structure. The atmospheric conditions were assumed to be calm and the temperature and relative humidity were set to 50 degrees Fahrenheit and 70 percent, respectively (based on program defaults). In order to maintain conservatism in the sound model, a ground absorption factor of 0.7 was used. Existing vegetation (i.e. trees) that could serve as a natural buffer was not considered in the model, thus this is another conservative factor in the analysis.

Figure 5 illustrates the projected operational noise levels of the Project on the surrounding area with 5-dBA colored contours, which considers both ambient noise and noise from the Project. Different sound level thresholds are represented by various colors on the figure. The three closest residences will experience the loudest noise from the new substation, which are located approximately 250 feet to 370 feet east to the southeast of the southeastern corner of the substation fence line. During the loudest times of the day these residences could experience a maximum sound level of about 54.5 dBA, 54.3 dBA, and 53.0 dBA, respectively. All other receptors in this area to the southeast of the substation are anticipated to experience a maximum sound level below 52 dBA during the loudest times of the day, and when ambient noise is not the dominant factor.

[11] (Thompson & Wood, 1984) *Electric Power Plant Environmental Noise Guide*, Volume 1, 2nd Edition, 1984

Path: R:\First Energy\68608_Niles\GIS\DataFiles\ArcDocs\Niles_Substation_Noise_CAR.mxd tfuller 9/10/2013



Legend

- 40 dBA
- 45 dBA
- 50 dBA
- 55 to [illegible] dBA
- Retaining Wall
- Area Source
- Structures
- Residence within 1500ft
- Fenceline
- Vertical Area Source

NORTH

500 250 0 500

[illegible]cale in Feet

Burns & McDonnell SINCE 1898

Figure 5

Proposed Niles Substation
Sound Level Countours (dBA) Leq

Source:2010 Microsoft Corporation and its data suppliers and Burns and McDonnell

Issued: 9/10/2013

(b) Additional Information

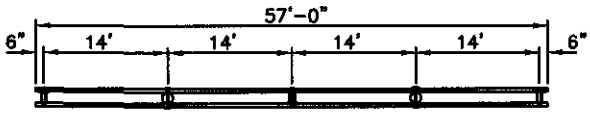
Construction and operation of the proposed Project will be in accordance with the requirements specified in the latest revision of the National Electric Safety Code (NESC) as adopted by the PUCO and will meet all applicable safety standards established by OSHA.

As set forth above, the proposed Highland-Shenango 345 kV Transmission Line Extension to, and Installation of , the Niles Substation Project is needed to reinforce the interconnected transmission system following the announced retirement of several coal-fired power plants in ATSI territory. Because the Project is needed to ensure the ATSI BES meets at a minimum all applicable NERC Transmission Planning (TPL) criteria, the Project will serve the public interest, convenience, and necessity. The Project is consistent with the regional plans for expansion of the electric power grid serving northeast Ohio.

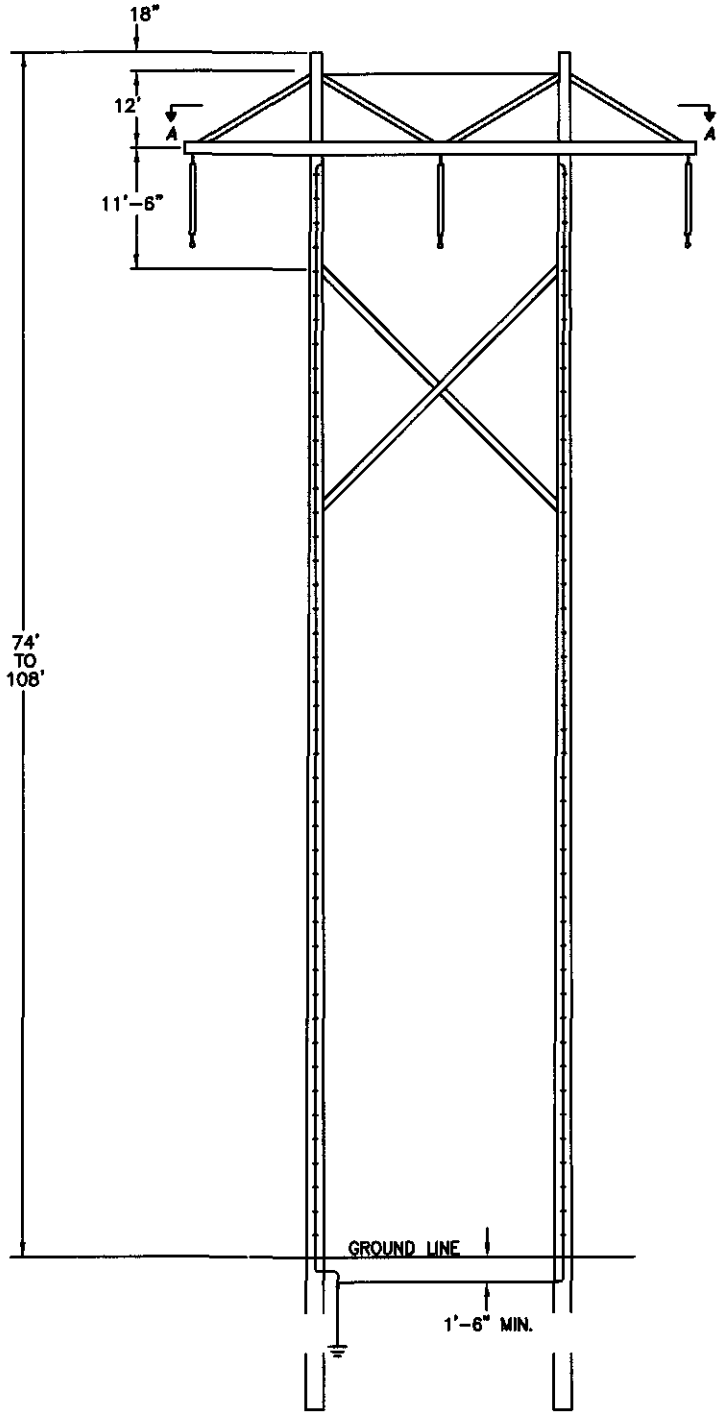
This LON describes the nature of the probable environmental impact of the proposed Project. Of all potential routes and sites identified by ATSI, the site and routes presented in this LON represent the site and route with the minimum adverse environmental impact feasible, given all pertinent considerations. The Project is not expected to significantly impact water resources and ATSI will comply with all applicable provisions of relevant environmental statutes.

APPENDICES

APPENDIX A – STRUCTURE DRAWINGS



SECTION A-A



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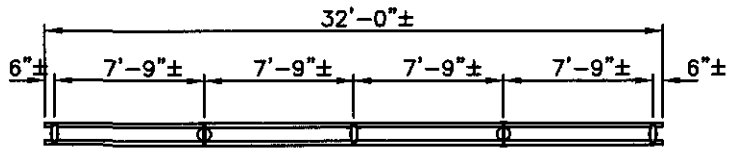
TRANSMISSION LINE EXTENSION
TO AND INSTALLATION OF NILES
SUBSTATION PROJECT

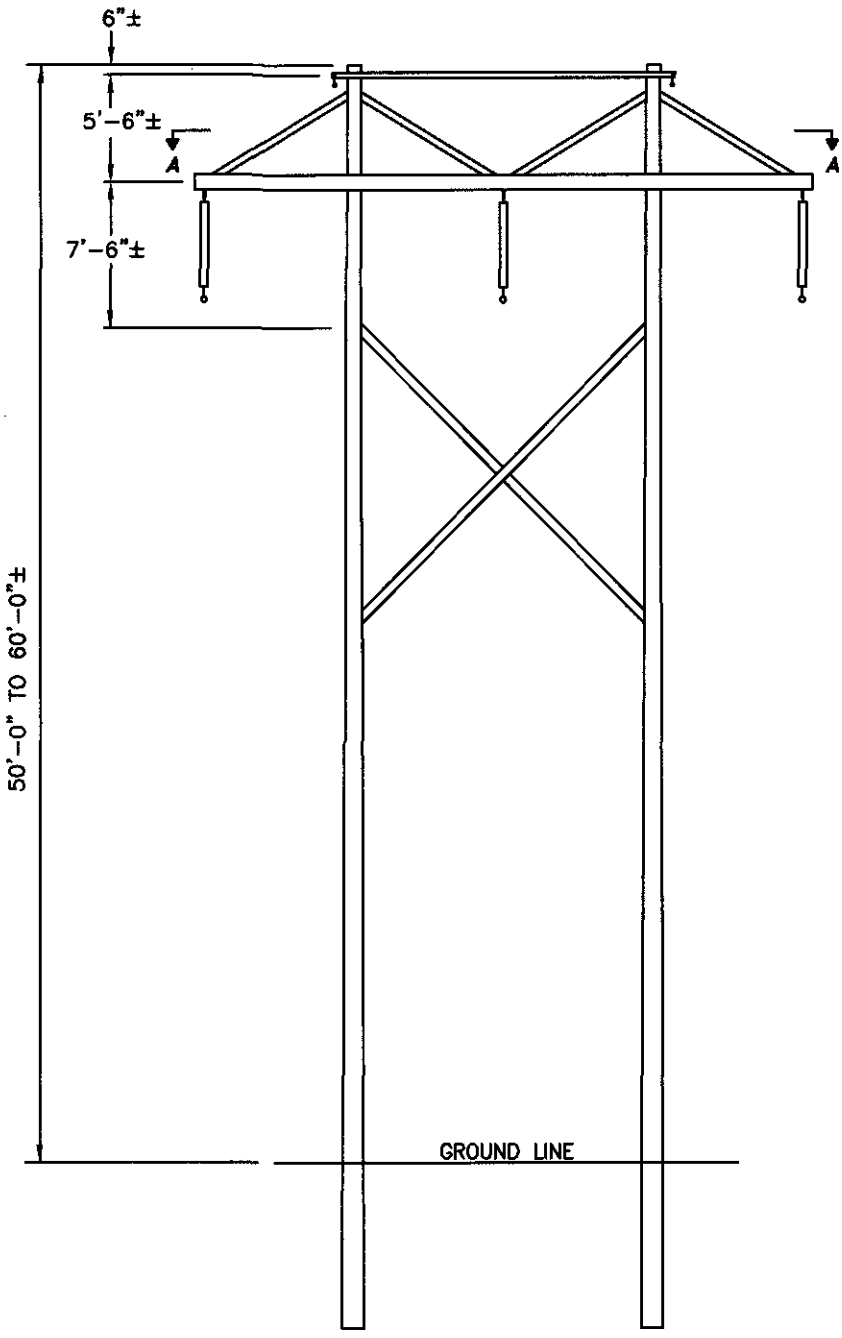
345 kV WOOD H-FRAME STRUCTURE

** NOT TO SCALE

FIGURE A-1



SECTION A-A



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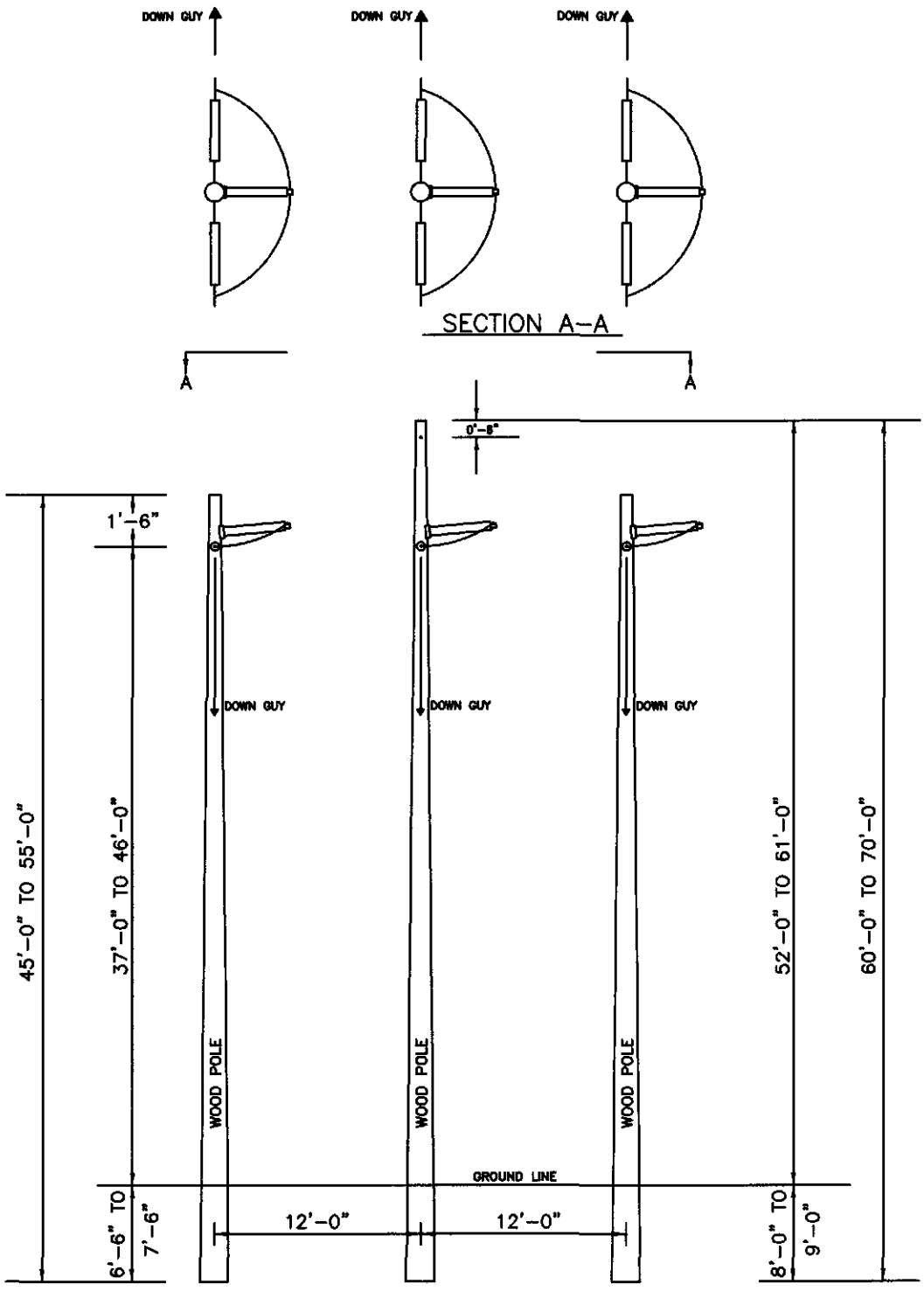
TYPICAL SINGLE CIRCUIT 138 kV H-FRAME STRUCTURE

FIGURE A-2



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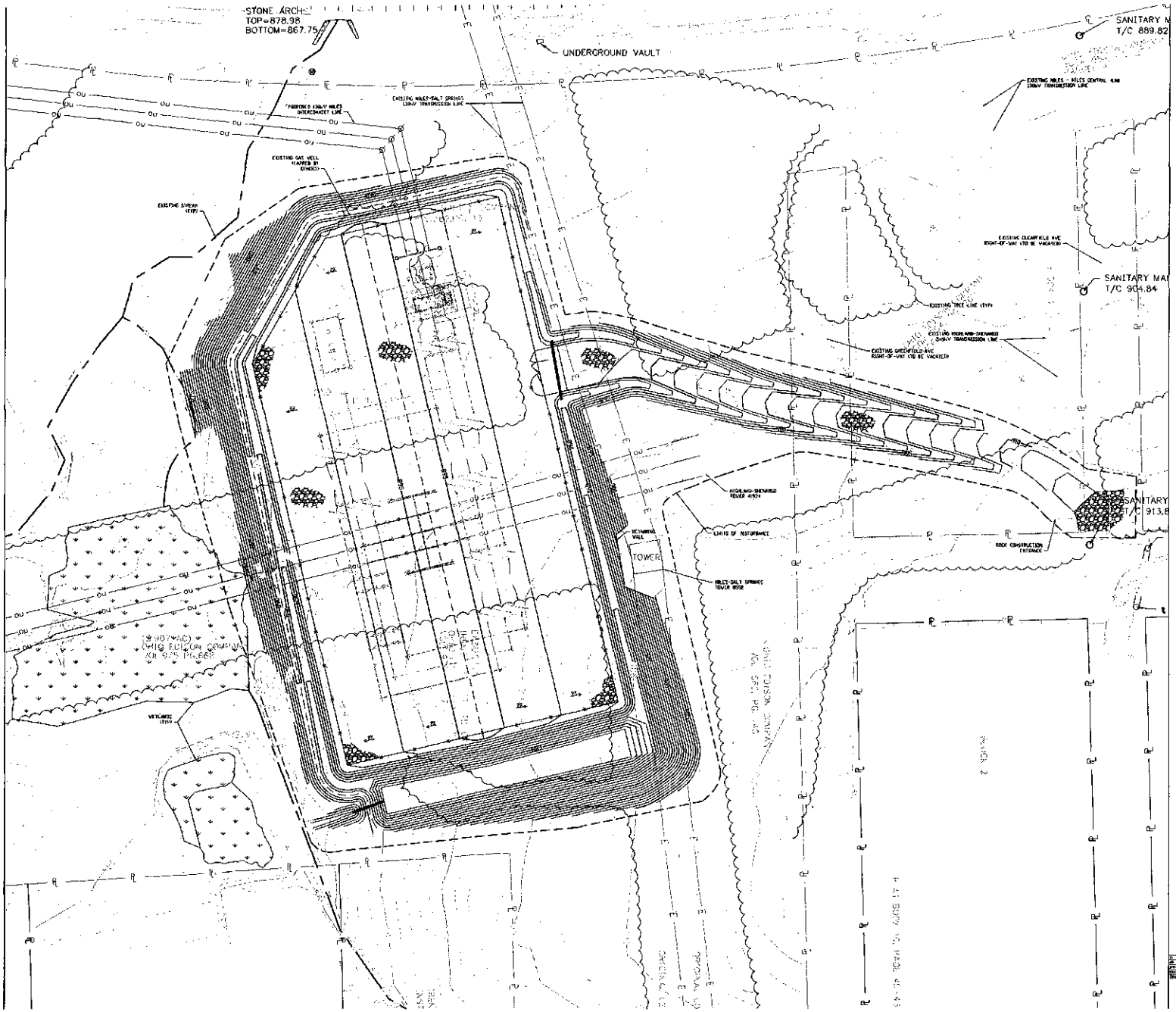
THREE POLE SINGLE CIRCUIT TANGENT DEAD END STRUCTURE

FIGURE A–3

APPENDIX B – GRADING PLAN



NOTES:

1. EXISTING CONTOUR DATA AND STRUCTURE INFORMATION BASED ON SURVEY PROVIDED BY:
   HARRINGTON & ASSOCIATES, LIMITED
   5233 SHERIDAN RD
   NORTH CANTON, OH 44720
   PHONE: 330-499-9617
2. ELEVATIONS SHOWN ARE FINISHED GRADE UNLESS OTHERWISE NOTED
3. SITE WORK AND NEW CONTOURS ARE BASED ON PRELIMINARY INFORMATION AND WILL CHANGE WITH FINAL SITE LAYOUT AND DESIGN. STORM WATER MANAGEMENT PROVISIONS (DITCHES, SWALES, ETC.) ARE SHOWN AS PRELIMINARY.
4. BC-BEYD DISTURBED SLOPES NOT RECEIVING CRUSHED ROCK SURFACING AS SPECIFIED.
5. FUTURE TRANSMISSION LINES SHOWN AS PRELIMINARY. FINAL DESIGN AND LAYOUT TO BE DONE BY OTHERS.
6. LIMITS OF DISTURBANCE ARE PRELIMINARY AND WILL BE UPDATED BASED UPON FINAL DESIGN.

LEGEND:

- 895 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 895 — NEW MAJOR CONTOUR
- NEW MINOR CONTOUR
- PROPERTY LINE
- EXISTING OVERHEAD LINE
- NEW OVERHEAD LINE
- EXISTING GAS LINE
- LIMITS OF DISTURBANCE
- EXISTING STREAM CENTERLINE
- EXISTING TREE LINE
- CRUSHED ROCK SURFACING
- VOLUME
- PERCENT SLOPE
- TOP OF SLOPE
- EXISTING TRANSMISSION POLE
- NEW TRANSMISSION POLE
- LIMITS OF FE PROPERTY

OVERHEAD TRANSMISSION LEGEND:

- HIGHLAND - SHENANGO 345kV
- PROPOSED HIGHLAND - MILES 345kV
- PROPOSED MILES - SHENANGO 345kV
- MILES - SALT SPRINGS 138kV
- MILES - EVERGREEN 138kV
- MILES - MILES CENTRAL NUMB 138kV
- PROPOSED MILES INTERCONNECT 138kV

NORTH

SCALE IN FEET

NOT FOR CONSTRUCTION

PRELIMINARY

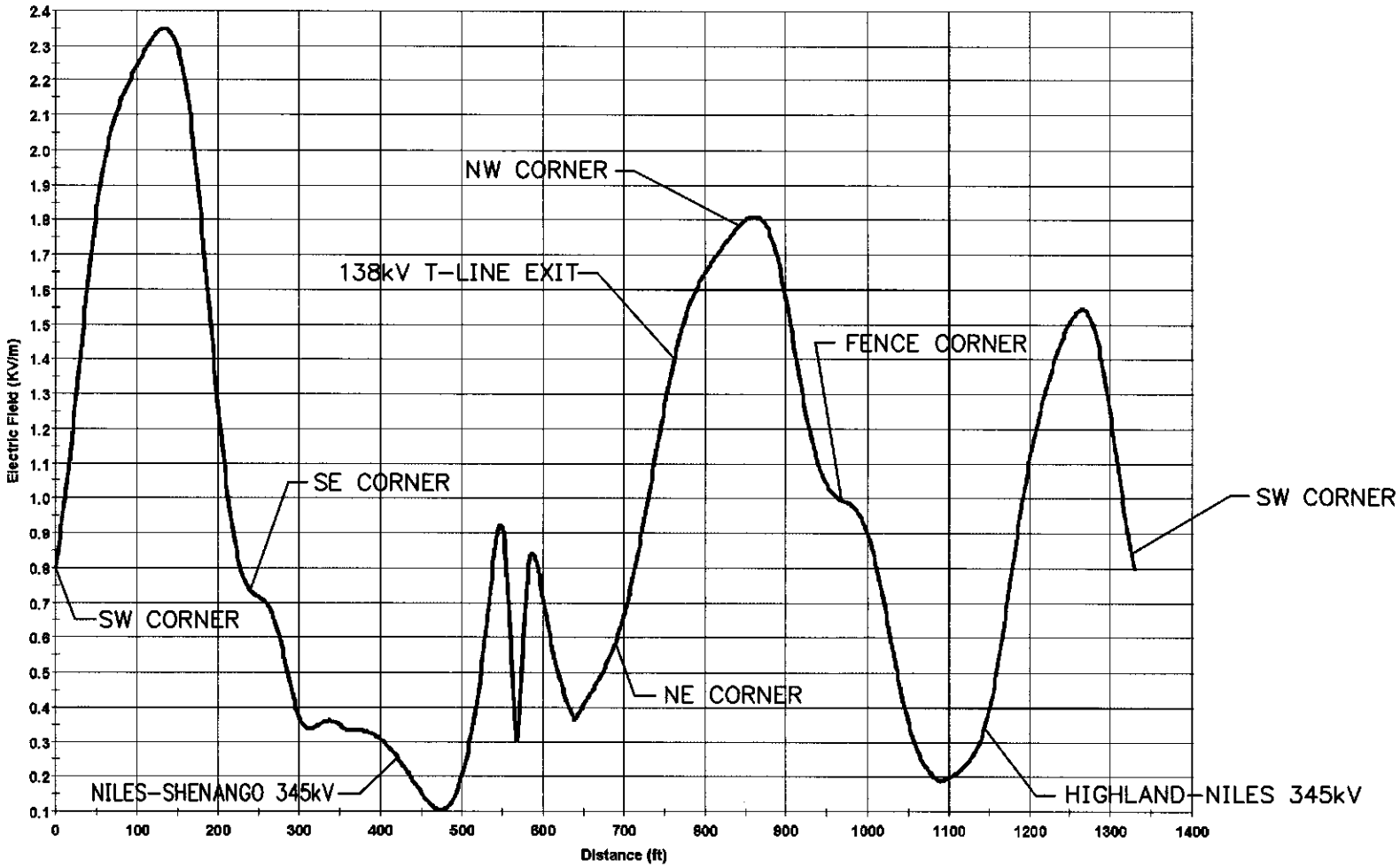
DATE: 07/19/13

FirstEnergy

PRELIMINARY GRADING PLAN

APPENDIX C – EMF FIGURES

Electric Field, New Niles [redacted] Normal Load(EF)



Resultant
Min = 0.104 kV/m Max = 2.349 kV/m

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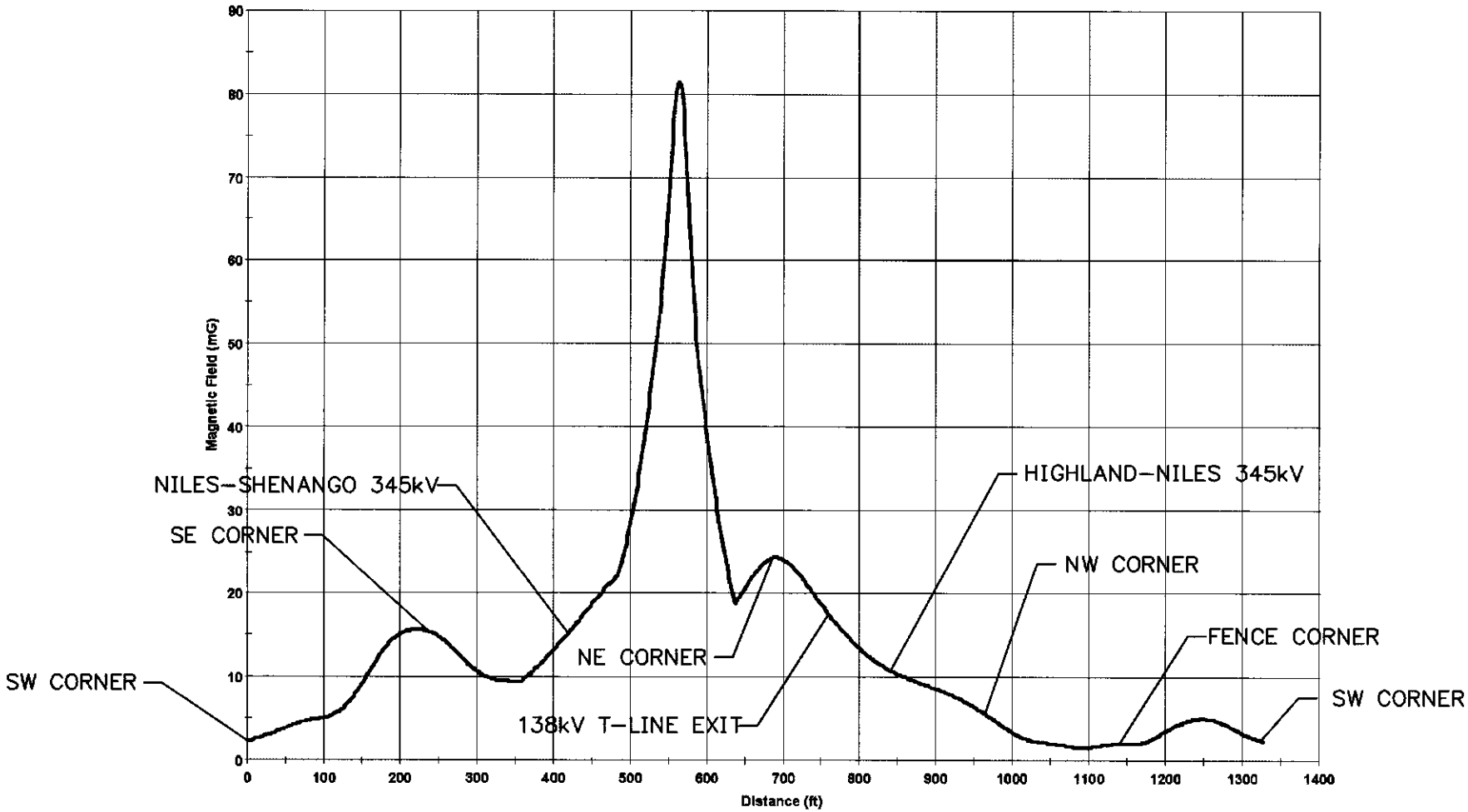
ELECTRIC FIELD

FIGURE C-1

magnetic Field, New Niles Fence - Normal Load



Resultant
Min = 1.449 mG Max = 81.486 mG

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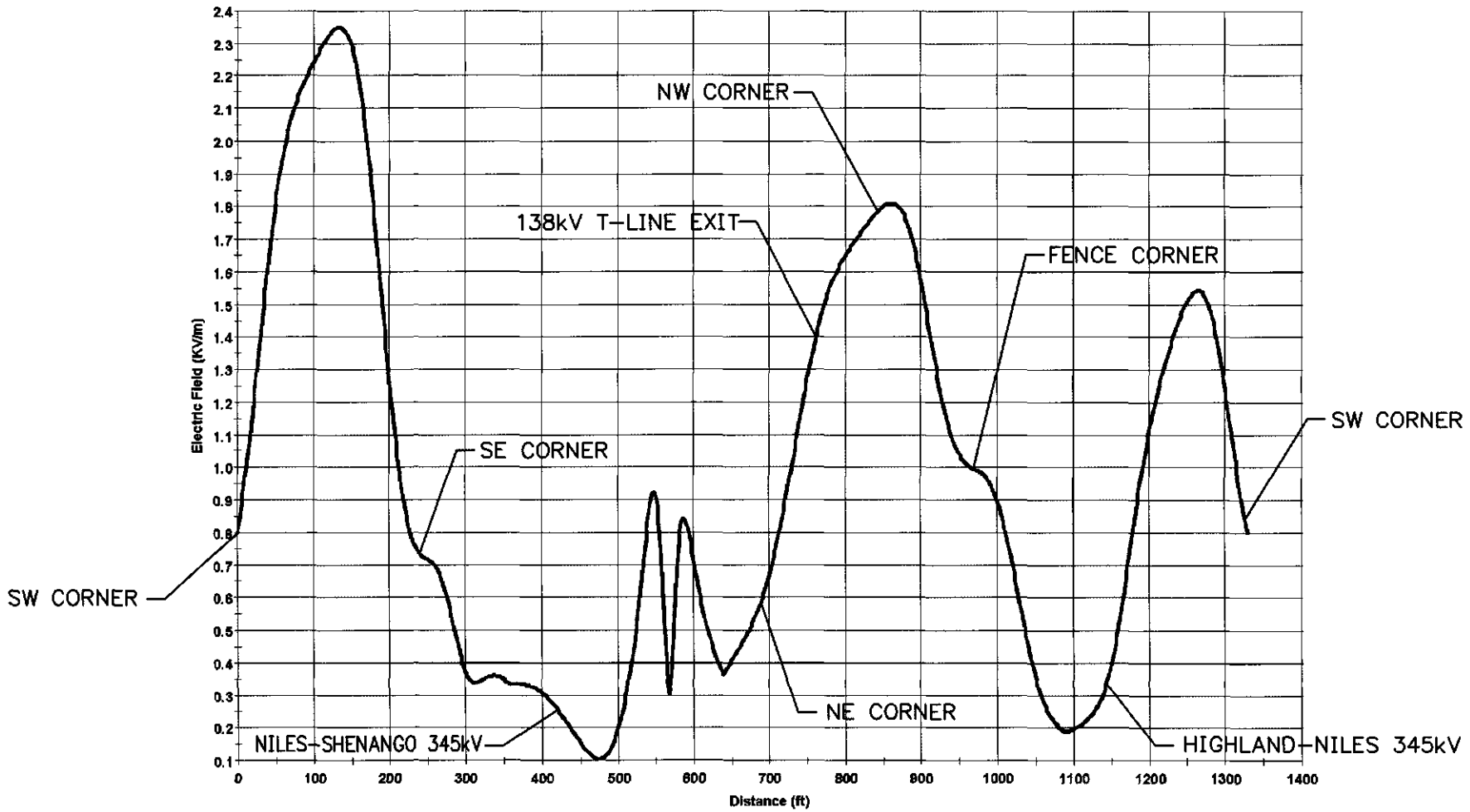
MAGNETIC FIELD – NORMAL LOAD

FIGURE C–2

Electric Field, New Niles [redacted] Emergency Load(EF)



Resultant
Min = 0.104 kV/m Max = 2.349 kV/m

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TRANSMISSION LINE EXTENSION
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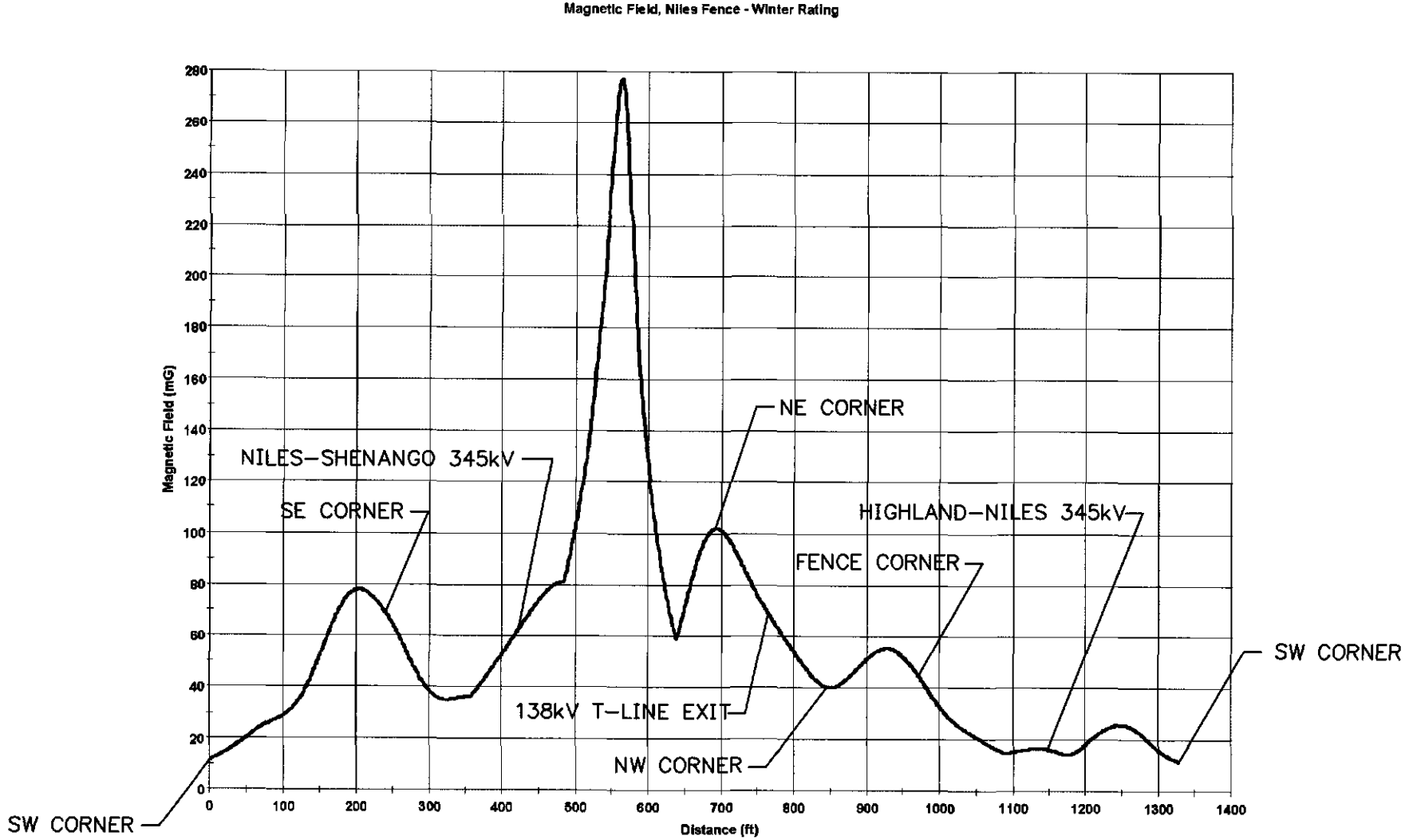
MAGNETIC FIELD – EMERGENCY LOAD

FIGURE C-3



ATSI®
American Transmission Systems, Inc.
a subsidiary of FirstEnergy Corp.

HIGHLAND-SHENANGO 345 kV
TRANSMISSION LINE EXTENSION
TO AND INSTALLATION OF NILES
SUBSTATION PROJECT

MAGNETIC FIELD – WINTER RATING

FIGURE C–4

DEPARTMENT OF THE ARMY
PITTSBURGH DISTRICT, CORPS OF ENGINEERS
WILLIAM S. MOORHEAD FEDERAL BUILDING
1000 LIBERTY AVENUE
PITTSBURGH, PA 15222-4186

REPLY TO
ATTENTION OF

October 12, 2012

Operations Division
Regulatory Branch
2012-1129

Ms. Jennifer S. Bell
Burns & McDonnell
9400 Ward Parkway
Kansas City, Missouri 64114-3319

Dear Ms. Bell:

I refer to your letter, received in this office July 17, 2012, regarding the Development Project, in Trumbull County, Ohio.

The US Army Corps of Engineers regulates any earth moving activities within streams or wetlands. This includes any placement of fill material, temporary or permanent. We recommend that you hire a qualified wetland consultant to evaluate the entire project area in order to determine if any jurisdictional streams or wetlands are present. Enclosed is a list of wetland consultants. If impacts to streams or wetlands are in fact proposed, you should again contact this office to discuss permitting requirements.

Every effort should be made to avoid and minimize impacts to the aquatic resources on-site. We will continue to work with you in order to protect any aquatic resources that may be present.

This project has been assigned Department of the Army Permit Number 2012-1129. Please refer to this number in all future correspondence. If you have any questions, please contact William Wright at 412-395-7189 or by e-mail william.h.wright@usace.army.mil.

Sincerely,

for Nancy Mullen
Chief Northern Section
Regulatory Branch

Enclosure

OHIO HISTORY

July 31, 2012

Jennifer Bell
Burns & McDonnell
9400 Ward Parkway
Kansas City, Mo 64114-3319

Dear Ms. Bell:

This is in response to your letter of July 17, 2012 requesting information concerning historic properties for an unidentified project in Trumbull County, Ohio. Unfortunately we do not have the time or staff to complete literature reviews that are the responsibility of the consultant. There are, however, several ways to access the information in our records.

You are welcome to use our files at the Ohio Historic Preservation Office. Our office maintains the Ohio Historic Inventory, the Ohio Archaeological Inventory, and the National Register of Historic Places for properties in Ohio. You may make an appointment with Carrie Simmons at (614) 298-2000 to use these resources. Our office is open from 9 AM to 5 PM, Monday through Friday. We also have a records search service available. Please see http://www.ohiohistory.org/resource/histpres/toolbox/recordsSearch.html for more information.

If this project requires Section 106 review we will need more information. Please provide a description of the project, past and current landuse, and a map showing the exact location. We will also need information about the possible indirect effects of construction on nearby buildings in the area of potential effects. For further information on Section 106 requirements you may wish to check http://www.ohiohistory.org/resource/histpres/services/106rev.html.

If you need a list of consultants, please call me at (614) 298-2000 or check our website at www.ohiohistory.org/resource/histpres/services. Thank you for your cooperation.

Sincerely,

Nathan J. Young

Nathan J. Young, Project Reviews Manager
Resource Protection and Review

2012-WOO-21239

OHIO HISTORICAL SOCIETY
Ohio Historic Preservation Office
1982 Velma Avenue, Columbus, Ohio 43211-2497 ph: 614.298.2000 fx: 614.298.2037
www.ohiohistory.org

Bell, Jennifer

From: Bennett, Amanda <ABennett@agri.ohio.gov>
Sent: Tuesday, July 17, 2012 2:10 PM
To: Bell, Jennifer
Subject: RE: Project #68608

Follow Up Flag: Follow up
Due By: Thursday, July 19, 2012 10:00 AM
Flag Status: Flagged

Thanks, Jennifer. To the best of my knowledge, none of our existing Trumbull County Easements are within your study area. That being said, just as with the Black Swamp area we spoke of last week, this particular area is within the service area of Western Reserve Land Conservancy, and I do not know what conservation/agricultural projects they may have going on their own:

Western Reserve Land Conservancy
P.O. Box 314
Novelty, OH 44072
440.729.9621

Thanks,

Amanda Y. Bennett
Program Manager
Office of Farmland Preservation
Ohio Department of Agriculture
8995 E. Main St.
Reynoldsburg, OH 43068-3399
Phone: 614-728-6214
Fax: 614-752-2282
abennett@agri.ohio.gov

From: Bell, Jennifer [mailto:jbell@burnsmcd.com]
Sent: Tuesday, July 17, 2012 3:16 PM
To: Bennett, Amanda
Subject: RE: Project #68608

No problem – thank you for the assistance. Map is attached.

Jennifer Bell
Environmental Scientist, Environmental Studies & Permitting
Burns & McDonnell
Direct: 303-474-2229
Main: 303-721-9292
Fax: 303-721-0563
jbell@burnsmcd.com
www.burnsmcd.com

From: Bennett, Amanda [mailto:ABennett@agri.ohio.gov]
Sent: Tuesday, July 17, 2012 12:46 PM
To: Bell, Jennifer
Subject: Project #68608

Hi Jennifer,

We received your letter and map today regarding your project in Trumbull County. We have 6 easements up that way...can you send me the map electronically again? That way I can forward to our local partner in the area, Western Reserve Land Conservancy.

Thanks,

Amanda Y. Bennett
Program Manager
Office of Farmland Preservation
Ohio Department of Agriculture
8995 E. Main St.
Reynoldsburg, OH 43068-3399
Phone: 614-728-6214
Fax: 614-752-2282
abennett@agri.ohio.gov

This message and any response to it may constitute a public record and thus may be publicly available to anyone who requests it.

Telephone Memorandum

Called:	Rodney Tornes, Dam Safety Program Manager
Organization:	Ohio DNR Division of Soil & Water Resources, Dam Safety Program
Caller:	Jennifer Bell
Organization:	BMCD
Subject of Call:	Inundation mapping for Mineral Ridge Dam
Call Date:	September 17, 2012
Phone No.:	614-265-6737
Project Name:	FirstEnergy Niles Substation Project
Project No.:	68608
Memo Prepared By:	Jennifer Bell
Date Memo Issued:	September 17, 2012

Summary:

I called Mr. Tornes to inquire about additional information regarding inundation area mapping. He indicated that DNR could not give out mapping information without permission from the owner. So, he suggested contacting the owner, the Mahoning Valley Sanitary District, for mapping information or the Trumbull County EMA. The DNR put together an Emergency Action Plan and one of the maps is the inundation map. A copy of this Action Plan was provided to the Mahoning Valley Sanitary District and the county emergency management agency. He indicated that these two should have this on file. He thought the Mahoning Valley Sanitary District kept good records and should be able to provide me with the inundation area mapping information.

Telephone Memorandum

Called:	Tom Holloway, Chief Engineer
Organization:	Mahoning Valley Sanitary District
Caller:	Jennifer Bell
Organization:	BMCD
Subject of Call:	Inundation mapping for Mineral Ridge Dam
Call Date:	October 15, 2012
Phone No.:	330-652-3614
Project Name:	FirstEnergy Niles Substation Project
Project No.:	68608
Memo Prepared By:	Jennifer Bell
Date Memo Issued:	October 15, 2012

Summary:

I called Mr. Holloway to inquire about obtaining a copy of the inundation area mapping for the Mineral Ridge Dam. He indicated that he has a copy of the Emergency Action Plan Report and a large-scale map on the wall of the inundation area. He is going to try to scan our area of interest and email me the scan. I indicated that I would email him a copy of the study area map. If he cannot scan the map, BMCD will need to stop by the office during the next site visit to take a look at the materials there.

Dam Breach Inundation Map

MEANDER WATER

MVSD • YOUR COMMUNITY WATER SUPPLY

Mineral Ridge Dam

0 0.5 1 2 3

1" = 1 Mile

Gannett Fleming

Your Trusted Advisor Since 1915

Legend

Sunny Day Breach

25% PMF Breach

PMF Breach


Mahoning River
Mosquito Creek
Meander Creek
Dam
Reservoir
276
300
Liberty
Mineral
Ridge

Telephone Memorandum

Called:	Jennifer Bell
Organization:	Burns & McDonnell
Caller:	Katharina Snyder (Inspector for NE Region)
Organization:	Ohio EPA – Division of Materials and Waste Management (DMWM)
Subject of Call:	Agency information request letter
Call Date:	July 24, 2012
Phone No. Called:	330-963-1257
Project Name:	FirstEnergy Niles Substation Project
Project No.:	68608
Memo Prepared By:	Jennifer Bell
Date Memo Issued:	July 24, 2012

Summary:

Ms. Snyder called in response to the agency letter sent to Pam Allen, Ohio EPA (Division of Materials and Waste Management). Ms. Snyder indicated that she is the inspector for the NE region, which covers Trumbull County. She recommended requesting a file review once a property is identified for the development. For the NE District, she said you can call the main number at 330-963-1200 and tell the secretary that you would like to request a file review and she will connect you with the appropriate staff member.

Ms. Snyder indicated that there are no operating landfills within the city limits of Niles. She recommended checking out the facility list on their website for active facilities (http://www.epa.ohio.gov/Default.aspx?tabid=2582). I asked her about any in Trumbull County, and she said there is a compost facility in the county, a construction and demolition debris landfill in Lordstown, a scrap tire transporter in the City of Warren, an infectious waste generator in the City of Warren, and a closed construction and demolition debris landfill in Girard.

I asked Ms. Snyder about any permits or regulations that we need to be aware of, and she said the "Rule 13 Requirement" applies if we end up building or doing any kind of construction on a hazardous waste disposal site. The full regulations are OAC Chapter 3745-27-13 (can be found at: http://www.epa.ohio.gov/Default.aspx?tabid=2543). We would need to obtain approval from the Ohio EPA before any construction on such a site in order to prevent releases of hazardous waste into the environment. The type of approval depends on the project and may be as small as a notification for activities such as sampling or boring or can be more extensive for larger development projects (may need to show designs and demonstrate how we would prevent a release into the environment.

cc: Kristi Wise, BMCD; Rob Everard, BMCD

Telephone Memorandum

Called:	Jennifer Bell
Organization:	Burns & McDonnell
Caller:	Nicole Pitella, NE District Office
Organization:	Ohio EPA – Division of Materials and Waste Management (DMWM)
Subject of Call:	Agency information request letter
Call Date:	July 30, 2012
Phone No. Called:	330-963-1142
Project Name:	FirstEnergy Niles Substation Project
Project No.:	68608
Memo Prepared By:	Jennifer Bell
Date Memo Issued:	July 30, 2012

Summary:

Ms. Pitella called in response to the agency letter sent to Pam Allen, Ohio EPA (Division of Materials and Waste Management). Ms. Snyder indicated that the letter was forwarded to her at the NE District office. If we would like to conduct a file review for the project, we can contact her to set up an appointment. We would give her specific names or addresses for properties we want to review, then she will pull the files and we can go into the office to review them. Her office is located in Twinsburg, which is about 1 hour west of Niles.

Bell, Jennifer

From: Kessler, John <John.Kessler@dnr.state.oh.us>
Sent: Monday, August 13, 2012 12:41 PM
To: Bell, Jennifer
Subject: FW: 12-477 comments Burns and McDonnell Development Project No. 68608

ODNR COMMENTS TO: Jennifer Bell, Burns & McDonnell, jbell@burnsmcd.com

Project: Burns and McDonnell Development Project No. 68608

Location: Niles, Trumbull County

The Ohio Department of Natural Resources (ODNR) has completed a review of the above referenced project. These comments were generated by an inter-disciplinary review within the Department. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the National Environmental Policy Act, the Coastal Zone Management Act, Ohio Revised Code and other applicable laws and regulations. These comments are also based on ODNR's experience as the state natural resource management agency and do not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Fish and Wildlife: The Division of Wildlife (DOW) has the following comments.

The project is within the range of the Indiana bat (*Myotis sodalis*), a state and federally endangered species. The following species of trees have relatively high value as potential Indiana bat roost trees: Shagbark hickory (*Carya ovata*), Shellbark hickory (*Carya laciniosa*), Bitternut hickory (*Carya cordiformis),* Black ash (*Fraxinus nigra*), Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus americana*), Shingle oak (*Quercus imbricaria*), Northern red oak (*Quercus rubra*), Slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (Populus deltoides), Silver maple (*Acer saccharinum*), Sassafras (*Sassafras albidum*), Post oak (*Quercus stellata*), and White oak (*Quercus alba*). Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed above with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed above with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. If suitable trees occur within the project area, these trees must be conserved. If suitable habitat occurs on the project area and trees must be cut, cutting must occur between September 30 and April 1. If suitable trees must be cut during the summer months, a net survey must be conducted in May or June prior to cutting. Net surveys shall incorporate either two net sites per square kilometer of project area with each net site containing a minimum of two nets used for two consecutive nights, or one net site per kilometer of stream within the project limits with each net site containing a minimum of two nets used for two consecutive nights. If no tree removal is proposed, the project is not likely to impact this species.

The project is within the range of the clubshell (*Pleurobema clava*), a state and federally endangered mussel, and the snuffbox (*Epioblasma triquetra*), a state endangered and federal endangered mussel.

If there is a history of mussels near the proposed project area, it may be necessary for a professional malacologist approved by the DOW to conduct a mussel survey in the project area. Surveys are to be done within six months before in-water work. If mussels that cannot be avoided are found in a project area, as a last resort, the DOW may recommend a professional malacologist collect and relocate the mussels to suitable and similar habitat upstream of the proposed project. If no in-water work is proposed, the project is not likely to impact these species.

The project is within the range of the Eastern massasauga (*Sistrurus catenatus*), a state endangered and a federal candidate snake species. Due to the lack of records in the project area for this species and the location of the project area, the project is not likely to impact this species.

The project is within the range of the mountain brook lamprey *(Ichthyomyzon greeleyi)*, a state endangered fish. The DOW recommends no in-water work from at least April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed, the project is not likely to impact this species.

The project is within the range of the black bear (*Ursus americanus*), a state endangered species, and the bobcat (*Lynx rufus*), a state endangered species. Due to the mobility of these species the project is not likely to impact these species.

The project is within the range of the trumpeter swan (*Cygnus buccinator*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Trumpeter swans prefer large marshes and lakes ranging in size from 40 to 150 acres. They like shallow wetlands one to three feet deep with a diverse mix of plenty of emergent and submergent vegetation and open water. Therefore, if this type of wetland habitat will be impacted, construction must be avoided in this habitat during the species' nesting period of May 1 to August 1. If this type of wetland habitat will not be impacted, the project is not likely to impact this species.

The project is within the range of the yellow-bellied sapsucker (*Sphyrapicus varius*), a state endangered bird. A statewide survey has not been completed for this species. A lack of records does not indicate the species is absent from the area. Yellow-bellied sapsuckers occupy wet deciduous forests or the margins of bogs where yellow birch, beech and aspen are prevalent. Therefore, if tree removal is proposed in this type of habitat, tree removal must not occur during the species' nesting period of May 1 to July 1. If no tree removal is proposed, the project is not likely to impact this species.

The ODNR, Ohio Biodiversity Database has a record in the Mahoning River for the Northern Crayfish (*Orconectes virilis*), species of concern. The DOW recommends no in-water work from at least April 15 to June 30 to reduce impacts to indigenous aquatic species and their habitat. If no in-water work is proposed, the project is not likely to impact this species.

We are unaware of any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges or other protected natural areas within the project area. Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area.

Please note that wetlands known to contain an individual of or documented occurrences of federal or state-listed threatened or endangered plant or animal species are most likely considered high quality, Category 3 wetlands by the Ohio Environmental Protection Agency.

ODNR appreciates the opportunity to provide these comments. Please contact John Kessler at (614) 265-6621 if you have questions about these comments or need additional information.

John Kessler, P.E.
Ohio Department of Natural Resources
Office of Real Estate
2045 Morse Rd., Columbus, OH 43229-6605
phone: 614-265-6621
email: john.kessler@dnr.state.oh.us

Bell, Jennifer

From: obdrequest <obdrequest@dnr.state.oh.us>
Sent: Thursday, July 19, 2012 7:04 AM
To: Bell, Jennifer
Subject: Ohio Biodiversity Database Request
Attachments: development project in trumbull county.dbf; Development Project in Trumbull County.pdf; development project in trumbull county.prj; development project in trumbull county.sbn; development project in trumbull county.sbx; development project in trumbull county.shp; development project in trumbull county.shx

Ms. Bell,

I am attaching response letter and GIS data for your Biodiversity Database request.

Please note that we are phasing out our fax number. Future requests should be sent by mail or email to this address.

obdrequest@dnr.state.oh.us

Please let me know if I can be of additional help.

Thanks!

Greg Schneider, Program Administrator
Biodiversity Database Program
Division of Wildlife
Ohio Department of Natural Resources
2045 Morse Rd., Bldg. G-3
Columbus, Ohio 43229-6693
Phone: (614) 265-6452
Fax: (614) 267-3096
<mailto:greg.schneider@dnr.state.oh.us>

Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR — JAMES ZEHRINGER, DIRECTOR

Ohio Division of Wildlife
Scott Zody, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

July 19, 2012

Jennifer Bell
Burns & McDonnell
9785 Maroon Circle, Suite 400
Centennial, CO 80112

Dear Ms. Bell

Per your request, I have e-mailed you a set of ArcView shape files for the Development Project in Trumbull County project area, including a one mile radius, in Weathersfield Township, Trumbull County, Ohio. This data may not be published or distributed beyond the scope of the project description on the data request form without prior written permission of the Biodiversity Database Program.

I am attaching a shape file for the rare and endangered plants and animals, geologic features, high quality plant communities and animal assemblages. Fields included are scientific and common names, state and federal statuses, as well as date of the most recent observation. State and federal statuses are defined as: E = endangered, T = threatened, P = potentially threatened, SC = species of concern, SI = special interest, A = recently added to inventory, status not yet determined, FE = federal endangered, FT = federal threatened, FPE = federal potentially endangered, FC = federal candidate and FSC = federal species of concern.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas.

This letter only represents a review of rare species and natural features data within the Ohio Biodiversity Database. It does not fulfill coordination under the National Environmental Policy Act (NEPA) or the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S. C. 661 et seq.) and does not supersede or replace the regulatory authority of any local, state or federal agency nor relieve the applicant of the obligation to comply with any local, state or federal laws or regulations.

Please contact me at 614-265-6452 if I can be of further assistance.

Sincerely,

Greg Schneider

Greg Schneider, Administrator
Ohio Biodiversity Database Program

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

August 20, 2012

Burns & McDonnell
Attn: Jennifer Bell
9400 Ward Parkway
Kansas City, MO 64114-3319

TAILS: 03E15000-2012-TA-1103

Re: Undefined Development Project
Burns & McDonnell Project # 68608
Trumbull County, Ohio.

Dear Ms. Bell:

This is in reference to your July 13, 2012 letter requesting information regarding federally listed threatened and endangered species in the vicinity of the subject line project. The final project location has not yet been determined. However, you have indicated that the project will likely occur within the city limits of Nile.

There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

The Service recommends that proposed developments avoid and minimize water quality impacts and impacts to high quality fish and wildlife habitat, such as forests, streams, and wetlands. Best construction techniques should be used to minimize erosion, in particular, on slopes. Additionally, natural buffers around streams and wetlands should be preserved to enhance beneficial functions. If streams or wetlands will be impacted, the Corps of Engineers should be contacted for possible need of a Section 404 permit. We support and recommend mitigation activities that reduce the likelihood of invasive plant spread and encourage native plant colonization. Prevention of non-native, invasive plant establishment is critical in maintaining high quality habitats. All disturbed areas in the project vicinity should be mulched and revegetated with native plant species.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (Myotis sodalis), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

Should the proposed site contain trees or associated habitats exhibiting any of the characteristics listed above, we recommend that the habitat and surrounding trees be saved wherever possible. If the trees must be cut, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid Federal permit. Please note that summer surveys must be conducted between May 15 and August 15.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus*), a small, docile rattlesnake that is currently a Federal candidate species. Since designated as a candidate species in 1999, it has declined significantly throughout its range and populations in Ohio that were once throughout glaciated portions of the state, are now small and isolated. The species has been listed by the State of Ohio as endangered since 1996. Several factors have contributed to the decline of the species including habitat loss and fragmentation, indiscriminate killing, collection, gene pool contamination and incompatible land use practices.

Eastern massasaugas use both upland and wetland habitat and these habitats differ by season. During the winter, massasaugas hibernate in low wet areas, primarily in crayfish burrows, but may use other structures. Presence of a water table near the surface is important for a suitable hibernaculum. In the summer, massasaugas use drier, open areas that contain a mix of grasses and forbs such as goldenrods and other prairie plants that may be intermixed with trees or shrubs. Adjoining lowland and upland habitat with variable elevations between are critical for the species to travel back and forth seasonally. Should the proposed project area contain any of the habitat types or features described above, we recommend that a habitat assessment be conducted to determine if suitable habitat for the species exists within the vicinity of the proposed site. Please note that habitat assessments should only be conducted by approved eastern massasauga surveyors due to variable habitat types and cryptic nature of the species. Any habitat assessments or surveys should be coordinated with this office.

This project lies within the range of the **snuffbox** (*Epioblasma triquetra*) and the **clubshell** (*Pleurobema clava*), both are federally listed endangered freshwater mussels. Due to the potential project location provided, we do not anticipate any impact on these species, or their habitat.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If you have questions, or if we may be of further assistance in this matter, please contact David Henry at extension 27 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

APPENDIX E – PUBLIC INFORMATION MEETING HANDOUTS

Ensuring Service Reliability for FirstEnergy Customers

Proposed Transmission Line Extensions, Additional Transmission Line and Substation in Eastern Ohio

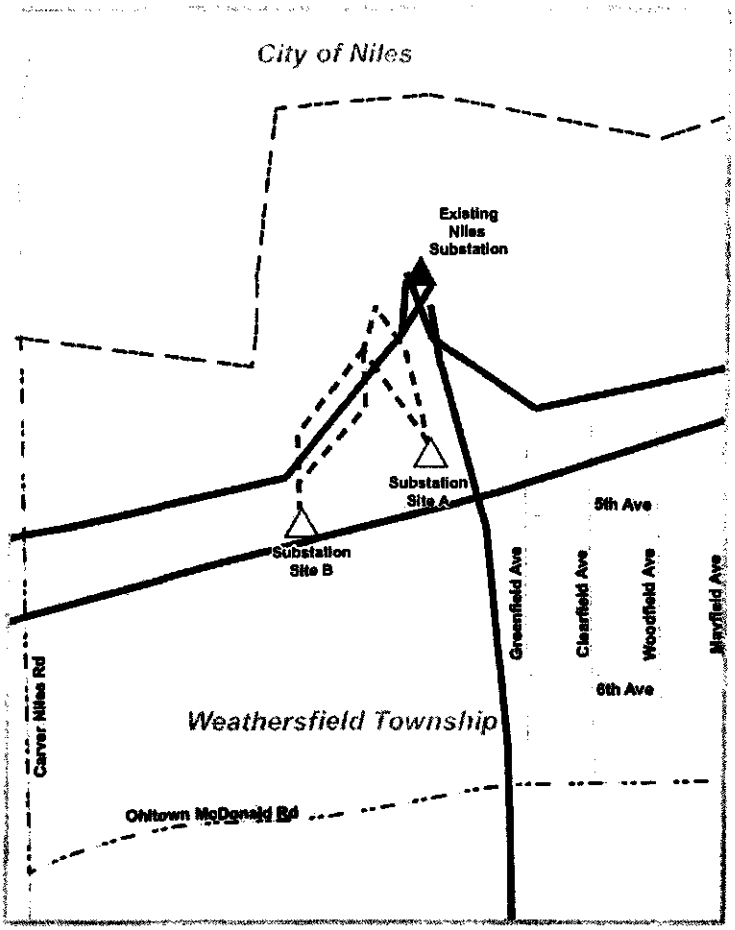
Energizing the Future

FirstEnergy's "Energizing the Future" initiative is a comprehensive transmission construction program designed to improve service reliability as power plants in the region are deactivated due to the high cost of complying with new U.S. EPA standards.

These "Energizing the Future" projects include constructing new 138 kilovolt (kV) and 345 kV transmission lines, new substations, and converting certain FirstEnergy northern Ohio generating units to synchronous condensers, devices that regulate voltage. FirstEnergy expects to invest approximately $500 million to $700 million over the next five years on these projects.

This initiative is based on recommendations by PJM Interconnection, the regional transmission organization that coordinates the movement of electricity and oversees reliability in all or part of 13 states and the District of Columbia.

Continued on back



Project Location:
Trumbull County, Ohio

Legend

- Potential Substation Site
- Existing Substation
- Potential New 138kV Route
- Existing Line
- Municipality
- Local Road

Various routes and substation sites are depicted; however, only one route and one substation site will be chosen.

FirstEnergy

Proposed Transmission Line Extensions and New Substation in Trumbull County, Ohio

This proposed project involves adding a new 345 kV line to reinforce the area's 138 kV transmission lines and construct a substation to ensure reliability.

Transmission Line Extensions: The project will extend an existing 345 kV transmission line approximately 150 feet and connect to a planned new substation. Additionally, a new 138 kV line will be installed from the new substation and extend approximately 1,000 feet to the existing substation located at the Niles Generating Station. Both the new and existing substations will be named Niles.

Substation: The planned Niles Substation will be built on property that is owned by Ohio Edison and will transform voltage from 345 kV to 138 kV.

Various routes for the transmission line extensions and sites for the substation are being evaluated. The goal is to locate the new substation as close as possible to the existing Niles substation to minimize impact to property owners and the environment.

FirstEnergy expects to invest more than $11 million for the project.

Public Involvement and the Process: All transmission projects encompass a multi-step process that includes significant public input.

- **Evaluation:** FirstEnergy's siting consultant began route studies for the line and sites for the substation in 2012. Potential routes are being further studied to minimize the impact to the environment and property owners.
- **Informational Meetings:** Potential routes for the transmission lines and sites for the substation will be discussed at a public information meeting held in the area that may be affected by the project. Members of the public and local officials will be invited to provide input for consideration. These comments will be used to help determine the proposed routes and sites that are ultimately proposed and developed.
- **OPSB Submittal:** As part of the siting process in Ohio, American Transmission Systems, Incorporated (ATSI), a subsidiary of FirstEnergy Corp., will submit a Letter of Notification for the project with the Ohio Power Siting Board (OPSB). This submittal is expected to occur in the first half of 2013. The OPSB's final decision on the project is anticipated to occur within three to six months after the submittal.
- **Easement/Property Acquisition:** Once the proposed route(s) are identified, discussions to acquire any new rights of way, if needed, will occur. After the formal Letter of Notification is filed, acquisition of any new rights of way will take place.
- **Construction:** Construction of the extended transmission line, new transmission line and substation will take place once necessary approvals are received and occur simultaneously to meet a June 1, 2015 in-service date. Construction of the three projects will begin in early 2014.

For more information about FirstEnergy's new transmission projects, visit **www.firstenergycorp.com/transmission**, call **1-800-589-2837** or email **transmissionprojects@firstenergycorp.com**.

PROJECT TIMELINE	
Second half 2012	Route Study, Substation Site Selection
Dec. 12 - Jan. 13	Proposed Routes and Substation Sites Developed
Jan. 28, 2013	Public Informational Meetings – Input Considered
First half 2013	Letter of Notification filed with Ohio Power Siting Board (OPSB); Review Period
Late 2013	Permits Received
First quarter 2014	Construction Begins
June 1, 2015	PJM Requested In-Service Date

Produced by FirstEnergy's Communications Department

FirstEnergy

Highland-Shenango 345 kV Transmission Line
Extension to Niles Substation Project

FirstEnergy®

Today's Date: _____

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Phone: _____ Email _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

Name of FirstEnergy Representative Taking Inquiry (if applicable)_____

OHIO POWER SITING BOARD APPLICATION PROCESS

Public Information Meeting

File Draft Application

Initial Board Review (within 60 days)

File Certified Application

Staff Technical Review (45-75 days)

Staff Report Issued

Public & Adjudicatory Hearing

Administrative Law Judge Report

Board Decision

OHIO POWER SITING BOARD APPLICATION CONTENTS

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Project Summary and Facility Overview

. . .

Review Of Need: *Reason for project, alternatives*

. . .

Site and Route Alternatives: *Routing study and fully developed preferred and alternate routes*

. . .

Technical: *Voltage, construction methods, etc.*

. . .

Financial: *Land, construction, facility costs, etc.*

. . .

Socio-Economic: *Impact on land use, residences, etc.*

. . .

Ecological: *Impact on woodlands, wetlands, streams, etc.*

[redacted]

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