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APPLICATION TO THE OHIO POWER SITING BOARD FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED

OPSB CASE NO. 06-1357-EL-BTX

American Municipal Power-Ohio 345 kV Transmission Line October 2007

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Instructions for the Preparation of Certificate Applications for Electric Power, Gas and Natural Gas Transmission Facilities

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4906-15-01 Project summary and facility overview.

(A) An applicant for a certificate to site a major electric power, gas, or natural gas transmission facility shall provide a project summary and overview of the proposed project. In general, the summary should be suitable as a reference for state and local governments and for the public. The summary and overview shall include the following:

(1) A statement explaining the general purpose of the facility.

(2) A description of the proposed facility.

(3) A description of the site or route selection process, including descriptions of the major alternatives considered.

(4) A discussion of the principal environmental and socioeconomic considerations of the preferred and alternate routes or sites.

(5) An explanation of the project schedule (a bar chart is acceptable).

(B) Information filed by the applicant in response to the requirements of this section shall not be deemed responses to any other section of the application requirements.

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4906-15-02 Review of need for proposed project.

(A) The applicant shall provide a statement explaining the need for the proposed facility, including a listing of the factors upon which it relied to reach that conclusion and references to the most recent long-term forecast report (if applicable). The statement shall also include but not be limited to, the following:

(1) A statement of the purpose of the proposed facility.

(2) Specific projections of system conditions or local requirements that impacted the applicant's opinion on the need for the proposed facility.

(3) Relevant load flow studies and contingency analyses, if appropriate, identifying the need for system improvement.

(4) For electric power transmission facilities, one copy of the relevant power flow base case model data, including "East Central Area Reliability Coordination Agreement" equivalents, in "General Electric (Positive Sequence Load Flow), Power Technology Incorporated", or common raw data format on diskette, with appropriate directions to recover data if compressed.

(5) For gas or natural gas transmission projects, one copy in electronic format of the relevant base case system data on diskette, with a description of the analysis program and the data format.

(B) Expansion plans.

(1) For the electric power transmission lines and associated facilities, the applicant shall provide a brief statement of how the proposed facility and site/route alternatives fit into the applicant's most recent long-term electric forecast report and the regional plans for expansion,

including, but not limited to, the following:

(a) Reference to any description of the proposed facility and site/route alternatives in the most recent long-term electric forecast report of the applicant.

(b) If no description was contained in the most recent long-term electric forecast report, an explanation as to why none was filed in the most recent long-term electric forecast report.

(c) Reference to regional expansion plans, including East Central Area Reliability Coordination Agreement bulk power plans, when applicable (if the transmission project will not affect regional plans, the applicant shall so state).

(2) For gas transmission lines and associated facilities, the applicant shall provide a brief statement of how the proposed facility and site/route alternatives fit into the applicant's most recent long-term gas forecast report, including the following:

(a) Reference to any description of the proposed facility and site/route alternatives in the most recent long-term gas forecast report of the applicant.

(b) If no description was contained in the most recent long-term gas forecast report, an explanation as to why none was filed in the most recent long-term gas forecast report.

(C) For electric power transmission facilities, the applicant shall provide an analysis of the impact of the proposed facility on the electric power system economy and reliability. The impact of the proposed facility on all interconnected utility systems shall be evaluated, and all conclusions shall be supported by relevant load flow studies.

(D) For electric power transmission lines, the applicant shall provide an analysis and evaluation of the options considered which would eliminate the need for construction of an electric power transmission line, including electric power generation options and options involving changes to existing and planned electric power transmission substations.

(E) The applicant shall describe why the proposed facility was selected to meet the projected need.

(F) Facility schedule.

(1) Schedule. The applicant shall provide a proposed schedule in bar chart format covering all applicable major activities and milestones, including:

(a) Preparation of the application.

(b) Submittal of the application for certificate.

(c) Issuance of the certificate.

(d) Acquisition of rights-of-way and land rights for the certified facility.

(e) Preparation of the final design.

(f) Construction of the facility.

(g) Placement of the facility in service.

(2) Delays. The applicant shall describe the impact of critical delays on the eventual in-service date.

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4906-15-03 Site and route alternatives analyses

(A) The applicant shall conduct a site and route selection study prior to submitting an application for an electric power transmission line, electric power transmission substation, gas or natural gas transmission line, or a gas compressor station. The study shall be designed to evaluate all practicable sites, routes, and route segments for the proposed facility identified within the project area.

(1) The applicant shall provide the following:

(a) A description of the study area or geographic boundaries selected, including the rationale for the selection.

(b) A map of suitable scale which includes the study area and which depicts the general routes, route segments, and sites which were evaluated.

(c) A comprehensive list of all siting criteria utilized by the applicant, including any quantitative or weighting values assigned to each.

(d) A description of relevant factors or constraints identified by the applicant and utilized in the route and site selection process.

(e) A description of the process by which the applicant utilized the siting criteria to determine the preferred and alternate routes and sites.

(f) A description of the routes and sites selected for evaluation, their final ranking, and the rationale for selecting the preferred and alternate routes and sites.

(g) A description of any qualitative or other factors utilized by the applicant in the selection of the preferred and alternate routes or sites.

(2) The applicant shall provide one copy of any constraint map utilized for the study directly to the board staff for review.

(B) The applicant shall provide a summary table comparing the routes, route segments, and sites, utilizing the technical, financial, environmental, socioeconomic, and other factors identified in the study. Design and equipment alternatives shall be included where the use of such alternatives influenced the siting decision.

(C) The applicant may provide a copy of any route and site selection study produced by or for the applicant for the proposed project as an attachment to the application. The study may be submitted in response to paragraphs (A) and (B) of this rule, provided that the information contained therein is responsive to the requirements of paragraphs (A) and (B) of this rule.

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4906-15-04 Technical data

(A) Site/route alternatives. Information on the location, major features, and the topographic, geologic, and hydrologic suitability of site/route alternatives shall be submitted by the applicant. This information may be derived from the best available reference materials.

(1) Geography and topography. The applicant shall provide map(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of a transmission line alignment, and the area within the immediate vicinity of a substation site or compressor station site,

which shall include the following features:

(a) The proposed transmission line alignments, including proposed turning points.

(b) The proposed substation or compressor station site locations.

(c) Major highway and railroad routes.

(d) Identifiable air transportation facilities, existing or proposed.

(e) Utility corridors.

(f) Proposed permanent access roads.

(g) Lakes, ponds, reservoirs, streams, canals, rivers, and swamps.

(h) Topographic contours.

(i) Soil associations or series.

(j) Population centers and legal boundaries of cities, villages, townships, and counties.

(2) Slope and soil mechanics. The applicant shall:

(a) Provide a brief, but specific description of the soils in the areas depicted on the above map(s) where slopes exceed twelve per cent. This information may be extracted from published sources.

(b) Discuss the rationales as to suitability of the soils for foundation construction.

(B) Layout and construction. The applicant shall provide information on the poposed layout and preparation of route/site alternatives, and the description of the proposed major structures and their installation as detailed below.

(1) Site activities. The applicant shall describe the proposed site clearing, construction methods and reclamation operations, including:

(a) Surveying and soil testing.

(b) Grading and excavation.

(c) Construction of temporary and permanent access roads and trenches.

(d) Stringing of cable and/or laying of pipe.

(e) Removal and disposal of construction debris such as crates, pallets, etc.

(f) Post-construction reclamation.

(2) Layout for associated facilities. The applicant shall:

(a) Provide a map of 1:2,400 scale of the site of major transmission line associated facilities such as substations, compressor stations and other stations, showing the following proposed features:

(i) Final grades after construction, including the site and access roads.

(ii) Proposed location of major structures and buildings.

(iii) Fenced-in or secured areas.

(iv) Estimated overall dimensions.

(b) Describe reasons for the proposed layout and any unusual features.

(c) Describe plans for any future modifications in the proposed layout, including the nature and approximate timing of contemplated changes.

(C) Transmission equipment. The applicant shall provide a description of the proposed transmission lines, as well as switching, capacity, metering, safety and other equipment pertinent to the operation of the proposed electric power and gas transmission lines and associated facilities. Include any provisions for future expansion.

(1) Provide the following data for electric power transmission lines:

(a) Design voltage.

(b) Tower designs, pole structures, conductor size and number per phase, and insulator arrangement.

(c) Base and foundation design.

(d) Cable type and size, where underground.

(e) Other major equipment or special structures.

(2) Provide a description for electric power transmission substations that includes a single-line diagram and a description of the proposed major equipment, such as:

(a) Breakers.

(b) Switchgear.

(c) Bus arrangement and structures.

(d) Transformers.

(e) Control buildings.

(f) Other major equipment.

(3) Provide the following data for gas transmission lines:

(a) Maximum allowable operating pressure.

(b) Pipe material.

(c) Pipe dimensions and specifications.

(d) Other major equipment.

(4) Provide a description of gas transmission facilities such as:

(a) Control buildings.

(b) Heaters, odorizers, and above-ground facilities.

(c) Any other major equipment.

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4906-15-05 Financial data.

(A) Ownership. The applicant shall state the current and proposed ownership status of the proposed facility, including sites, rights-of-way, structures, and equipment. The information shall cover sole and combined ownerships, any leases, options to purchase, or franchises, and shall specify the extent, terms, and conditions of ownership, or other contracts or agreements.

(B) Electric capital costs. The applicant shall submit estimates of applicable capital and intangible costs for the various components of electric power transmission facility alternatives. The data submitted shall be classified according to the federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for the utility companies, 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). The estimates shall include:

(1) Land and land rights.

(2) Structures and improvements.

(3) Substation equipment.

(4) Poles and fixtures.

(5) Towers and fixtures.

(6) Overhead conductors.

(7) Underground conductors and insulation.

(8) Underground-to-overhead conversion equipment.

(9) Right-of-way clearing and roads, trails, or other access.

(C) Gas capital cost. The applicant shall submit estimates of applicable capital and intangible costs for the various components of gas transmission facility alternatives. The data submitted shall be classified according to the federal energy regulatory commission uniform system of accounts prescribed by the public utilities commission of Ohio for utility companies, 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. The estimates shall include:

(1) Land and land rights.

(2) Structures and improvements.

(3) Pipes.

(4) Valves, meters, boosters, regulators, tanks, and other equipment.

(5) Roads, trails, or other access.

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4906-15-06 Socioeconomic and land use impact analysis.

(A) The applicant shall conduct a literature search and map review for the area within one thousand feet on each side of each proposed transmission line centerline and within one thousand feet of the perimeter of each substation or compressor station designed to identify specific land use areas as required in paragraph (B)(3) of this rule. On-site investigations shall be conducted within one hundred feet of each side of each proposed transmission line centerline and within one hundred feet of the perimeter of each substation or compressor station to characterize the potential effects of construction, operation, and maintenance of the proposed facility.

(B) The applicant shall provide, for each of the site/route alternatives and adjacent areas, map(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of a transmission alignment, and the area within the immediate vicinity of a substation site, which map(s) shall include the following features:

(1) Proposed transmission line alignments, including proposed turning points.

(2) Proposed substation or compressor station locations.

(3) General land use within the area, including, but not limited to:

(a) Residential use.

(b) Commercial use.

(c) Industrial use.

(d) Cultural use (as identified in paragraph (F) of this rule).

(e) Agricultural use.

(f) Recreational use.

(g) Institutional use (e.g., schools, hospitals, churches, government facilities, etc.).

(4) Transportation corridors.

(5) Existing utility corridors.

(6) Noise-sensitive areas.

(7) Agricultural land (including agricultural district land) existing at least sixty days prior to submission of the application located within each transmission line right-of-way or within each site boundary.

(C) The applicant shall provide for each of the site/route alternatives, a description of the impact of the proposed facility on each land use identified in paragraph (B)(3) of this rule. As it relates to agricultural land, the evaluation shall include impacts to cultivated land, permanent pasture land, managed wood lots, orchards, nurseries, and agricultural-related structures.

(1) Construction: The applicant shall estimate the probable impact of the proposed facility on each land use (including: (a) buildings that will be destroyed, acquired, or removed as the result of the planned facility and criteria for owner compensation; and (b) field operations [such as plowing, planting, cultivating, spraying, and harvesting], irrigation, and field drainage systems).

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility on each land use.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during the construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize impact to land use, such as effects on subsurface field drainage systems.

(D) The applicant shall provide the following public interaction information for each of the site/route alternatives:

(1) A list of counties, townships, villages, and cities within one thousand feet on each side of the centerline or facility perimeter.

(2) A list of the public officials contacted regarding the application, their office addresses, and office telephone numbers.

(3) A description of the program or company/public interaction planned for the siting, construction, and operation of the proposed facility, i.e. public information programs.

(4) A description of any insurance or other corporate program, if any, for providing liability compensation for damages, if such should occur, to the public resulting from construction or operation of the proposed facility.

(5) A description of how the facility will serve the public interest, convenience, and necessity.

(6) An estimate of the increase in tax revenues as a result of facility placement.

(7) A description of the impact of the facility on regional development, referring to pertinent formally adopted regional development plans.

(E) The applicant shall provide the following health, safety, and aesthetic information for each site/route alternative:

(1) The applicant shall provide a description of how the facility will be constructed, operated, and maintained to comply with the requirements of applicable state and federal statutes and regulations, including the 2002 edition of the "National Electrical Safety Code", applicable occupational safety and health administration regulations, U.S. department of transportation gas pipeline safety standards, and

Chapter 4901:1-16 of the Administrative Code.

(2) For electric power transmission facilities, the applicant shall discuss the production of electric and magnetic fields during operation of the preferred and alternate site/route. If more than one conductor configuration is to be used on the proposed facility, information shall be provided for each configuration that constitutes more than ten per cent of the total line length, or more than one mile of the total line length being certificated. Where an alternate structure design is submitted, information shall also be provided on the alternate structure. The discussion shall include:

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

(i) Winter normal conductor rating.

(ii) Emergency line loading.

(iii) Normal maximum loading.
Provide corresponding current flows, conductor ground clearance for normal maximum loading and distance from the centerline to the edge of the right-of-way. Estimates shall be made for minimum conductor height. The applicant shall also provide typical cross-section profiles of the calculated electric and magnetic field strength levels at the normal maximum loading conditions.

(b) References to the current state of knowledge concerning possible health effects of exposure to electric and magnetic field strength levels.

(c) Description of the company's consideration of electric and magnetic field strength levels, both as a general company policy and specifically in the design and siting of the transmission line project including: alternate conductor configurations and phasing, tower height, corridor location and right-of-way width.

(d) Description of the company's current procedures for addressing public inquiries regarding electric and magnetic field strength levels, including copies of informational materials and company procedures for customer electric and magnetic field strength level readings.

(3) The applicant shall discuss the aesthetic impact of the proposed facility with reference to plans and sketches, including the following:

(a) The views of the proposed facility from such sensitive vantage points as residential areas, lookout points, scenic highways, and waterways.

(b) Structure design features, as appropriate.

(c) How the proposed facility will likely affect the aesthetic quality of the site and surrounding area.

(d) Measures that will be taken to minimize any visual impacts created by the proposed facility.

(4) For electric power transmission facilities, the applicant shall provide an estimate of the level of radio and television interference from operation of the proposed facility, identify the most severely impacted

areas, if any, and discuss methods of mitigation.

(F) The applicant shall provide, for each of the site/route alternatives, a description of the impact of the proposed facility on cultural resources. This description shall include potential and identified recreational areas and those districts, sites, buildings, structures, and objects which are recognized by, registered with, or identified as eligible for registration by the Ohio historical society or the Ohio department of natural resources. It shall include but not be limited to the following:

(1) Location studies: The applicant shall describe studies used to determine the location of cultural resources within the study corridor. Correspondence with the Ohio historical preservation office shall be included.

(2) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on cultural resources.

(3) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility on cultural resources.

(4) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during the operation and maintenance of the proposed facility to minimize impact to cultural resources.

(G) The applicant shall submit data and related information on noise emissions generated by the proposed transmission line and associated facilities. Construction noise information shall be submitted for only those portions of transmission line routes requiring more than four months of actual construction time to complete in residential, commercial, and other noise-sensitive areas.

(1) Construction: To assure noise control during construction, the applicant shall estimate the nature of any intermittent, recurring, or particularly annoying sounds from the following sources:

(a) Dynamiting or blasting activities.

(b) Operation of earth moving and excavating equipment.

(c) Driving of piles.

(d) Erection of structures.

(e) Truck traffic.

(f) Installation of equipment.

(2) Operation and maintenance: The applicant shall estimate the effect of noise generation due to the operation or maintenance of the transmission line and associated facilities.

(3) Mitigation procedures: The applicant shall describe any equipment and procedures designed to mitigate noise emissions during both the site clearing and construction phase, and during the operation and maintenance of the facility to minimize noise impact.

(H) The applicant shall provide site-specific information that may be required in a particular case to adequately describe other significant issues of concern that were not addressed above. The applicant shall describe measures that were taken and/or will be taken to avoid or minimize adverse impact. The applicant shall describe public safety-related equipment and procedures that were and/or will be taken.

Effective: 12/15/2003
119.032 review dates: 09/30/2003, 09/30/2008
Promulgated Under: 111.15
Statutory Authority: 4906.03
Rule Amplifies: 4906.06, 4906.03
Prior Effective Dates: 10/10/78, 6/5/93, 8/28/98

4906-15-07 <u>Ecological impact analysis.</u>

(A) The applicant shall provide a summary of any studies that have been made by or for the applicant on the natural environment in which the proposed facility will be located. The applicant shall conduct and report the results of a literature search, including map review, for the area within one thousand feet on each side of a transmission line alignment and the area within the immediate vicinity of a substation or compressor station site. On-site investigations shall be conducted within one hundred feet on each side of a transmission line centerline or within one hundred feet of a substation or compressor station site to characterize the potential effects of construction, operation, or maintenance of the proposed facility.

(B) The applicant shall provide for each of the site/route alternatives a map(s) of not less than 1:24,000 scale, including the area one thousand feet on each side of the transmission line alignment and the area within the immediate vicinity of a substation site or compressor station site. The map(s) shall include the following:

(1) Proposed transmission line alignments.

(2) Proposed substation or compressor station locations.

(3) All areas currently not developed for agricultural, residential, commercial, industrial, institutional, or cultural purposes including:

(a) Streams and drainage channels.

(b) Lakes, ponds, and reservoirs.

(c) Marshes, swamps, and other wetlands.

(d) Woody and herbaceous vegetation land.

(e) Locations of threatened or endangered species.

(4) Soil associations in the corridor.

(C) The applicant shall provide for each of the site/route alternatives a description of each stream or body of water (and associated characteristics including floodplain) that is present and may be affected by the proposed facility, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on streams and bodies of water. This shall include the impacts from route clearing.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on streams and bodies of water. This shall include the permanent impacts from route clearing.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on streams and bodies of water.

(D) The applicant shall provide for each of the site/route alternatives a description of each wetland that is present and may be affected by the proposed facility. The applicant shall describe the probable impact on these wetlands, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on wetlands and wildlife habitat.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on wetlands and wildlife habitat. This would include the permanent impacts from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility

and during the operation and maintenance of the proposed facility to minimize the impact on wetlands and wildlife habitat.

(E) The applicant shall provide for each of the site/route alternatives a description of the naturally occurring vegetation that is present and may be affected by the proposed facility. The applicant shall describe the probable impact to the environment from the clearing and disposal of this vegetation, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on the vegetation. This would include the impacts from route clearing, types of vegetation waste generated, and the method of disposal or dispersal.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on species described above. This would include the permanent impact from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on species described above.

(F) The applicant shall provide for each of the site/route alternatives a description of each major species of commercial or recreational value and species designated as endangered or threatened, in accordance with U.S. and Ohio species lists, that is present and may be affected. The applicant shall describe the probable impact to the habitat of the species described above, including but not limited to the following:

(1) Construction: The applicant shall estimate the probable impact of the construction of the proposed facility on commercial, recreational, threatened, or endangered species. This would include the impacts from route clearing and any impact to natural nesting areas.

(2) Operation and maintenance: The applicant shall estimate the probable impact of the operation and maintenance of the proposed facility after construction on species described above. This would include the permanent impact from route clearing and any impact to natural nesting areas.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during the operation and maintenance of the proposed facility to minimize the impact on species described above.

(G) The applicant shall provide for each of the site/route alternatives a description of the areas with slopes and/or highly erodible soils (according to the natural resource conservation service and county soil surveys) that are present and may be affected by the proposed facility. The applicant shall describe the probable impact to these areas, including but not limited to the following:

(1) Construction: The applicant shall provide a description of the measures that will be taken to avoid or minimize erosion and sedimentation during the site clearing, access road construction, facility construction process, and any other temporary grading. If a storm water pollution prevention plan is required for the proposed facility, the applicant shall include the schedule for the preparation of this plan.

(2) Operation and maintenance: The applicant shall describe and estimate the probable impact of the operation and maintenance of the proposed facility after construction on the environment. This would include

permanent impacts from sites where grading has taken place.

(3) Mitigation procedures: The applicant shall describe the mitigation procedures to be used during construction of the proposed facility and during operation and maintenance of the proposed facility to minimize the impact on the environment due to erosion from storm water run-off.

(H) The applicant shall provide site-specific information that may be required in this particular case to adequately describe other significant issues of concern that were not addressed above. The applicant shall describe measures that were taken and/or will be taken to avoid or minimize adverse impacts. The applicant shall describe public safety-related equipment and procedures that were and/or will be taken.

Effective: 12/15/2003
119.032 review dates: 09/30/2003, 09/30/2008
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Prior Effective Dates: 10/10/78, 3/20/87, 8/28/98

(A) Project Summary and Facility Overview

(1) Statement of General Purpose of the Proposed Facility

On behalf of its members and project partners, American Municipal Power-Ohio, Inc. ("Applicant" or "AMP-Ohio") requests a Certificate of Environmental Compatibility and Public Need from the Ohio Power Siting Board ("OPSB") for the construction of an approximately 5-mile long 345 kilovolt ("kV") transmission line and related facilities ("transmission project") necessary to transmit the electricity generated by a proposed 960 Megawatt ("MW") net electric generation facility, consisting of two 480 MW net electric generating units, to be built on a footprint of approximately 1,000 acres in the vicinity of Letart Falls, Meigs County, Ohio. To honor its public power function, the proposed generation facility is named the American Municipal Power Generating Station ("AMPGS").[1] The transmission project is an inextricable component of the AMPGS project, and is not being undertaken on a stand-alone basis.

The AMPGS and transmission project are being undertaken because the public power members of AMP-Ohio and its project partners, Virginia's Blue Ridge Power Agency ("BRPA") and the Michigan South Central Power Agency ("MSCPA"), need base load electric generation to serve the energy demands of more than 500,000 customers of the 92 public power systems that are participating in the development of the AMPGS (the "Participating Members"). A substantial majority (75) of these Participating Members are Ohio communities. As noted above, the 345 kV transmission project is necessary to carry the generation output of the AMPGS. The transmission project will consist of an approximately 5-mile long, double circuit 345 kV transmission line, with a right-of-way ("ROW") of 150 feet. The transmission project will begin at the AMPGS and will interconnect with the existing 345 kV Sporn-Muskingum River transmission line located approximately 3.5 miles north of the AMPGS. The 345 kV Sporn-Muskingum River transmission line is the closest existing facility located in Ohio that is suitable for interconnection and delivery of the AMPGS's output to the grid.

AMP-Ohio, headquartered in Columbus, Ohio, is a nonprofit wholesale power supplier and services provider for 121 municipal electric systems, 81 of which are located in Ohio, 27 in Pennsylvania, 7 in Michigan, 4 in Virginia, and 2 in West Virginia. Formed in 1971, AMP-Ohio is governed by a 16-member board of trustees that represents AMP-

[1] The AMPGS application to the OPSB is docketed in Case No. 06-1358-EL-BGN.

Ohio's member communities. AMP-Ohio's members are political subdivisions of their respective states and own and operate municipal electric utilities. AMP-Ohio, along with its member communities, has a proven power project development record, including coal, natural gas, hydro, wind, solar, and landfill gas electric generation projects, as well as distributive generation and demand side management projects.[2] BRPA's membership consists of 11 public power systems in Virginia, and MSCPA has 5 public power system members in Michigan.

Difficult supply availability in wholesale power markets, constrained transmission access, and volatile prices are adversely and materially impacting AMP-Ohio's ability to provide its members with a reliable, cost-effective, and cost-predictable power supply. An in-depth analysis of AMP-Ohio's long-term forecast for power supply requirements, general load growth, long-term power purchase arrangements, generation projects by other parties, and the need for more environmentally-friendly generation, reveals a critical undersupply of asset-based electric generation to supply the needs of AMP-Ohio's members. Thus, to secure reliable power supplies for its members' and their customers, AMP-Ohio and its Participating Members have determined that it serves its members' best interests to develop the AMPGS.[3] Thus, it became necessary to develop the transmission project to carry the AMPGS's generation output.

As noted above, the AMPGS will serve a portion of the generation needs of AMP-Ohio's members, and the members of its project partners, BRPA and MSCPA. The substantial

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[2] AMP-Ohio supplies its member municipal utilities with power from a diversified resource mix, including assets owned by AMP-Ohio and managed by AMP-Ohio on behalf of asset-owning members. This resource mix includes energy produced at AMP-Ohio's 213 MW coal-fired Richard H. Gorsuch Station ("RHGS") in Marietta, Ohio; 334 MW of natural gas and diesel fired distributive generation facilities; the 42 MW Belleville Hydroelectric facility; the 7.2 MW American Municipal Power/Green Mountain Energy Wind farm located near Bowling Green; and, wholesale market power purchases and bilateral contracts. However, AMP-Ohio and its members self-generate only approximately 15% of their wholesale energy supplies, while approximately 85% of their energy needs are purchased in the marketplace. Moreover, concurrently with the proposed in-service date for the AMPGS, AMP-Ohio plans to retire or re-power RHGS. AMP-Ohio has issued a Solicitation for Interest ("SOI") seeking, among other things, partners and proposals to re-power RHGS with emerging, innovative, and environmentally-responsible generation technology.

[3] AMP-Ohio and its Participating Members will develop the AMPGS as part of a diversified mix of additional asset-based electric generation, which includes approximately 250 MW of hydroelectric capacity to be constructed on existing locks and dams on the Ohio River, and approximately 50 MW of additional wind power generation in Ohio and Pennsylvania. AMP-Ohio is also exploring other cogeneration projects, as well as participating in projects being developed by third-parties. For example, AMP-Ohio has recently concluded negotiations for an additional 22 MW of landfill gas generation. Additionally, AMP-Ohio and its members have been at the forefront of the Ohio electric industry innovation, including solar and fuel cell generation, mercury removal programs, and numerous demand side management and other conservation programs, including replacing to date over twenty-five thousand incandescent light bulbs with free or discounted priced compact fluorescents, as well as direct control of water heaters, and air conditioning.

majority of the electricity generated by the AMPGS will serve the needs of Ohio consumers. Of the 960 MW net output of the AMPGS, 794 MW is currently reserved or dedicated for 75 of AMP-Ohio's members located in Ohio, 4 MW to one AMP-Ohio member located in West Virginia, 10 MW to two AMP-Ohio members located in Pennsylvania, 50 MW to MSCPA's members, and 100 MW to BRPA's members. Consistent with AMP-Ohio's established record of environmental stewardship, the AMPGS will be designed to meet the latest environmental control and emissions requirements. Furthermore, AMP-Ohio will also construct the transmission project in a manner that minimizes impacts to the environment and land use.

(2) Description of the Proposed Facility

As noted above, the 345 kV transmission project is necessary to carry the generation output of the AMPGS. The transmission project will consist of an approximately 5-mile long, double circuit 345 kV transmission line, with a ROW width of 150 feet. The transmission project will begin at the AMPGS, located in Meigs County, Ohio, and will interconnect with the existing 345 kV Sporn-Muskingum River transmission line located approximately 3.5 miles north of the AMPGS. The 345 kV Sporn-Muskingum River transmission line is the closest existing facility located in Ohio that is suitable for interconnection and delivery of the AMPGS's output to the grid. The transmission project will be constructed using monopole structures, which have a relatively small visual impact.

Additional details of the facilities comprising of the transmission project are discussed in response to OAC 4906-15-04.

(3) Description of Route Selection Process and Major Alternatives Considered

As part of developing the AMPGS project, and based on the selected site for the AMPGS,[4] AMP-Ohio prepared a route selection report to evaluate route alternatives for the transmission project necessary to interconnect the AMPGS with the electrical grid. The route selection study for the transmission project is provided as Appendix 03-1. The attached route selection study contains a description of the route selection process, including the description of the other routes identified as alternatives to the proposed Preferred and Alternate Routes for the transmission project.

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[4] Further information relating to the site selection process for the AMPGS is available as part of the AMPGS application to the OPSB. *See* Case No. 06-1358-EL-BGN.

In accordance with applicable rules, AMP-Ohio identified two viable routes for the transmission project, designated as the Preferred and Alternate Routes.[5] Among the viable routes, the Preferred Route achieves the most reasonable balance of environmental and socio-economic considerations, maintaining acceptable construction and operation costs, and satisfying safety and technical considerations. After considering major routing criteria and applicable factors, the Preferred Route was chosen. AMP-Ohio believes it achieves the best balance of (i) minimizing proximity to residences and other sensitive land uses (e.g., schools, churches, cemeteries); (ii) maximizing use of existing linear corridors by, for example, following an existing transmission line as much as possible; (iii) minimizing public road crossings; (iv) minimizing perennial stream crossings; and (v) minimizing clear views of the line from potential viewers, such as residential concentrations, while satisfying acceptable cost, construction, operational, and maintenance considerations.

In general, the Preferred Route is superior to the Alternate Route for socio-economic, aesthetic, and land development reasons. Although the Preferred and Alternate Routes share certain characteristics, the Alternate Route is less desirable than the Preferred Route because of the factors listed above, and because the Alternate Route will pass through areas of active residential development along the bluffs overlooking the Ohio River. The Preferred Route will significantly minimize conflicts with future residential developments and related population concentrations. Similarly, although the Preferred Route is approximately 3,700 feet longer than the Alternate Route, it will have a lesser impact on land use for residential and development purposes because it travels a greater distance along an existing transmission line (approximately 5,100 feet for the Preferred Route, versus approximately 800 feet for the Alternate Route).

To connect the AMPGS to the electric grid, the proposed transmission line will connect to the nearest suitable transmission line located in Ohio, which is an existing 345 kV Sporn-Muskingum River transmission line operated by American Electric Power ("AEP") that passes southeast to northwest approximately 3.5 miles north of the selected site for the AMPGS in Meigs County. The Preferred Route will be sited through Letart and Sutton Townships and interconnect with the existing 345 kV Sporn-Muskingum River line at a new switchyard located south of Racine, Ohio. The Preferred Route traverses primarily through undeveloped land, and will include a 150-foot wide ROW, with no existing residences or sensitive properties located within 250 feet from the centerline.

[5] The proposed Preferred and Alternate Routes meet OAC 4906-5-04(A)'s requirement that the two routes not be common by more that twenty percent.

The transmission project, whether with the Preferred or Alternate Route, will interconnect with the 345 kV Sporn-Muskingum River line south of Racine, Ohio, in an area with relatively flat, high ground that is suitable for the construction of a switchyard for interconnection purposes. The existing 138 kV Sporn-Kaiser No. 1 line crosses the 345 kV Sporn-Muskingum River line proximate to the area where AMP-Ohio will locate its interconnection switchyard. From the switchyard, the Preferred Route parallels the north side of the 138 kV Sporn-Kaiser No. 1 line to the southeast, then proceeds south through forested hills, then turns southwest and west to enter the AMPGS site. Paralleling the 138 kV Sporn-Kaiser No. 1 line avoids areas of active and potential residential development along the bluffs overlooking the Ohio River and requires the fewest public road crossings. Alternatively, from the interconnection switchyard the Alternate Route parallels the 138 kV Sporn-Kaiser No. 1 line for a shorter distance and lacks some of the benefits associated with the Preferred Route.

Additional details regarding the Preferred and Alternate Routes, as well as the route selection process, are provided in response to OAC 4906-15-03.

(4) Principal Environmental and Socioeconomic Considerations

AMP-Ohio performed a general socioeconomic and environmental survey of the proposed Preferred and Alternate Routes and related study area to evaluate the construction and operation of the transmission project. This included field surveys, preparation of land use maps, review of current population estimates and projections for the area, and an assessment of the project's compatibility with local and regional development plans. AMP-Ohio used this information to assess the selection of the routes, construction and operation of the transmission facilities along the proposed routes, and the potential social and economic impacts of the proposed project on the surrounding communities. Based on a review of available land use plans and contacts with local agencies, the transmission project is consistent and compatible with local and regional development projects. Further, existing land use is not expected to be significantly altered by the project as proposed. Additional land use and impact information is discussed in response to OAC 4906-15-06.

Independently, and as an essential component of the AMPGS project, the transmission project will have positive impacts on local commercial and industrial activities. To the extent reasonable and available, the local region will supply equipment and materials for the construction and operation of the AMPGS and the transmission project. Further, local businesses will benefit from the expenditures of construction personnel for locally-supplied goods and services. AMP-Ohio commissioned an economic impact study that demonstrates the significant economic benefits to the local and surrounding communities relating to the construction and operation of the AMPGS, which included the economic impact of the transmission project as a necessary component of the overall AMPGS project. This economic impact study is confidential and proprietary; however, it will be available for review by OPSB Staff upon request at the offices of Chester Willcox & Saxbe LLP ("CWS") in Columbus, Ohio.

AMP-Ohio performed ecological studies for the proposed routes, as set forth in Appendix 07-1. The studies included analysis of published literature, maps, and a field survey to assess the presence of plant and animal species, wetlands, and streams located along the project route. Ecological findings are discussed in response to OAC 4906-15-07. Moreover, AMP-Ohio anticipates no impacts on cultural resources as a consequence of this project.

(5) Project Schedule Summary

The projected schedule for construction and operation of the AMPGS, and therefore, the transmission project, is as follows:

- Public Information Meeting: December 2006.
- Docket application with the OPSB: October 2007.
- Obtain OPSB Approval and Certification: No later than May 2008.
- Design, Engineering, Procurement, and Construction Activities: 2008 – 2013.
- AMPGS Commercial Operation: Unit 1 and Unit 2 operational – 2013.

Further details regarding the schedule for the construction and operation of the transmission project are provided in response to OAC 4906-15-02(F).

OAC 4906-15-02 REVIEW OF NEED FOR PROPOSED PROJECT

(A) Statement of Need

The transmission project is necessary to carry generation output of the AMPGS.[1] The transmission project cannot exist as a stand-alone project since it is inextricably required to connect the AMPGS to its customers.

(1) Purpose of the Proposed Facility

The transmission project, consisting of an approximately 5-mile long 345 kV transmission line and related facilities, is necessary to transmit the electricity generated by the 960 MW net AMPGS generating facility proposed to be built in the vicinity of Letart Falls, Meigs County, Ohio. More specifically, as noted in response to OAC 4906-15-01, the AMPGS and the transmission project are being undertaken because the public power members of AMP-Ohio and its project partners (BRPA and MSCPA) need baseload electric generation to serve the energy demands of more than 500,000 customers of the 92 public power systems that are participating in the development of the AMPGS, a substantial majority (75) of which are Ohio communities. In short, the 345 kV transmission project is necessary to carry the generation output of the AMPGS.

(2) Projections of System Conditions and Local Requirements Impacting Need

As noted above, the transmission project is an inextricable component of the AMPGS project for the purpose of delivering the AMPGS's output. The transmission project is not being undertaken on a stand-alone basis, such as to improve the electrical grid, relieve congestion, or otherwise expand in response to system conditions or local transmission system requirements.

(3) Relevant Load Flow Studies and Contingency Analyses, if Appropriate, Identifying the Need for System Improvement

Not applicable. See above response to OAC 4906-15-02(A)(2).

(4) Base Case Model Data

The base case will be provided as a supplement under a separate cover to the OPSB Staff. Additionally, the feasibility and system impact studies performed by PJM Interconnection ("PJM"), the Regional Transmission Organization ("RTO") relevant to the transmission project, are attached hereto as Appendix 02-1 and 02-2 respectively.

[1] The AMPGS application to the OPSB is docketed in Case No. 06-1358-EL-BGN.

(5) Base Case Data for Natural Gas Transmission Line

Not applicable; not a gas or natural gas transmission project.

(B) <u>Expansion Plans</u>

(1) Long-Term Forecast

AMP-Ohio is not a public utility regulated by the Public Utilities Commission of Ohio. AMP-Ohio is neither required to, nor does, prepare long-term electric forecast reports or regional plans for expansion of transmission facilities. Moreover, as discussed above, the transmission project is not being proposed due to a need to improve existing transmission infrastructure in response to local or regional conditions, nor transmission system expansion plans to accommodate actual or forecasted transmission load growth. The transmission project is necessary to carry the generation output of the proposed AMPGS. See also above response to OAC 4906-15-02(A)(2) and (4).

(2) Gas Transmission Lines and Associated Facilities

Not applicable, not a gas or natural gas transmission project.

(C) <u>System Economy and Reliability</u>

System impacts studies are being performed by PJM, the RTO relevant to the transmission project . Feasibility and impact studies are attached hereto as Appendix 02-1 and 02-2.

(D) <u>Options to Eliminate the Need for the Proposed Project</u>

Unlike the proposed construction of a transmission facility to supplement the transmission capacity for a load center, and which could potentially be offset by conservation, load reduction, alternative transmission upgrades, or other electric generation option, this transmission project is being necessitated by the construction of a new electric generating station, the AMPGS. In particular, the transmission project is necessary to transmit the electricity that will be generated by the AMPGS, which, as noted in response to OAC 4906-15-01, will be a new 960 MW net electric generating facility. The closest feasible transmission facility located in Ohio is the 345 kV Sporn-Muskingum River transmission line located approximately 3.5 miles north of the AMPGS. The transmission project will connect the AMPGS to the 345 kV Sporn-Muskingum River transmission line. Accordingly, there are no options available that would eliminate the need to develop the transmission project.

(E) <u>Facility Rationale</u>

See above response to OAC 4906-15-02(D).

(F) Facility Schedule

(1) Schedule

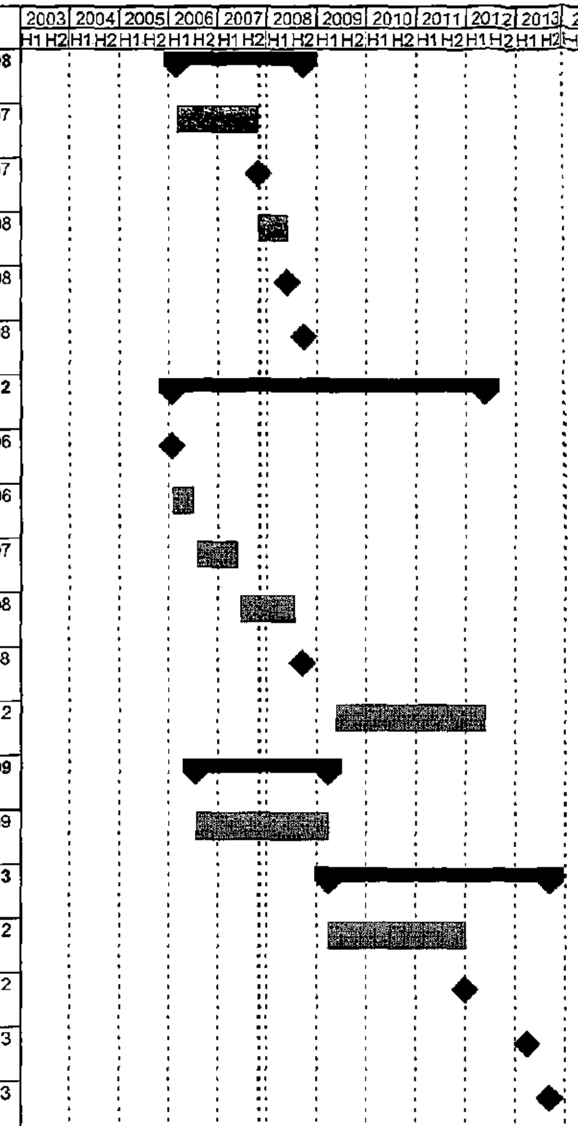
The proposed schedule for the construction and operation of the transmission project is set forth in Figure 02-1.

(2) Impact of Delays

The AMPGS will supply the single largest portion of AMP-Ohio's generation supplies for its members' power supply needs, replacing energy purchased from the market and AMP-Ohio's existing Richard H. Gorsuch Station. The electricity generated by the AMPGS cannot be delivered without the completion of the transmission project. Therefore, significant or critical delays in the development of the transmission project are expected to have material, adverse effects on the ability of AMP-Ohio's members to provide predictably priced and reliable power supplies to their customers starting in 2013, which is when the AMPGS is scheduled to begin operation. Delays also would require AMP-Ohio to continue reliance on older, less efficient, and less environmentally desirable generation facilities. Finally, delays would most certainly drive up the cost of the project.

American Municipal Power Generating Station Transmission Line Project (October 30, 2007)

ID	Task Name	Start	Finish
1	**OPSB Transmission Certification**	**Wed 3/8/06**	**Wed 10/1/08**
2	Application Preparation	Wed 3/8/06	Wed 10/31/07
3	*Submit Application to OPSB*	Wed 10/31/07	Wed 10/31/07
4	*Application Review*	Thu 11/1/07	Fri 5/30/08
5	Certificate Issued	Fri 5/30/08	Fri 5/30/08
6	Approval to Construct	Wed 10/1/08	Wed 10/1/08
7	**PJM Interconnection**	**Tue 1/31/06**	**Mon 5/28/12**
8	Transmission Interconnection Request Submittal	Tue 1/31/06	Tue 1/31/06
9	Interconnection Feasability Study	Fri 2/3/06	Fri 7/7/06
10	Interconnection Systerm Impact Study by PJM	Mon 8/7/06	Thu 5/31/07
11	Interconnection Facilities Study	Mon 7/2/07	Mon 7/28/08
12	Executed Interconnection Agreement	Wed 9/24/08	Wed 9/24/08
13	PJM System Upgrades	*Wed 5/27/09*	*Mon 5/28/12*
14	**Land Acquisition and Right of Way Easements**	***Thu 7/27/06***	***Wed 4/1/09***
15	Acquire Right of Way Options and Easements	Thu 7/27/06	Wed 4/1/09
16	**Project Milestones**	**Wed 4/1/09**	**Tue 9/17/13**
17	*Design Engineering, Procurement and Construction of Transmission Line and Interconnect*	Wed 4/1/09	Tue 1/3/12
18	Electrical Backfeed to Generating Station	Tue 1/3/12	Tue 1/3/12
19	Commercial Operation AMPGS Unit 1	Tue 4/2/13	Tue 4/2/13
20	Commercial Operation AMPGS Unit 2	Tue 9/17/13	Tue 9/17/13



All dates beyond the date below are estimates

Date: Wed 10/31/07

Task | Progress | Milestone | *Summary*

Rolled Up Task | Rolled Up Milestone | Rolled Up Progress | Split

External Tasks | Project Summary | Group By Summary | Deadline

AMP-Ohio

Figure 02-1
Page 1 of 1

APPENDIX 02-1

FEASIBILITY STUDY

PJM Generator Interconnection Request Queue #P54 Sporn-Waterford 345kV Feasibility Study

376382
June 2006

Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

Sporn-Waterford 345kV P54 Feasibility Study Report

General

American Municipal Power-Ohio, Inc. (AMP Ohio) proposes to install PJM Project #P54, a 1035 MW (net) generating facility comprised of two (2) pulverized coal units. The proposed generating facility site is located in Racine, Meigs County, Ohio. Two different connection point options have been requested for study. The first is a connection point on the Sporn–N42 345 kV line. The second is a connection point on the Sporn-Amos and Sporn-Kanawha River 345 kV tower circuits. For both of these cases, it is assumed AMP Ohio will provide a new graded station site at or near the above mentioned existing AEP owned 345 kV tower lines. The project is scheduled in-service May 1, 2012.

*The estimates below are preliminary in nature and based in 2006 dollars, as they were determined without detailed engineering and design studies. Final estimates will require detailed engineering analysis, including on-site review and coordination with the Interconnection Customer to determine final construction requirements. It will take approximately 36 months after obtaining the authorization to construct the facilities as outlined above excluding any potential issues related to acquiring required right-of-way or station site.

Direct Connection

Option #1: Tapping into the Sporn-N42 345 kV line (See Exhibit marked "AMP Ohio 345 kV IPP Plan A")

AMP Ohio has requested tapping into the Sporn–N42 345 kV line as a first option for connecting their generating facility to the AEP system. The proposed plan is for AEP to build a 345 kV station near the Sporn – N42 345 kV line on a site provided by AMP-Ohio. AMP-Ohio will be responsible for constructing the 345 kV line required to connect the generating plant to the new 345 kV station to be built beside the Sporn–N42 345 kV line.

Direct Connection Costs:

Construct a new 345 kV station (AMP-Ohio Station) near the Sporn--N42 345 kV line including: three (3) 345 kV circuit breakers in a breaker and a half configuration, line disconnect switches, 345 kV line traps, 345 kV CCVTs, and 345 kV metering on the AMP Ohio line, 345 kV line surge arresters, breaker control and line relaying for the station and all lines coming into the station and station service equipment. A graded station site is to be provided by AMP-Ohio.

Estimated Cost*　　　　$8,800,000

Option #2: Tapping into the Sporn-Amos and Sporn-Kanawha River 345 kV tower circuits (See Exhibit marked "AMP Ohio 345 kV IPP Plan B")

AMP-Ohio has requested tapping into the Sporn-Amos and Sporn-Kanawha River 345 kV tower circuit as a second option for connecting their generating facility to the AEP system. The proposed plan is for AEP to build a 345 kV station near the Sporn-Amos and Sporn-Kanawha

River 345 kV tower circuits on a site provided by AMP-Ohio. AMP-Ohio will be responsible for constructing the 345 kV line required to connect the generating plant to the new 345 kV station to be built beside the Sporn-Amos and Sporn-Kanawha River 345 kV tower circuits.

Direct Connection Costs:

Construct a new 345 kV station (AMP-Ohio Station) near the Sporn-Amos and Sporn-Kanawha River 345 kV tower circuits including: eight (8) 345 kV circuit breakers in a breaker and a half configuration, line disconnect switches, 345 kV line traps, 345 kV CCVTs, 345 kV metering on both of AMP Ohio's lines, 345 kV line surge arresters, breaker control and line relaying for the station and all lines coming into the station and station service equipment. A graded station site is to be provided by AMP Ohio.

Estimated Cost* **$ 14,100,000**

Network Impacts

The #P54 project was studied as a 1035 MW capacity resource at two distinct points of interconnection in the AEP system. Option #1 considers the injection to be a tap of the Sporn-N42 345 kV line, while Option #2 considers it to be a tap of the Amos-Sporn and Sporn-Kanawha River 345 kV tower circuit. Project #P54 was evaluated for compliance with reliability criteria for summer peak conditions in 2010. Potential network impacts were as follows:

Option 1: Tapping into the Sporn-N42 345 kV line:

Generator Deliverability

1. The Muskingum-Ohio Central 345 kV line loads to 107% of its normal rating (972 MVA) for N-0 conditions. Project #P54 contributes approximately 61 MW to cause this overload.
2. The Poston to Eliot 138 kV line loads to 100% of its emergency rating (301 MVA) for the outage of the Muskingum-Waterford 345 kV line. The #P54 contributes approximately 26 MW to cause this overload.
3. The Sporn-P54 345 line loads to 129% of its emergency rating (1918 MVA) for the outage of the Muskingum-Waterford 345 kV line for loss of the Muskingum-Waterford 345 kV line. The #P54 contributes approximately 1030 MW to cause this overload.

Multiple Facility Contingency

No identified problems

Normal System

4. The Waterford – Muskingum River 345 kV line overloads under an N-0 condition. The limiting elements of this line are approximately 1 mile of conductor and the line risers at Muskingum.
5. The Sporn A-Rutland 138kV line overloads under N-0 conditions to 101% of its normal rating (297 MVA). The P54 project contributes approximately 17 MW to cause this overload.

Single Contingency

6. The Waterford – Muskingum River 345 kV line also overloads under an N-1 condition for an outage of the Sporn – AMP Ohio Station 345 kV line.

Short Circuit

No problems identified

Contribution to Previously Identified Overloads

1. Contribution of 124 MW to further overload the Harrison-Prunty Town 500 kV line, which was originally caused by the #O69 project for outage of the 500 kV line from the G30_W51 to Ft. Martin.
2. Contribution of 115 MW to further overload the Kammer 765/500 kV transformer previously caused by the N42 project for loss of the Harrison to Belmont 500 kV line.
3. Contribution of 411 MW to further overload the Waterford-Muskingum 345 kV. The overload was originally caused by the N42 for N-0 conditions
4. Contribution of 13 MW to further overload the Mahans Lane-Tidd 138 kV line previously identified as a base case overload for the Tidd-Collier 345 kV tower circuit outage. The corresponding network upgrades are being prepared by APS.

New System Reinforcements

1. The overload of the Muskingum – Ohio Central 345 kV line under an N-0 condition can be alleviated by replacing the 1600A line switch, the line's service entrance conductor, a bus and risers with higher rated equipment. The Estimated Cost* to do this work is **$1,300,000.**

2. The overload of the Poston – Elliot 138 kV line can be alleviated by rebuilding the line with 7.2 miles of higher rating conductors, replacing a 1200A circuit breaker, a 1200A wave-trap, bus conductors & line risers at Poston substation. The Estimated Cost* to do this work is **$10,200,000.**

3. The overload of the Sporn-P54 345 kV can be alleviated by reconductoring approximately 2.2 miles of the existing 6-wire line. The Estimated Cost* to reconductor the line is **$5,600,000.**

4. The normal system overload on the Waterford-Muskingum 345kV circuit can be alleviated by reconductoring approximately 1 mile of the circuit out of Waterford and changing line risers at Muskingum. (Upgrade # n0479) This upgrade originally defined for the N42 project. These changes can be accomplished prior to May 2010. The estimated cost is **$1.2 million.**

5. The overload on the Sporn A-Rutland 138kV line can be alleviated by replacing the service entrance line. The Estimated Cost* to replace the service entrance line is **$900,000.**

6. The single contingency overload on the Waterford-Muskingum 345kV circuit can be alleviated by reconductoring an additional 5 miles of the existing line. The estimated cost for the additional reconductoring is **$12,500,000**.

Fixes for Contribution to Previously Identified System Reinforcements

1. The Harrison-Pruntytown 500kV line overload can be alleviated by construction of a second 500kV line between Fort Martin SS and the proposed North Longview SS and additions at Fort Martin and North Longview Switching Stations.

Second Fort Martin - North Longview 500kV line. Install a 1.5 mile 500kV line consisting of 8 structures between Fort Martin and North Longview. Assume R/W acquisition will be required. (This cost can be highly variable).

Estimated cost Line	**$2,150,000**
Estimated cost R/W	**$ 500,000**

Fort Martin Switching Station Extend the 2 main 500kV buses and install a new 500kV cross bus with 2 500kV breakers, 4 switches, 3 CVTs, 3 line arresters and a 500kV deadend structure.

Estimated cost **$4,150,000**

North Longview Switching Station Install 3 500kV breakers, 6 switches, 2 bus CVTs, 500kV deadend structure, 3 line arresters and 3 line CVTs

Estimated cost **$3,200,000**

Estimated costs are in 2009 dollars.

This project will have an allocated portion of the costs for this upgrade.

2. The overload of the Kammer transformer can be alleviated by replacing the existing 1500 MVA transformer with three single phase units rated at 600 MVA each and a 600 MVA spare and replacing other substation equipment as required. (Upgrade # n0480) The estimated cost for the replacement is **$ 18,000,000.** The estimated lead time for replacement is 24 months. This project will have an allocated portion of the costs for this upgrade.

3. The Waterford-Muskingum River upgrades are described above. This project will have an allocated portion of those costs.

4. The Mahans Lane-Tidd 138kV line overload can be alleviated by rebuilding and replacing 7.3 miles of 556 conductor with 954 conductor. The estimated cost is **$1,750,000.**

Option 2: Tapping into the Sporn-Amos and Sporn-Kanawah R 345 kV tower circuit:

Generator Deliverability

1. The Muskingum-Ohio Central 345 kV line loads to 101% of its normal rating (972 MVA) for N-0 conditions. Project #P54 contributes approximately 27 MW to cause this overload.
2. The Poston to Eliot 138 kV line loads to 100% of its emergency rating (301 MVA) for the outage of the Muskingum-Waterford 345 kV line. The #P54 contributes approximately 26 MW to cause this overload.

Multiple Facility Contingency

No problems identified

Normal System

3. The Waterford – Muskingum River 345 kV line overloads under an N-0 condition. The limiting elements of this line are approximately 1 mile of conductor and the line risers at Muskingum.

4. The Sporn A-Rutland 138kV line overloads under N-0 conditions to 101% of its normal rating (297 MVA). The P54 project contributes approximately 17 MW to cause this overload.

Short Circuit

No problems identified

Contribution to Previously Identified Overloads

1. Contribution of 113 MW to further overload the Harrison-Prunty Town 500 kV line for the loss of the loss of the Ft. Martin-G30_W51 500 kV line. This thermal violation was first caused by the O69 project.
2. Contribution of 111 MW to further overload the Kammer 765/500 kV transformer for the loss of Harrison-Belmont 500 kV line. This violation was originally caused by the N42 project.
3. Contribution of 223 MW to further overload the Waterford-Muskingum 345 kV line for N-0 conditions. This violation was originally cause by the N42 project.
4. Contribution of 10 MW to further overload the Mahans Lane-Tidd 138 kV line previously identified as a base case overload for the Tidd-Collier 345 kV tower circuit outage.

New System Reinforcements

1. The overload of the Muskingum – Ohio Central 345 kV line under an N-0 condition can be alleviated by replacing the 1600A line switch, the line's service entrance conductor, a bus and risers with higher rated equipment. The Estimated Cost* to do this work is **$1,300,000.**

2 The overload of the Poston – Elliot 138 kV line can be alleviated by rebuilding the line with 7.2 miles of higher rating conductors, replacing a 1200A circuit breaker, a 1200A wave-trap, bus conductors & line risers at Poston substation. The Estimated Cost* to do this work is **$10,200,000.**

3 The overload on the Sporn A-Rutland 138kV line can be alleviated by replacing the service entrance line. The Estimated Cost* to replace the service entrance line is **$900,000**.

Fixes for Contribution to Previously Identified System Reinforcements

1. The Harrison-Pruntytown 500kV line overload can be alleviated by construction of a second 500kV line between Fort Martin SS and the proposed North Longview SS and additions at Fort Martin and North Longview Switching Stations.

Second Fort Martin - North Longview 500kV line. Install a 1.5 mile 500kV line consisting of 8 structures between Fort Martin and North Longview. Assume R/W acquisition will be required. (This cost can be highly variable).

Estimated cost Line	**$2,150,000**
Estimated cost R/W	**$ 500,000**

Fort Martin Switching Station Extend the 2 main 500kV buses and install a new 500kV cross bus with 2 500kV breakers, 4 switches, 3 CVTs, 3 line arresters and a 500kV deadend structure.

Estimated cost **$4,150,000**

North Longview Switching Station Install 3 500kV breakers, 6 switches, 2 bus CVTs, 500kV deadend structure, 3 line arresters and 3 line CVTs

Estimated cost **$3,200,000**

Estimated costs are in 2009 dollars.

This project will have an allocated portion of the costs for this upgrade.

2 The overload of the Kammer transformer can be alleviated by replacing the existing 1500 MVA transformer with three single phase units rated at 600 MVA each and a 600 MVA spare and replacing other substation equipment as required. (Upgrade # n0480) The estimated cost for the replacement is **$ 18,000,000.** The estimated lead time for replacement is 24 months. This project will have an allocated portion of the costs for this upgrade.

3 The Waterford-Muskingum River upgrades are described below. This project will have an allocated portion of those costs.

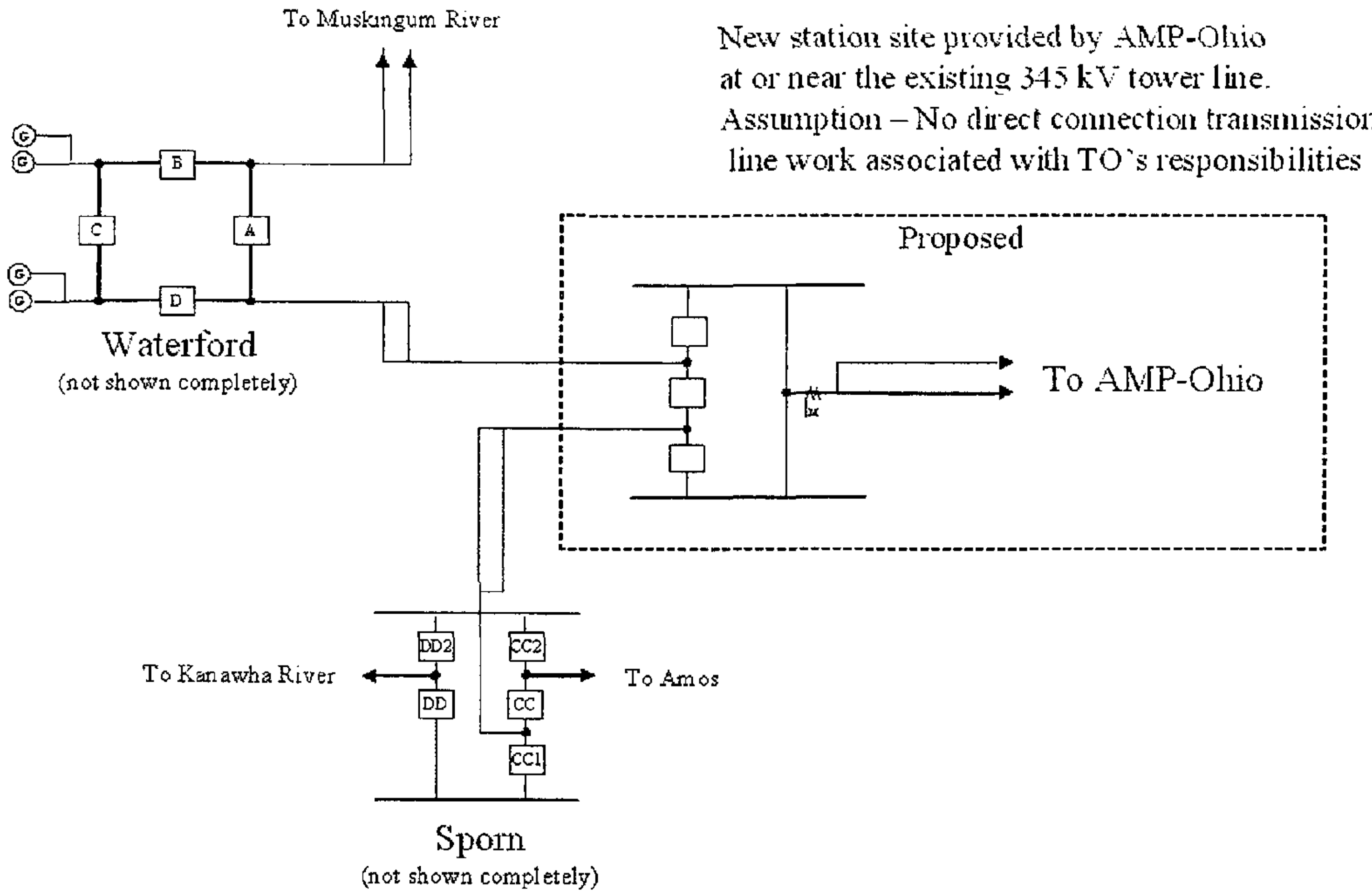
The normal system overload on the Waterford-Muskingum 345kV circuit can be alleviated by reconductoring approximately 1 mile of the circuit out of Waterford and changing line risers at Muskingum. (Upgrade # n0479) This upgrade originally defined for the N42 project. These changes can be accomplished prior to May 2010. The estimated cost is **$1.2 million**.

4. The Mahans Lane-Tidd 138kV line overload can be alleviated by rebuilding and replacing 7.3 miles of 556 conductor with 954 conductor. The estimated cost is **$1,750,000.**

Potential Issues

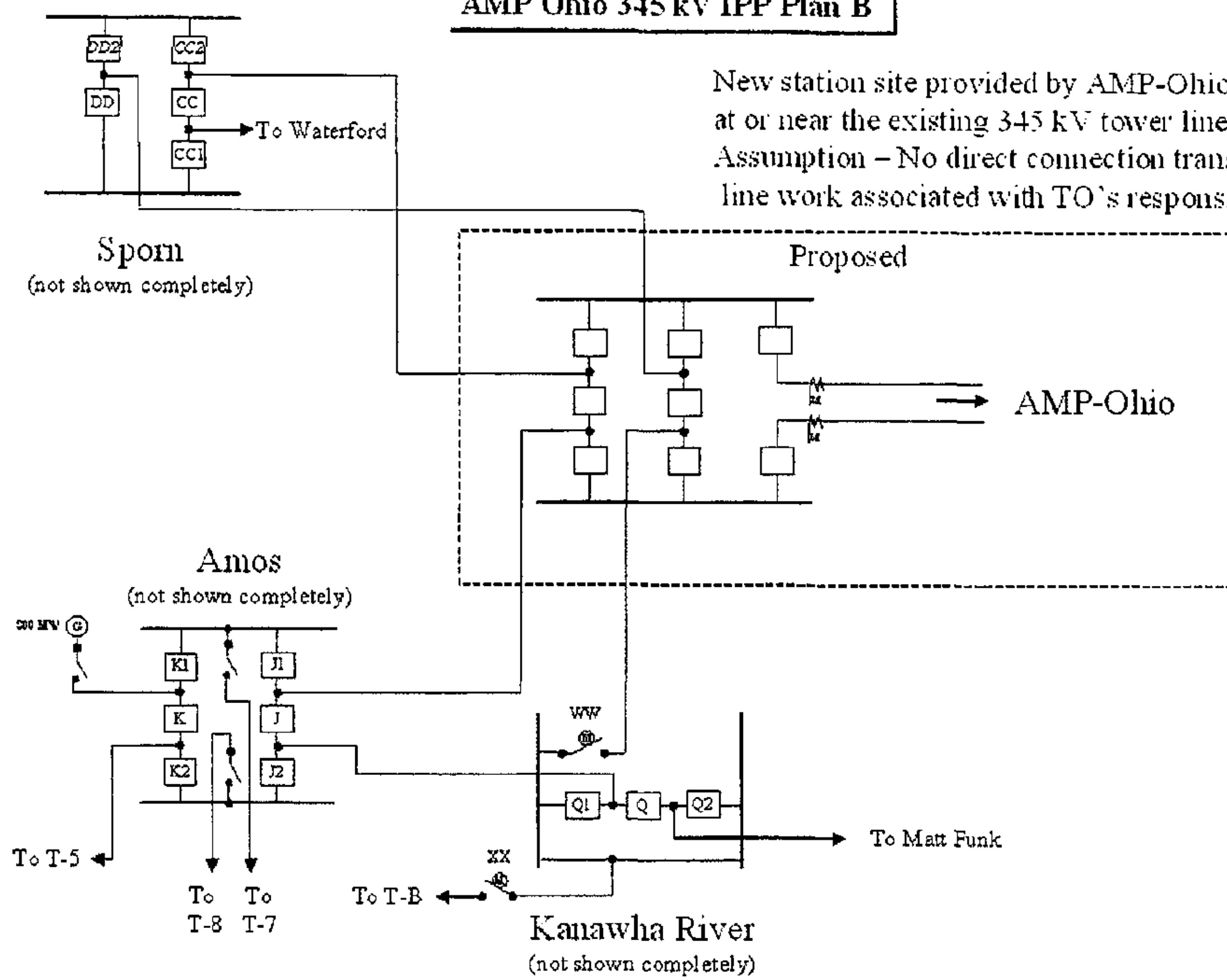
1. The Fort Martin-G30_W51 500 kV line loads to 99% of its emergency rating (3502 MVA) for the outage of the Prunty Town-Harrison 500 kV line. The P54 contributes 127 MW to the loading of this facility.

AMP Ohio 345 kV IPP Plan A



AMP Ohio 345 kV IPP Plan B

New station site provided by AMP-Ohio at or near the existing 345 kV tower line. Assumption – No direct connection transmission line work associated with TO's responsibilities



APPENDIX 02-2

SYSTEM IMPACT STUDY

PJM Generator Interconnection Request
Queue #P54
Sporn-Waterford 345kV
Impact Study

420321
May 2007

P54 Sporn-Waterford 345kV Impact Study Report

General

American Municipal Power-Ohio, Inc. (AMP Ohio) proposes to install PJM Project #P54, a 1035 MW (net) generating facility comprised of two (2) pulverized coal units. The proposed generating facility site is located in Racine, Meigs County, Ohio. After review of the Feasibility Study report AMP Ohio selected connection to the Sporn–N42 345 kV line. It is assumed AMP Ohio will provide a new graded station site at or near the above mentioned existing AEP owned 345 kV tower lines. The project is scheduled in-service May 1, 2012.

The intent of the Feasibility / Impact study is to determine system reinforcements and associated costs and construction time estimates required to facilitate the addition of the new generating plant to the transmission system. The reinforcements include the direct connection of the generator to the system and any network upgrades necessary to maintain the reliability of the transmission system.

The short-circuit and stability analysis performed during this study assumed that the transmission system improvements associated with PJM Project #P54 (described in the "Systems Reinforcement Costs" section below) were in service. A load flow study was performed as well to verify that the addition of these improvements would not cause additional overloads.

Direct Connection

To connect the PJM Project #P54 generating facility to the AEP system, AMP Ohio has asked to tap the N42 - Sporn 345 kV line. The proposed plan is then for AEP to build a 345 kV station near the N42 - Sporn 345 kV line, on a **site provided by AMP Ohio,** and for **AMP Ohio to construct the 345 kV line** required to connect their generating plant to this new 345 kV station.

Direct Connection Costs:

The following cost estimate is for AEP to build a new 345 kV station (P54 Station) near the N42 - Sporn 345 kV line, including: three (3) 4000 A 345 kV circuit breakers in a ring bus configuration, 4000 A line disconnect switches, 345 kV metering, 345 kV bus and structures, a control building, relays and controls, control cables, grounding grid, fence and all associated equipment. See Figure #1. This estimate includes the cost for grading of a station property. (Upgrade #n0605)

Estimated Cost	**$ 14,800,000**
Estimated Construction Time	**24 months**

As part of the direct connection requirements for the new P54 interconnect station, it will be necessary to replace the existing relaying equipment at Sporn Station, on the P54 - Sporn 345 kV line. It may also be necessary to replace the existing relaying equipment at a second terminal, depending on the timing of future generator additions proposed on the Sporn – Waterford 345 kV line. (Upgrade #n0606)

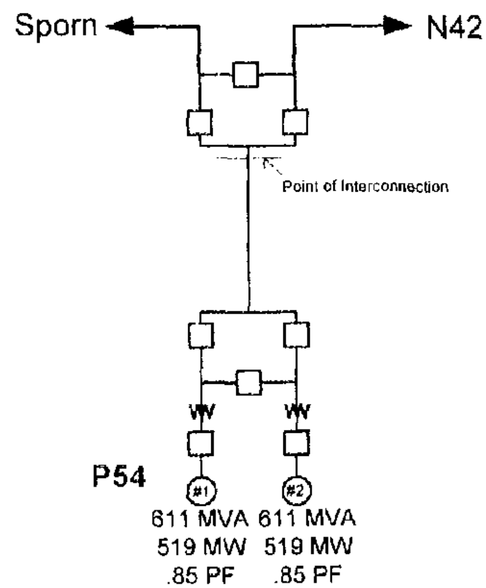
Estimated Relaying Costs per Terminal $ 650,000

This estimate is greater than the one provided during the Feasibility Study phase of this project for the following reasons:

1. It will be necessary to install 4000 Amp station equipment (circuit breakers, switches, bus equipment, etc.) due to the thermal loading associated with certain double-contingency outage conditions.
2. This estimate includes the cost for grading of a station property.
3. The labor costs included in this estimate have been adjusted to those expected in 2012.

Figure #1

R54 Sporn-Waterford 345kV



Network Impacts

The following problems have been identified during the study of PJM Project #P54 based upon a 2011 system. The normal system and single contingency overloads presented here are the same as those presented in the Feasibility Study phase of this project. The double contingency overloads presented below were identified during this Impact Study phase. Due to the dependence of these double contingency overloads on circuit breaker outages at each affected station, they have been separated by station. See Appendix A for a one-line diagram of the anticipated future switching configuration of the Sporn – Muskingum River 345 kV circuit with PJM Project #P54 in service.

System Normal

1. The Elliot Tap – Poston 138 kV line overloads and exceeds its normal rating of 223 MVA.

Single Contingency

2. The P54 - Sporn 345 kV line overloads and exceeds its emergency rating of 1918MVA for an outage of the Muskingum River – Waterford 345 kV line. Project #P54 contributes 1030MW causing the loading on the line to increase from 73.7% to 127.1%.

3. The Muskingum River – Waterford 345 kV line overloads and exceeds its emergency rating 2374MVA for an outage of the P54 - Sporn 345 kV line. Project #P54 contributes 1030MW causing the loading on the line to increase from 60.4% to 102.0%.

Multiple Contingency

4. The Tidd-Carnegie 138 kV line overloads and exceeds its emergency rating of 173MVA for a tower line outage of the Tidd-Collier and Tidd-Wylie Ridge 345kV lines. Project #P54 contributes 8.4MW causing the flow on the line to increase from 96.71% to 101.55%.

5. The Heaters-French Creek 138 kV line overloads and exceeds its emergency rating 101MVA for a bus fault outage of the Back Fork-Cowen 138kV line and the Cowen-Cruppemeck 138kV line. Project #P54 contributes 6.6MW causing the flow on the line to increase from 96.34% to 102.83%.

Double Contingency

6. Sporn 345 kV Station:

1. Sporn circuit breaker "CC" overloads and exceeds its emergency rating* for an outage of the Muskingum River – Waterford 345 kV line and an outage of Sporn circuit breaker "CC1".

2. Sporn circuit breaker "CC1" overloads and exceeds its emergency rating for an outage of the Muskingum River – Waterford 345 kV line and an outage of Sporn circuit breaker "CC".

7. Waterford Station:

1. Waterford circuit breaker "52-A" and its disconnect switches overload and exceed their emergency ratings† for an outage of the P54 - Sporn 345 kV line and an outage of Waterford circuit breaker "52-B".

2. Waterford circuit breaker "52-B" and its disconnect switches overload and exceed their emergency ratings for an outage of the P54 - Sporn 345 kV line and an outage of Waterford circuit breaker "52-A".

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* Sporn 345 kV circuit breakers "CC" & "CC1" have a 3150 Amp emergency rating.

† Waterford 345 kV circuit breakers "52-A", "52-B" & "52-C" and their associated disconnect switches have 3150 Amp and 4020 Amp emergency ratings, respectively.

3. Waterford circuit breaker "52-C" and its disconnect switches overload and exceed their emergency ratings for an outage of the P54 - Sporn 345 kV line and an outage of Waterford circuit breaker "52-A".

8. Muskingum River Station:

1. Muskingum River circuit breaker "SD" and its disconnect switches overload and exceed their emergency ratings[‡] for an outage of the P54 - Sporn 345 kV line and an outage of Muskingum circuit breaker "SE".

2. Muskingum River circuit breaker "SE" and its disconnect switches overload and exceed their emergency ratings for an outage of the P54 - Sporn 345 kV line and an outage of Muskingum River circuit breaker "SD".

3. Muskingum River circuit breaker "SF" and its disconnect switches overload and exceed their emergency ratings for an outage of the P54 - Sporn 345 kV line and an outage of Muskingum River circuit breaker "SD".

Short Circuit Analysis

No problems identified.

Stability Analysis

Stability analysis was performed at 2011 summer light load conditions and peak load conditions. The maximum generation output is considered. Attachment #1 lists the fault cases evaluated. The range of contingencies evaluated included all that were deemed necessary to assess expected compliance with ECAR criteria.

Results of the study indicate that with all transmission facilities in service, dynamic performance of the system with the proposed project was acceptable. However, with the pre-disturbance outage of N42- Waterford 345 KV line, Waterford- Muskingum River 345 KV line, Sporn-Kyger Creek 345 KV line and Sporn 345KV/SpornB 138KV #4 Transformer several faults would result in instability of the two P54 generators as well as several generators in the area . To avoid the instability the study indicates the output of P54 will need to be restricted to the following:

Pre-Disturbance outage	P54 Gross output in MW
N42- Waterford 345 KV line	766
Waterford- Muskingum River 345 KV line	0 (P54 units have to be out of service)
Sporn- Kyger Creek 345 KV line	1065
Sporn 345KV/SpornB 138KV #4 Transformer	0 (P54 units have to be out of service)

‡ Muskingum River 345 kV circuit breakers "SD", "SE" & "SF" and their associated disconnect switches have 3150 Amp and 4020 Amp emergency ratings, respectively.

Note: While the stability analysis has been performed at expected extreme system conditions, there is a potential that evaluation at a different level of generator MW and/or MVAR output at different system load levels and operating conditions would disclose unforeseen stability problems. The regional reliability analysis routinely performed to test all system changes will include one such evaluation. Any problems uncovered in that or other operating or planning studies will need to be resolved.

Moreover, when the proposed generating station is designed and unit specific dynamics data for the turbine generators and its controls are available, and if it is different than the data provided for this study, a transient stability analysis at a variety of expected operating conditions using the more accurate data shall be performed to verify impact on the dynamic performance of the system. As more accurate or unit specific dynamics data for the proposed facility, as well as Plant layout become available, it must be forwarded to PJM.

System Reinforcement Costs:

1. The overload of the Elliot Tap – Poston 138 kV line under an N-0 conditions can be alleviated by rebuilding approximately 3 miles of the 138 kV line between the Poston Station and the Elliot Tap. (Upgrade #n0589)

   The estimated cost to do this work is $3,000,000 and it should take approximately 12 months to be completed.

2. The overload of the P54 – Sporn 345 kV line under an N-1 condition can be alleviated by replacing risers and switches at the Sporn Station and by rebuilding approximately 4 miles of the 345 kV line between the Sporn Station and the new P54 Interconnect Station. (Upgrade #n0590)

   The estimated cost to do this work is $13,400,000 and it should take approximately 12 months to be completed.

3. The overload the Muskingum River – Waterford 345 kV line under and N-1 condition can be alleviated by (in addition to the N-0 related upgrades) rebuilding approximately 4 miles of 345 kV line between the Muskingum River and Waterford Stations. (Upgrade #n0591)

   The estimated cost to do this work is $10,700,000 and it should take approximately 12 months to be completed.

4. The overload of the Tidd-Carnegie 138kV line can be alleviated by Allegheny Power reconductoring 1.21 miles of 556 ACSR with 954 ACSR conductor at an estimated cost of **$320,000** in 2011 dollars. (Upgrade #n0592)

5. The overload of the French Creek-Heaters Tap line section overload can be alleviated by Allegheny Power reconductoring the 25.11 mile line section

with 954 ACSR conductor at an estimated cost of **$9,500,000** in 2012 dollars. (Upgrade #n0593)

6. The overload of Sporn Station 345kV circuit breaker "CC" under an N-2 condition can be alleviated by replacing the circuit breaker. (Upgrade #0594)

   The estimated cost to do this work is $1,900,000 and it should take approximately 12 months to be completed.

   The overload of Sporn Station 345kV circuit breaker "CC1" under and N-2 condition can be alleviated by replacing the circuit breaker. (Upgrade #n0595)

   The estimated cost to do this work is $1,900,000 and it should take approximately 12 months to be completed.

7. The overload of Waterford Station circuit breaker "52-A" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #n0596)

   The estimated cost to do this work is $2,000,000 and it should take approximately 12 months to be completed.

   The overload of Waterford Station circuit breaker "52-B" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #n0597)

   The estimated cost to do this work is $2,000,000 and it should take approximately 12 months to be completed.

   The overload of Waterford Station circuit breaker "52-C" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #n0598)

   The estimated cost to do this work is $2,000,000 and it should take approximately 12 months to be completed.

8. The overload of Muskingum River Station circuit breaker "SD" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #n0599)

   The estimated cost to do this work is $1,700,000 and it should take approximately 12 months to be completed.

   The overload of Muskingum River Station circuit breaker "SE" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #n0600)

The estimated cost to do this work is $1,700,000 and it should take approximately 12 months to be completed.

The overload of Muskingum River Station circuit breaker "SF" and its disconnect switches under an N-2 condition can be alleviated by replacing the circuit breaker and switches. (Upgrade #0601)

The estimated cost to do this work is $1,700,000 and it should take approximately 12 months to be completed.

Contribution to Previously Identified Overloads

1. The Belmont – Harrison 500 kV line overloads and exceeds its emergency rating 2285MVA for a fault on the 765 kV line from Kammer to South Canton with a stuck "NN" breaker in Kammer substation causing the outage of the 765 kV line from Kammer to South Canton, the 756/500kV transformer at Kammer substation, and the 765/345kV transformer at South Canton substation.

   Project #P54 contributes 119MW causing the loading on the line to increase from 100.4% to 105.7%. Project #P46 in ComEd area is the first to cause this overload.

2. The #P54 project contributes 131.5MW to the overload on the Hatfield-Ronco 500 kV circuit for the stuck breaker contingency at Mt. Storm 500kV station for Mt. Storm-Pruntytown line fault. The circuit was initially overloaded due to the #O73 project in ComEd.

3. The #P54 project contributes 134.0MW to the overload on the Kammer 765/500 kV transformer for the stuck breaker contingency at Belmont 500kV station for a fault on the Belmont-Harrison 500kV line. The Kammer transformer was initially overloaded due to the #O22 project in AEP.

4. The #P54 project contributes 312.9MW to the 0verload on the Waterford-Muskingum River 345kV line for system normal conditions. This Waterford-Muskingum River 345kV line was initially overloaded due to the #N42 project in AEP.

Contribution to Previously Identified Upgrades

1. The overload on the Belmont - Harrison 500 kV circuit can be alleviated by replacing terminal equipment in 2008 to bring the circuit loadability up to the conductor rating of 3153 Amp 2731 MVA summer continuous / 4044 Amp 3502 MVA summer 4 hour / 4651 Amp 4028 MVA. The cost is **$100,000** in 2008 dollars. The cost allocation to the P54 project is shown below. (Upgrade #n0602)

	MW(above rating)	% of $100K	$K
P46	6.62	5%	5
P54	119	95%	95

2. The overload on the Hatfield-Ronco 500kV circuit can be alleviated by reconductoring 1.42 miles of the circuit with 1113 ACSS conductor. The estimated cost of the project is **$2.8 million** in 2010 dollars. The cost allocation to the P54 project is shown below. (Upgrade #n0603)

	MW	% of $2.8M	$K
O73	7	5%	140
P54	131.5	95%	**2,660**

3. The overload on the Kammer 765/500kV transformer can be alleviated by installing a third breaker in the Harrison - Belmont line cross bus at Belmont 500kV station. The estimated cost of the project is **$1.5 million** in 2009 dollars. The cost allocation to the P54 project is shown below. (Upgrade #n0604)

PJT ID	MW Contr	% of 1.5M	$K
O22	2.8	0.005364	8.0
O23	40.443	0.077477	116.2
O24	40.323	0.077247	115.9
O27	40.5	0.077586	116.4
O29	29.65725	0.056815	85.2
O49	26.47	0.050709	76.1
O50	26.85	0.051437	77.2
O51	39.981	0.076592	114.9
P10	26.934	0.051598	77.4
P11	26.438	0.050648	76.0
P20	28.2051	0.054033	81.0
P36	*31.4952*	*0.060336*	*90.5*
P37	27.93948	0.053524	80.3
P54	134.0015	0.256708	**385.1**

4. The overload Waterford-Muskingum River 345kV line can be alleviated by reconductoring approximately 1 mile of the Waterford-Muskingum River 345kV line near Waterford and replacing the line risers at Muskingum River.

(Upgrade n0479) The estimated cost for this upgrade is $3,000,000. The cost allocation to the P54 project is shown below.

	MW	%	$M
N42	37	10.57%	0.32
P54	312.9	89.43%	**2.537**

Cost Responsibility

The P54 project is responsible for 100% of the Direct Connection costs described above of **$15, 450,000.** This cost responsibility could increase by $650,000 to **$16,100,000** if the Facilities Study report identifies that the relays need to be upgraded on the Waterford terminal of the line.

The P54 project is responsible for the costs shown in the chart below for network upgrades.

n0589	$3,000,000
n0590	$13,400,000
n0591	$10,700,000
n0592	$320,000
n0593	$5,900,000
n0594	$1,900,000
n0595	$1,900,000
n0596	$2,000,000
n0597	$2,000,000
n0598	$2,000,000
n0599	$1,700,000
n0600	$1,700,000
n0601	$1,700,000
n0602	$95,000
n0603	$2,660,000
n0604	$385,100
n0479	$2,537,000
Total	**$53,897,100**

Appendix A

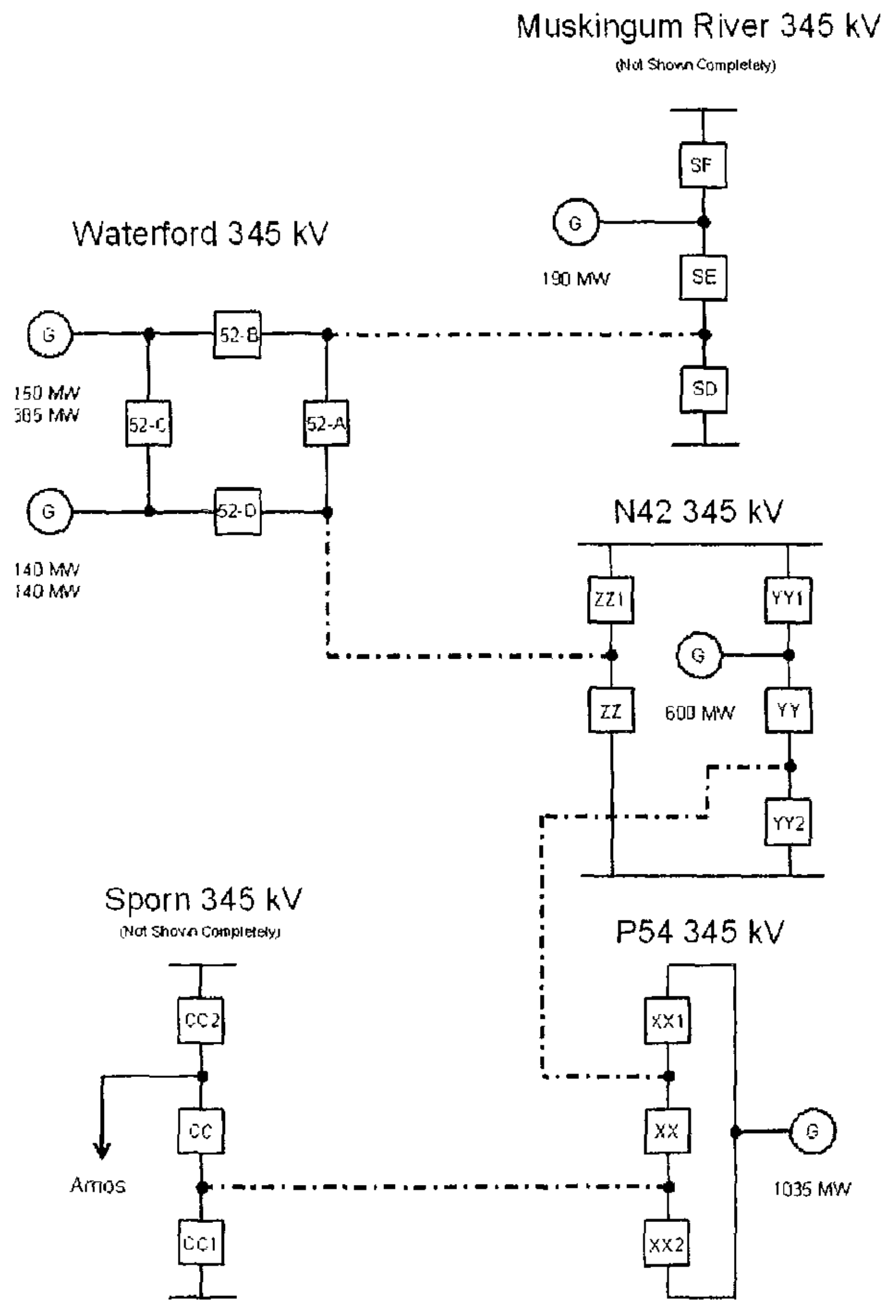


Figure 1: Anticipated future one-line switching configuration of the Sporn – Muskingum River 345 kV circuit with the PJM Project #P54 in service.

Attachment #1

P54

2011 Summer Light/Peak Load Case Stability Faults

BREAKER CLEARING TIMES (CYCLES)

Station	Primary (3ph/slg)	Stuck Breaker (total)	Zone 2 (total)	Re-closing
345 kV	4	15	24	-
138 kV	5	18	63	-

Faults in red are unstable
Faults in blue shows slow damping

With all Transmission Facilities in Service:

P54-1A: 3PH @ P54 on P54 – Sporn 345 kV line
P54-1C: SLG @ P54 – Sporn 345 kV line, 80% from P54, Zone 2 operation at P54

P54-2A: 3PH @ P54 on P54 –N42 345 kV line
P54-2C: SLG @ P54 – N42 345 kV line, 80% from P54, Zone 2 operation at P54

P54-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54-4B2: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn –P54 345 kV line

P54-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line
P54-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn –Kanawha River 345 kV line

P54-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'

P54-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn –Amos 345 kV line
P54-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn –Kanawha River 345 kV line
P54-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn –Kyger Creek 345 kV line

P54-8B1: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn – Amos 345 kV line
P54-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmrs'3' & 'B'

P54-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/oWaterford – N42 345 kV line
P54-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54-10B1: SLG @ Waterford on Waterford – N42 345 kV line, stuck at Waterford, l/o Waterford –Muskingum River 345 kV line
P54-10B2: SLG @ Waterford on Waterford – N42 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42
P54-11C: SLG @ N42 – Waterford 345 kV line, 80% from N42, Zone 2 operation at N42

With P54 – N42 345 kV line out of service (Pre-disturbance outage P):

P54P-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54P-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'
P54P-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54P-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'

P54P-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54P-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54P-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54P-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54P-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn - Kanawha River 345 kV line

P54P-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54P-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54P-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn –Kanawha River 345 kV line
P54P-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn -Kyger Creek 345 kV line

With N42 – Waterford 345 kV line out of service (Pre-disturbance outage Q):

P54Q-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54Q-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54Q-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54Q-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'

P54Q-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54Q-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54Q-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54Q-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54Q-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54Q-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54Q-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54Q-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line
P54Q-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kyger Creek 345 kV line

With Waterford – Muskingum River 345 kV line out of service (Pre-disturbance outage R):

P54R-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54R-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54R-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54R-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'

P54R-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54R-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54R-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54R-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54R-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54R-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54R-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54R-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line
P54R-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kyger Creek 345 kV line

With Sporn – Amos 345 kV line out of service (Pre-disturbance outage S):

P54S-1A: 3PH @ P54 on P54 – Sporn 345 kV line

P54S-2A: 3PH @ P54 on P54 –N42 345 kV line

P54S-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54S-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54S-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54S-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54S-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54S-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54S-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line
P54S-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54S-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54S-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54S-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line
P54S-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kyger Creek 345 kV line

P54S-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmrs '3' & 'B'

P54S-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54S-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford – P54 345 kV line
P54S-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54S-10B1: SLG @ Waterford on Waterford – N42 345 kV line, stuck at Waterford, l/o Waterford – Muskingum River 345 kV line
P54S-10B2: SLG @ Waterford on Waterford – N42 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54S-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54S-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42

With Sporn – Kanawha River 345 kV line out of service (Pre-disturbance outage T):

P54T-1A: 3PH @ P54 on P54 – Sporn 345 kV line

P54T-2A: 3PH @ P54 on P54 – N42 345 kV line

P54T-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54T-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54T-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54T-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54T-4B2: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn –P54 345 kV line

P54T-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54T-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line

P54T-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54T-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54T-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54T-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line
P54T-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kyger Creek 345 kV line

P54T-8B1: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn – Amos 345 kV I line
P54T-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmr '3' & 'B'

P54T-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54T-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford – P54 345 kV line
P54T-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54T-10B1: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford – Muskingum River 345 kV line
P54T-10B2: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54T-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54T-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42

With Sporn – Kyger Creek 345 kV line out of service (Pre-disturbance outage U):

P54U-1A: 3PH @ P54 on P54 – Sporn 345 kV line

P54U-2A: 3PH @ P54 on P54 –N42 345 kV line

P54U-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54U-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54U-4B2: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn –P54 345 kV line

P54U-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54U-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'

P54U-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54U-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54U-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line
P54U-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54U-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54U-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54U-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line
P54U-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Kyger Creek 345 kV line

P54U-8B1: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn – Amos 345 kV line
P54U-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmrs '3' & 'B'

P54U-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54U-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford – P54 345 kV line
P54U-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54U-10B1: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford – Muskingum River 345 kV line
P54U-10B2: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54U-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54U-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42

With Sporn 345/138 kV Transformer (4) out of service (Pre-disturbance outage V):

P54V-1A: 3PH @ P54 on P54 – Sporn 345 kV line

P54V-2A: 3PH @ P54 on P54 – Waterford 345 kV line

P54V-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54V-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54V-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54V-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54V-4B2: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn –P54 345 kV line

P54V-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54V-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54V-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54V-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54V-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line
P54V-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54V-8B1: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn – Amos 345 kV line
P54V-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmrs '3' & 'B'

P54V-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54V-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford – P54 345 kV line
P54V-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54V-10B1: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford – Muskingum River 345 kV line
P54V-10B2: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54V-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54V-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42

With Sporn 345/138 kV Transformer (B) out of service (Pre-disturbance outage W):

P54W-1A: 3PH @ P54 on P54 – Sporn 345 kV line

P54W-2A: 3PH @ P54 on P54 – Waterford 345 kV line

P54W-3A: 3PH @ Sporn on Sporn – Kyger Creek 345 kV line
P54W-3B: SLG @ Sporn on Sporn – Kyger Creek 345 kV line, stuck at Sporn, l/o Sporn 345/138 kVxfmr '4'

P54W-4A: 3PH @ Sporn on Sporn – Amos 345 kV line
P54W-4B1: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54W-4B2: SLG @ Sporn on Sporn – Amos 345 kV line, stuck at Sporn, l/o Sporn –P54 345 kV line

P54W-5A: 3PH @ Sporn on Sporn – Kanawha River 345 kV line
P54W-5B1: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o Sporn – Kyger Creek 345 kV line and Sporn 345/138 kV xfmr '4'
P54W-5B2: SLG @ Sporn on Sporn – Kanawha River 345 kV line, stuck at Sporn, l/o of Sporn 345/138kV xfmrs '3' and 'B'

P54W-6A: 3PH @ Sporn on Sporn 345/138 kV xfmr '3'
P54W-6B1: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – P54 345 kV line
P54W-6B2: SLG @ Sporn on Sporn 345/138 kV xfmr '3', stuck at Sporn 345 kV side, l/o Sporn – Kanawha River 345 kV line

P54W-7A: 3PH @ Sporn on Sporn 345/138 kV xfmr '4'
P54W-7B1: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn – Amos 345 kV line
P54W-7B2: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn –Kanawha River 345 kV line
P54W-7B3: SLG @ Sporn on Sporn 345/138 kV xfmr '4', stuck at Sporn 345 kV side, l/o Sporn - Kyger Creek 345 kV line

P54W-8B1: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn – Amos 345 kV line
P54W-8B2: SLG @ Sporn on Sporn –P54 345 kV line, stuck at Sporn, l/o Sporn 345/138 kV xfmrs '3' & 'B'

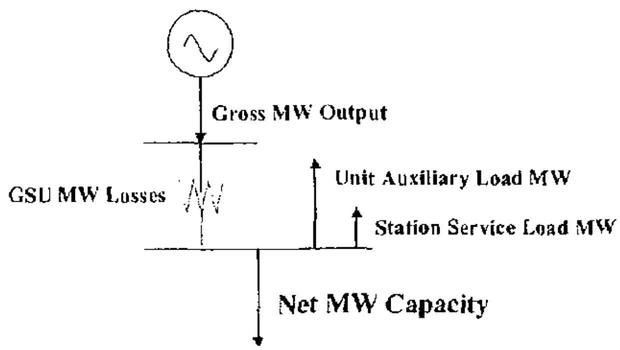
P54W-9A: 3PH @ Waterford on Waterford – Muskingum River 345 kV line
P54W-9B1: SLG @ Waterford on Waterford – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford – P54 345 kV line
P54W-9B2: SLG @ Waterford on – Muskingum River 345 kV line, stuck at Waterford, l/o Waterford units '1A' and '1S'

P54W-10B1: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford – Muskingum River 345 kV line
P54W-10B2: SLG @ Waterford on Waterford – P54 345 kV line, stuck at Waterford, l/o Waterford units '1B' and '1C'

P54W-11A: 3PH @ N42 on N42 – Waterford 345 kV line
P54W-11B: SLG @ N42 on N42 – Waterford 345 kV line, stuck at N42

ATTACHMENT #2

Unit Capability Data



Net MW Capacity = (Gross MW Output - GSU MW Losses* – Unit Auxiliary Load MW - Station Service Load MW)

Queue Letter/Position/Unit ID:	**P54/ST**
Primary Fuel Type:	**Coal**
Maximum Summer (92° F ambient air temp.) Net MW Output**:	**1035**
Maximum Summer (92° F ambient air temp.) Gross MW Output:	**1135**
Minimum Summer (92° F ambient air temp.) Gross MW Output:	**0**
Maximum Winter (30° F ambient air temp.) Gross MW Output:	**1135**
Minimum Winter (30° F ambient air temp.) Gross MW Output:	**0**
Gross Reactive Power Capability at Maximum Gross MW Output – Please include Reactive Capability Curve (Leading and Lagging):	**298 MVAR**
Individual Unit Auxiliary Load at Maximum Summer MW Output (MW/MVAR):	**0**
Individual Unit Auxiliary Load at Minimum Summer MW Output (MW/MVAR):	**100/25**
Individual Unit Auxiliary Load at Maximum Winter MW Output (MW/MVAR):	**0**
Individual Unit Auxiliary Load at Minimum Winter MW Output (MW/MVAR):	**100/25**
Station Service Load (MW/MVAR):	**Included in unit**

* GSU losses are expected to be minimal.
** Your project's declared MW, as first submitted in Attachment N, and later confirmed or modified by the Impact Study Agreement, should be based on either the 92 °F Ambient Air Temperature rating of the unit(s) or, if less, the declared Capacity rating of your project.

Unit Generator Dynamics Data

Queue Letter/Position/Unit ID: ______ **P54/ST**

MVA Base (upon which all reactances, resistance and inertia are calculated): ______ **567**

Nominal Power Factor: ______ **0.85**

Terminal Voltage (kV): ______ **22**

Unsaturated Reactances (on MVA Base)

- Direct Axis Synchronous Reactance, $X_{d(i)}$: ______ **2.24**
- Direct Axis Transient Reactance, X'd(i): ______ **0.325**
- Direct Axis Sub-transient Reactance, X"d(i): ______ **0.24**
- Quadrature Axis Synchronous Reactance, Xq(i): ______ **2.06**
- Quadrature Axis Transient Reactance, X'q(i): ______ **0.47**
- Quadrature Axis Sub-transient Reactance, X"q(i): ______ **0.24**
- Stator Leakage Reactance, Xl: ______ **0.191**
- Negative Sequence Reactance, X2(i): ______ **0.014**
- Zero Sequence Reactance, X0: ______ **0.007**

Saturated Sub-transient Reactance, X"d(v) (on MVA Base): ______ **0.17**

Armature Resistance, Ra (on MVA Base): ______ **0.00117**

Time Constants (seconds)

- Direct Axis Transient Open Circuit, T'_{do}: ______ **4.6**
- Direct Axis Sub-transient Open Circuit, T''_{do}: ______ **0.03**
- Quadrature Axis Transient Open Circuit, T'_{qo}: ______ **0.4**
- Quadrature Axis Sub-transient Open Circuit, T''_{qo}: ______ **0.06**
- Inertia, H (kW-sec/kVA, on KVA Base): ______ **3.4**

Speed Damping, D: ______ **0**

Saturation Values at Per-Unit Voltage [S(1.0), S(1.2)]: ______ **0.081.0.286**

Units utilize a   Generator model.

Unit GSU Data

Queue Letter/Position/Unit ID: ____ **P54/ST**

Generator Step-up Transformer MVA Base: ______________________________ **567**

Generator Step-up Transformer Impedance (R+jX, or %, on transformer MVA Base): ___ **12%**

Generator Step-up Transformer Reactance-to-Resistance Ration (X/R): __________ **N/A**

Generator Step-up Transformer Rating (MVA): ___________________________ **567**

Generator Step-up Transformer Low-side Voltage (kV): _____________________ **22**

Generator Step-up Transformer High-side Voltage (kV): ____________________ **345**

Generator Step-up Transformer Off-nominal Turns Ratio: __________________ **16.5%**

Generator Step-up Transformer Number of Taps and Step Size: _____________ **±2.5,±5**

(A) Site and Route Selection Study

AMP-Ohio's consultant, Sargent & Lundy, conducted a route selection study for the proposed transmission project. The objective of the study was the identification and selection of technically and economically feasible preferred and alternate routes for the transmission project that also minimizes, to the extent possible, the overall adverse effects of the project on the ecology, sensitive land uses, and cultural features impacted by the selected route. The route selection study is attached hereto as Appendix 03-1.

As noted in response to OAC 4906-15-01, the transmission project is a necessary component of the AMPGS project. The AMPGS is a proposed 960 MW net electric generation facility, consisting of two 480 MW net electric generating units, to be built on a footprint of approximately 1,000 acres in the vicinity of Letart Falls, Meigs County, Ohio. The transmission project is designed to connect the AMPGS to the existing AEP-owned 345 kV Sporn-Muskingum River transmission line, which is located approximately 3.5 miles north of the AMPGS site. This connection is necessary so that the electricity generated by the AMPGS can be delivered to the transmission grid for ultimate delivery to end-users.

(1) Route Selection Details

(a) Description of Study Area

The study area for the route selection process was determined by the location of the end points for the transmission project. The proposed transmission project begins at the AMPGS site and ends at a switchyard to be located along the 345 kV Sporn-Muskingum River transmission line.

(b) Map of Study Area

The approximate study area is illustrated in Figure 03-1.

(c) List of Siting Criteria

The following are the major siting criteria used to identify, evaluate, and compare the potential routes identified for the transmission project:

- Minimize the number of residences or other significant structures that would have to be removed for transmission line construction.

- Minimize proximity of the transmission line to residences and other sensitive land uses (e.g., parks, historical sites, recreation areas, schools, churches, hospitals, cemeteries).
- Maximize the use of existing linear corridors by following existing transmission lines, railroads, or roads, to the extent possible.
- If not following an existing transmission line, railroad, or road, follow section lines or fence lines to the extent possible; avoid crossing the middle of farm fields.
- Minimize the overall length of the transmission line route.
- Minimize contact with streams, floodplains, wetlands, forested areas, and other sensitive natural habitats.
- Minimize crossings of public roads and railroads.
- Minimize contact with areas where terrain or drainage would interfere with transmission line construction and maintenance.
- Minimize clear views of the transmission line from residential concentrations, recreational areas, heavily traveled highways, and other areas where there are large numbers of potential viewers.
- Minimize the number of route angles (changes in direction that would require heavier and more expensive transmission towers).

(d) Relevant Factors Utilized in Site Selection Process

In order to achieve the criteria discussed in response to OAC 4906-15-03(A)(1)(b), the site selection study considered land use and natural features that might be favorable or unfavorable for transmission line routing, construction, and maintenance. The favorable features identified in the study area include existing transmission lines, roads, and township-range lines that a new transmission line could parallel to minimize its adverse impacts. Unfavorable features include residences, cemeteries, water bodies, floodplains, wetlands, and forested areas. These favorable and unfavorable features were considered in identifying and evaluating potential transmission line routes, as described below.

(e) Description of Selection Process

Inasmuch as no single route was expected to satisfy all routing criteria listed above in the response to OAC 4906-15-03(A)(1)(b), a reasonable number of alternative routes were identified. Each potential route was drawn to maximize contacts with favorable features, minimize contact with unfavorable features, and best balance the major routing criteria.

All of the alternative routes were drawn and studied in detail. The important characteristics of each alternative were quantified, including the total route length, the amount of the route that parallels existing corridors, and the amount of contact with sensitive natural habitats. A particularly important consideration was the identification of the number of residences within 75 feet of the centerline of the route, because such residences would be within the transmission line ROW, and would therefore have to be removed. Residences and other sensitive land uses within 250 feet of the route centerline were quantified as an indication of proximity that could result in adverse visual impacts. The alternative routes were compared relative to these quantified characteristics, as well as subjective criteria.

(f) Description of Routes and Sites Selected

Six alternative routes were identified, consisting of three primary routes, each with two sub-routes. The primary routes and sub-routes are described below. For purposes of this description, all routes begin at the proposed switchyard where the proposed transmission project will interconnect with the existing the 345 kV Sporn-Muskingum River transmission line. The interconnection switchyard will be located in an area of relatively flat, high ground where the 345 kV Sporn-Muskingum River transmission line crosses the 138 kV Sporn-Kaiser No. 1 transmission line that crosses the study area from the southeast to the northwest. The locations of the proposed switchyard and the alternative routes are shown in Figure 03-2.

Route 1 originates at the interconnection switchyard and parallels the north side of the existing 138 kV Sporn-Kaiser No. 1 transmission line for approximately 800 feet to the east-southeast. The route then proceeds south through forested hills, generally following the edge of bluffs overlooking the Ohio River, for several thousand feet. At this point, Route 1A descends from the bluffs, proceeds south through flat farmland for approximately 3,000 feet, then parallels the north side of Plants Road (Township Road 214) for approximately 2,000 feet to the west, and then parallels the existing 69 kV Racine Hydro Extension transmission line to the selected site for the AMPGS. Route 1B proceeds south through the forested hills for several thousand additional feet, and then turns southwest and west to enter the AMPGS site. By following Plants Road and the 69 kV Racine Hydro Extension transmission line, Route 1A makes more use of existing corridors than does Route 1B. However, Route 1A is approximately 700 feet longer, requires more angles, is within 250 feet of three residences and a cemetery, and crosses the 69 kV Racine Hydro Extension transmission line twice.

Route 2 originates at the proposed interconnection switchyard and parallels the north side of the existing 138 kV Sporn-Kaiser No. 1 transmission line for approximately 5,100 feet to the east-southeast. It then proceeds generally south through forested hills for several thousand feet before splitting into the same A and B alternatives described in the preceding paragraph. By following the 138 kV Sporn-Kaiser No. 1 transmission line farther to the east than Route 1, Route 2 adds some length but avoids areas of active residential development along the bluffs overlooking the Ohio River.

Route 3 originates at the proposed interconnection switchyard and parallels the north side of the existing 138 kV Sporn-Kaiser No. 1 transmission line for approximately 14,000 feet to the southeast. It then proceeds south through forested hills for approximately 8,000 feet, paralleling the west side of the dividing line between Range 11 West and Range 12 West. Route 3 then turns west and parallels the south side of the dividing line between Township 1 North and Township 2 North for approximately 8,000 feet. It then splits into the same A and B alternatives described above. By following the 138 kV Sporn-Kaiser No. 1 transmission line farther to the east than Route 2 and following township-range lines, Route 3 makes maximum use of existing linear corridors. However, Route 3 adds considerable length and passes through areas of active residential development along Apple Grove-Dorcas Road (County Road 28) and Manuel Road (Township Road 98). By passing through these areas of active residential development, Route 3 comes close to many more residences than do any of the other alternatives. At least two of these residences appear to be within the proposed ROW and therefore would have to be removed.

The key characteristics of the alternative routes are summarized in Table 03-1.

(g) Description of Qualitative Selection Factors

As indicated in Table 03-1, each alternative route offers certain advantages and disadvantages. Route 2B was selected as the Preferred Route for the following reasons:

- It does not require any structures to be removed.
- It does not pass within 250 feet of any occupied residences or other sensitive properties.
- It minimizes potential conflicts with future development, because it avoids the areas of active residential development along the bluffs overlooking the Ohio River and along Apple Grove-Dorcas Road and Manuel Road.
- It requires the fewest angles, fewest public road crossings, and fewest perennial stream crossings.
- It does not appear to have any significant problems that would negate the advantages described above.

Route 1B was selected as the Alternate Route. It is less desirable than Route 2B because it passes through the area of active residential development along the bluffs overlooking the Ohio River. It also makes less use of the existing 138 kV Sporn-Kaiser No. 1 transmission line corridor, requires more public road crossings, and more perennial stream crossings. Route 1B is desirable because it is the only route other than Route 2B that does not pass within 250 feet of any occupied residences or other sensitive properties. It also is the shortest route. However, it does not have the advantages of Route 2B with respect to minimizing adverse impacts to land use. Route 2B also minimizes clear views of the line from potential viewers, such as residential concentrations.

An overview of the Preferred and Alternate Routes is provided in Figure 03-3.

(2) Constraint Map

Major constraints identified in the study area are illustrated in Figures 03-1 through 03-3. Small constraints, such as individual residences, are not included in Figures 03-1 through 03-3 but were considered in identifying and evaluating potential routes.

(B) Summary Comparison Table

The summary comparison table is attached hereto as Table 03-1.

(C) Copy of Route and Site Selection Study

The route selection study is attached hereto as Appendix 03-1.

Table 03-1
(Page 1 of 2)

Summary and Comparison of Alternative Route Characteristics

Characteristic	Route 1A	Route 1B (Alternate)	Route 2A	Route 2B (Preferred)	Route 3A	Route 3B
Total length (feet)	23,400	**22,700**	27,050	26,400	39,560	38,560
Length along existing road, railroad, or *transmission line*	8,000	800	12,130	5,100	**20,370**	14,250
Length along township-range or section line (feet)	0	0	0	0	**16,620**	14,250
Significant angles (number)	10	**5**	9	**5**	10	6
Residences within 75 feet of centerline (number)	**0**	**0**	**0**	**0**	2	2
Other sensitive properties* within 75 feet of centerline (description)	**None**	**None**	**None**	**None**	**None**	**None**
Residences within 250 feet of centerline (number)	3	**0**	3	**0**	16	13
Other sensitive properties* within 250 feet of centerline (description)	Cemetery	**None**	Cemetery	**None**	Cemetery	**None**
Perennial stream crossings (number)	3	3	**2**	**2**	3	3
Floodplains crossed (feet)	1,250	**0**	1,000	**0**	1,000	**0**
Wetlands crossed (feet)	**0**	**0**	**0**	**0**	**0**	**0**

Table 03-1
(Page 2 of 2)

Summary and Comparison of Alternative Route Characteristics

Characteristic	Route 1A	Route 1B (Alternate)	Route 2A	Route 2B (Preferred)	Route 3A	Route 3B
Forest land crossed (feet)	**15,200**	20,700	19,200	23,600	31,500	33,550
Public road crossings (number)	7	5	6	**4**	11	10
Railroad crossings (number)	**0**	**0**	**0**	**0**	**0**	**0**

Notes:

1. Numbers in bold type represent the most favorable value for each characteristic, indicating the route that would have the least contact with undesirable characteristics or the most contact with desirable characteristics.
2. *Sensitive properties include parks, historical sites, recreation areas, schools, churches, cemeteries, and hospitals.

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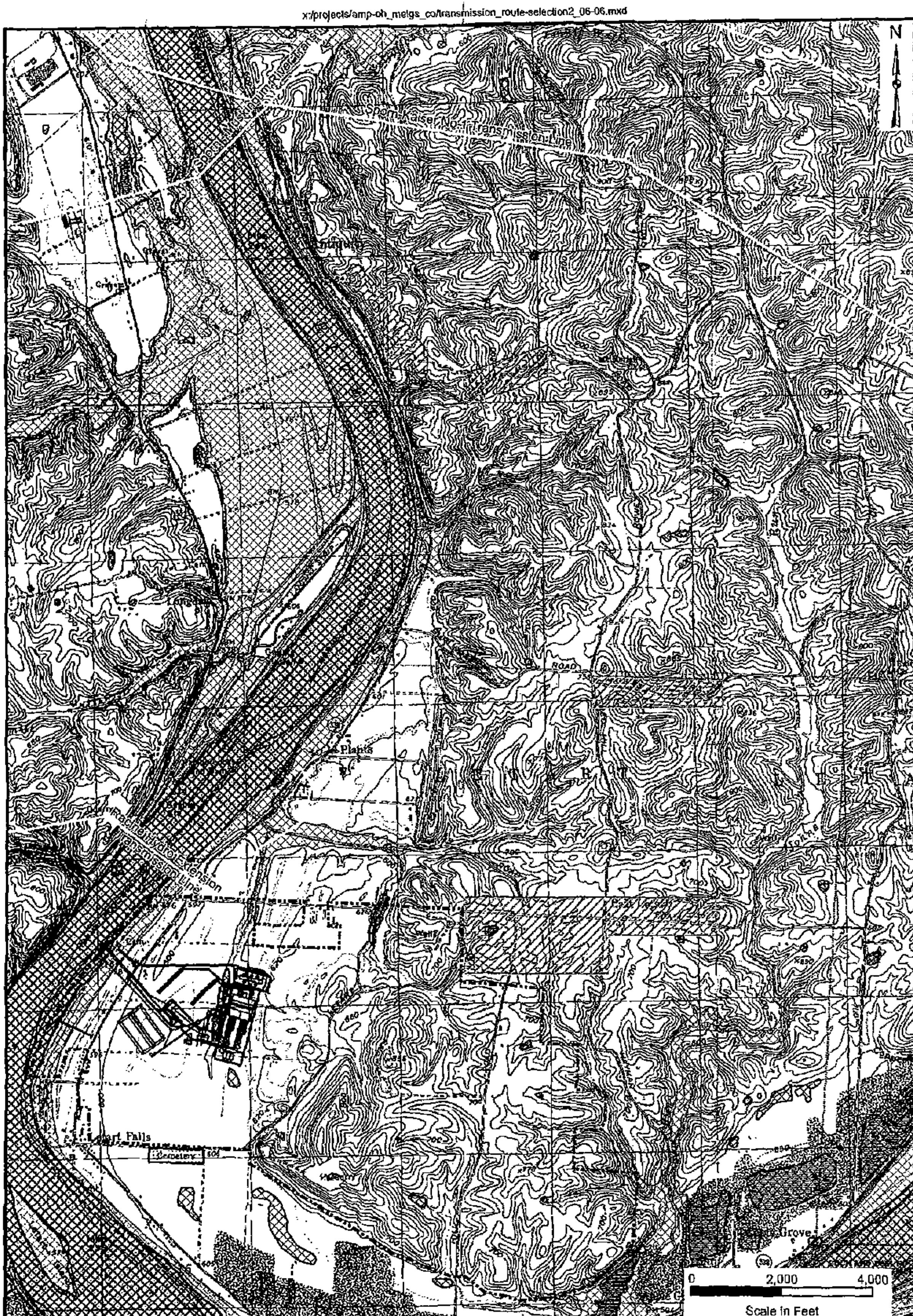

LEGEND:

Proposed Property Boundary

100-Year Flood Area (FEMA Q3 data)

Residential Concentration

Cemetery

Wetlands (USFWS NWI)

Lacustrine

Palustrine

Riverine

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangles
New Haven, WV-OH (1958, photorevised 1987) and Ravenswood, OH-WV (1960, photorevised 1987).

AMP OHIO

AMPGS
TRANSMISSION PROJECT

FIGURE 03-1
APPROXIMATE STUDY AREA
AND MAJOR CONSTRAINTS

JOB NO. 14946376

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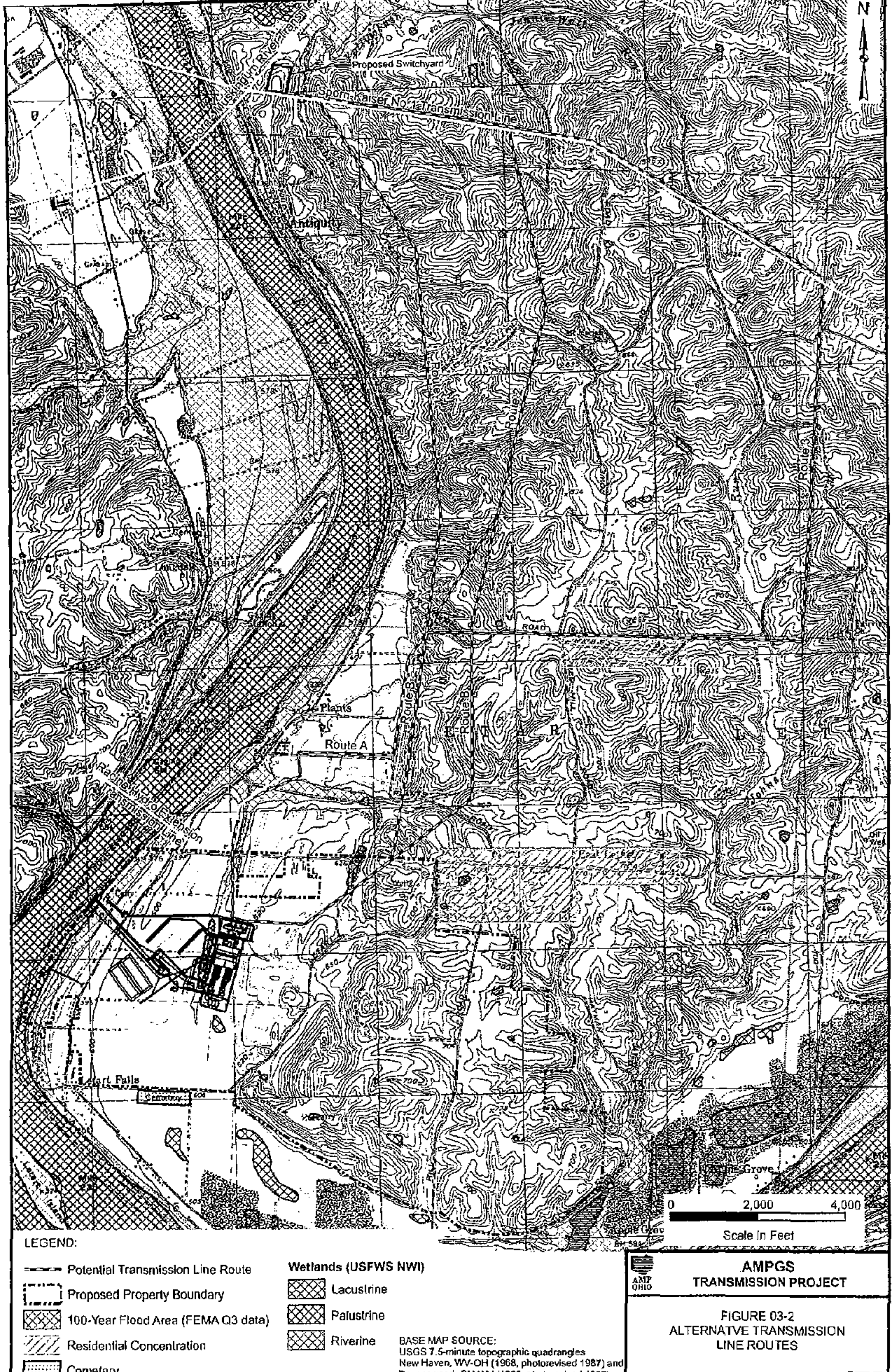

AMPGS
TRANSMISSION PROJECT

FIGURE 03-2
ALTERNATVE TRANSMISSION
LINE ROUTES

LEGEND:

- Proposed Property Boundary
- Preferred Route
- Alternate Route
- Proposed Pole Location
- Residential Concentration
- Cemetery

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangles
New Haven, WV-OH (1968, photorevised 1987) and
Ravenswood, OH-WV (1960, photorevised 1987).

AMP OHIO

AMPGS
TRANSMISSION PROJECT

FIGURE 03-3
PREFERRED AND
ALTERNATE ROUTES

JOB NO. 14946376

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APPENDIX 03-1

ROUTE SELECTION STUDY

AMERICAN MUNICIPAL POWER GENERATING STATION

TRANSMISSION LINE ROUTE EVALUATION
SL-008843
REV. 1

PREPARED FOR

JULY 2007
PROJECT NO. 11501-042

PREPARED BY

Sargent & Lundy LLC

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LEGAL NOTICE

This report was prepared by Sargent & Lundy, L.L.C., hereinafter referred to as Sargent & Lundy or S&L, expressly for American Municipal Power-Ohio, Inc. (AMP-Ohio) and its project partners, Blue Ridge Power Agency (BRPA) and Michigan South Central Power Agency (MSCPA). Neither Sargent & Lundy, nor any person acting on their behalf (a) makes any warranty, express or implied, with respect to the use of any information or methods disclosed in this report or (b) assumes any liability with respect to the use of any information or methods disclosed in this report.

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1. INTRODUCTION

Sargent & Lundy, L.L.C. (S&L) was requested by American Municipal Power-Ohio, Inc. (AMP-Ohio) and its project partners, Blue Ridge Power Agency (BRPA) and Michigan South Central Power Agency (MSCPA), collectively known as the Participants, to identify and evaluate alternative transmission line routes for the proposed American Municipal Power Generating Station (AMPGS) in Meigs County, Ohio. Environmental and technical data were used to evaluate the potential routes for impacts on sensitive land uses, natural habitats, and other environmental features. The routes also were evaluated for technical characteristics that affect costs and constructability. Six alternative routes were evaluated. These alternatives include three primary routes, each with two sub-routes. Based on the evaluations of these routes, one preferred route and one alternate route were selected.

The methods used in the route evaluation and the results of the evaluations are summarized below.

2. METHODS

2.1 ROUTING CRITERIA

At the beginning of the transmission line routing study, S&L and the Participants agreed on the criteria to be followed in identifying and evaluating potential routes. These criteria were based on standard transmission line routing practices and experience on previous transmission line projects. The major routing criteria established for the study were the following:

- Minimize number of residences or other significant structures that would have to be removed for transmission line construction.
- Minimize proximity to residences and other sensitive land uses (parks, preserves, historical sites, recreation areas, schools, churches, hospitals, cemeteries, etc.).
- Maximize use of existing linear corridors by following existing transmission lines, railroads, or roads as much as possible.
- If not following an existing transmission line, railroad, or road, follow section lines or fence lines as much as possible; avoid crossing the middle of farm fields.
- Minimize overall route length.
- Minimize contact with streams, floodplains, wetlands, forested areas, and other sensitive natural habitats.

- Minimize contact with areas where terrain or drainage would interfere with transmission line construction and maintenance.
- Minimize crossings of public roads and railroads.
- Minimize clear views of the transmission line from residential concentrations, recreational areas, heavily traveled highways, and other areas where there are large numbers of potential viewers.
- Minimize number of route angles (changes in direction that would require heavier and more expensive transmission towers).

These criteria focus both on minimizing adverse environmental impacts and ensuring that the transmission line can be constructed without excessive costs or constructability problems. The route evaluations were based on a double-circuit 345-kilovolt (kV) transmission line, with a right-of-way width of 150 feet.

2.2 DATA COLLECTION AND CONSTRAINT IDENTIFICATION

Data for the transmission routing study were obtained from the Internet sites of state and federal agencies, aerial photographs, topographic maps, National Wetlands Inventory maps, and field reconnaissance from roads and other public vantage points.

The data were used to identify routing constraints, which are land uses or natural features that are favorable or unfavorable for transmission line routing. Favorable features identified in the AMPGS site area included existing transmission lines, roads, and township-range lines, which a new transmission line could parallel to minimize environmental impacts. Unfavorable features included residences, cemeteries, water bodies, floodplains, wetlands, and forested areas. These favorable and unfavorable constraints were considered in identifying and evaluating potential routes, as described below.

2.3 POTENTIAL ROUTE IDENTIFICATION AND EVALUATION

With the major constraints established, potential routes were identified between the power plant switchyard location and the nearest transmission facility suitable for interconnection. The potential routes were drawn so as to maximize contact with favorable features, minimize contact with unfavorable features, and best satisfy the routing criteria noted above. Because no single route is able to perfectly satisfy all routing criteria, a reasonable number of alternative routes were identified. The number of alternative routes was based on the distance between the end points and the extent of routing constraints in the site area. To the extent possible, each alternative route attempted to make use of certain favorable features while avoiding unfavorable features.

All of the alternative routes were then studied in detail. The important characteristics of each alternative were quantified, including the total route length, the amount of the route that parallels existing corridors, and the amount of contact with sensitive natural habitats. Another important characteristic was the number of residences within 75 feet of the route centerline; these residences would be within the transmission line right-of-way and, therefore, would have to be removed. Residences and other sensitive land uses within 250 feet of the route centerline were quantified as an indication of proximity that could result in adverse visual impacts. The alternative routes were compared with one another in terms of these quantified characteristics, as well as more subjective judgements. Based on an overall assessment of how well each alternative achieved the routing objectives, one preferred route and one alternate route were selected.

3. RESULTS

The nearest transmission line suitable for interconnection in the AMPGS site area is a 345-kV line that passes from north to south through West Virginia, approximately 2.5 miles west of the AMPGS site. However, the Participants decided to interconnect with the nearest suitable transmission line that is located in Ohio. This is the 345-kV Sporn-Muskingum River transmission line, which passes from east to west, approximately 3.5 miles north of the AMPGS site.

The Ohio River forms the western boundary of the area within which potential transmission lines routes could be located. Immediately east of the river is a strip of flat land with an elevation of approximately 600 feet above Mean Sea Level. At the AMPGS site location, this strip of flat land is about 4,000 feet wide, but moving north along the river the strip of land becomes much narrower. Near the Sporn-Muskingum River transmission line, the strip of flat land is only about 250 feet wide in some places. Immediately east of the flat land are bluffs and forested hills, with elevations ranging from about 700 feet to 850 feet above Mean Sea Level. Individual residences are scattered along roads in the flat areas and in the forested hills. The nearest residential concentration is the town of Letart Falls, Ohio, which is located approximately 1 mile southwest of the AMPGS site. Some areas in the forested hills between the AMPGS site and the Sporn-Muskingum River transmission line are experiencing considerable recent residential development.

Ohio Route 124, a narrow two-lane highway, is located in the strip of flat land along the Ohio River. North of the AMPGS site, this highway passes under the Sporn-Muskingum River transmission line, so parallel to the highway was considered as a potential route for the new transmission line. However, numerous occupied residences and some businesses are located on both sides of this highway, and it would not be feasible to construct the transmission line without removing many of these residences and/or businesses. In addition, because the strip of flat land is so narrow in some places, it would not be feasible to maintain the standard 150-foot-wide transmission right-of-way between the highway and the adjacent bluffs. Therefore, construction and maintenance of the transmission line would be very difficult, and it might not be possible to maintain safe clearances between the line and highway traffic. For these reasons, paralleling Ohio Route 124 was rejected.

The only other significant linear corridors in the area between the AMPGS site and the Sporn-Muskingum River transmission line are a few township roads, one 138-kV transmission line, and one 69-kV transmission line. The 69-kV line, which is known as the Racine-Hydro Extension transmission line, originates from a substation at the Racine Dam, which is located approximately 2,500 feet north of the AMPGS site. This line proceeds south to Township Road 623 and then turns west to cross the Ohio River. The 138-kV line, which is known as the Sporn-Kaiser No. 1 transmission line, passes from the southeast to the northwest, about 3 miles north of the AMPGS site. This line crosses the Sporn-Muskingum River transmission line near Ohio Route 124. The crossing point is in an area of relatively flat, high ground that would be suitable for the construction of a switchyard. Therefore, this point was considered to be the most logical location for interconnecting with the Sporn-Muskingum River transmission line. All of the potential transmission line routes described below begin at this point.

Based on the site area conditions described above, six alternative transmission line routes were identified for the AMPGS site. These alternatives included three primary routes, each with two sub-routes, as summarized below.

- Route 1 originates at the interconnection point described above and parallels the north side of the existing Sporn-Kaiser No. 1 transmission line for about 800 feet to the east-southeast. This route then proceeds south through forested hills, generally following the edge of the bluffs overlooking the Ohio River, for several thousand feet. At this point, Route 1A descends from the bluffs, proceeds south through flat farmland for about 3,000 feet, then parallels the north side of Township Road 214 for about 2,000 feet to the west, and then parallels the existing Racine-Hydro Extension transmission line to the AMPGS site. Route 1B proceeds south through the forested hills for several thousand additional feet, and then turns southwest and west to enter the AMPGS site. By following Township Road 214 and the Racine-Hydro Extension line, Route 1A makes more use of existing corridors than does Route 1B. However, Route 1A is approximately 700 feet longer, requires more angles, comes within 250 feet of three residences and a cemetery, and twice crosses the Racine-Hydro Extension line.

- Route 2 originates at the interconnection point described above and parallels the north side of the existing Sporn-Kaiser No. 1 line for about 5,100 feet to the east-southeast. It then generally proceeds south through forested hills for several thousand feet before splitting into the same A and B alternatives described above. By following the Sporn-Kaiser No. 1 line farther to the east than Route 1, Route 2 adds some length but avoids areas of active residential development along the bluffs overlooking the Ohio River.

- Route 3 originates at the interconnection point described above and parallels the north side of the existing Sporn-Kaiser No. 1 line for about 14,000 feet to the southeast. It then proceeds south through forested hills for about 8,000 feet, paralleling the west side of the dividing line between Range 11 West and Range 12 West. Route 3 then turns west and parallels the south side of the dividing line between Township 1 North and Township 2 North for about 8,000 feet. It then splits into the same A and B alternatives described above. By following the Sporn-Kaiser No. 1 line farther to the east than Route 2 and then following township-range lines, Route 3 makes maximum use of existing linear corridors. However, Route 3 adds considerable length and passes through areas of active residential development along County Road 28 and Township Road 98. By passing through these areas of active residential development, Route 3 comes close to many more residences than do any of the other alternatives. At least two of these residences appear to be within the proposed right-of-way and, therefore, would have to be removed.

The locations of the alternative routes are shown in Figure 1. The key characteristics of the routes are summarized in Table 1.

As indicated in Table 1, each alternative route offers certain advantages and disadvantages. Route 2B was selected as the preferred route for the following reasons:

- Does not require any structures to be removed and does not pass within 250 feet of any occupied residences or other sensitive properties.

- By avoiding the areas of active residential development along the bluffs overlooking the Ohio River and along County Road 28 and Township Road 98, Route 2B minimizes potential conflicts with future developments.

- Requires the fewest angles, fewest public road crossings, and fewest perennial stream crossings.

- Does not appear to have any significant problems that would negate the advantages described above.

Route 1B was selected as the alternate because it is the only route other than Route 2B that does not pass within 250 feet of occupied residences or other sensitive properties. Also, it is the shortest route and has many of the same advantages as Route 2B. It is less desirable than Route 2B because it passes through the area of active residential development along the bluffs overlooking the Ohio River. It also makes less use of the existing Sporn-Kaiser No. 1 transmission line corridor and requires both more public road crossings and perennial stream crossings.

Table 1. Comparison of Alternative Routes for the AMPGS Site

Characteristic	Route 1A	Route 1B (Alternate)	Route 2A	Route 2B (Preferred)	Route 3A	Route 3B
Total length (feet)	23,400	**22,700**	27,050	26,400	39,560	38,560
Length along existing road, railroad, or transmission line	8,000	800	12,130	5,100	**20,370**	14,250
Length along township-range or section line (feet)	0	0	0	0	**16,620**	14,250
Significant angles (number)	10	**5**	9	**5**	10	6
Residences within 75 feet of centerline (number)	**0**	**0**	**0**	**0**	2	2
Other sensitive properties* within 75 feet of centerline (description)	**None**	**None**	**None**	**None**	**None**	**None**
Residences within 250 feet of centerline (number)	3	**0**	3	**0**	16	13
Other sensitive properties* within 250 feet of centerline (description)	Cemetery	**None**	Cemetery	**None**	Cemetery	**None**
Perennial stream crossings (number)	3	3	**2**	**2**	3	3
Floodplains crossed (feet)	1,250	**0**	1,000	**0**	1,000	**0**
Wetlands crossed (feet)	**0**	**0**	**0**	**0**	**0**	**0**

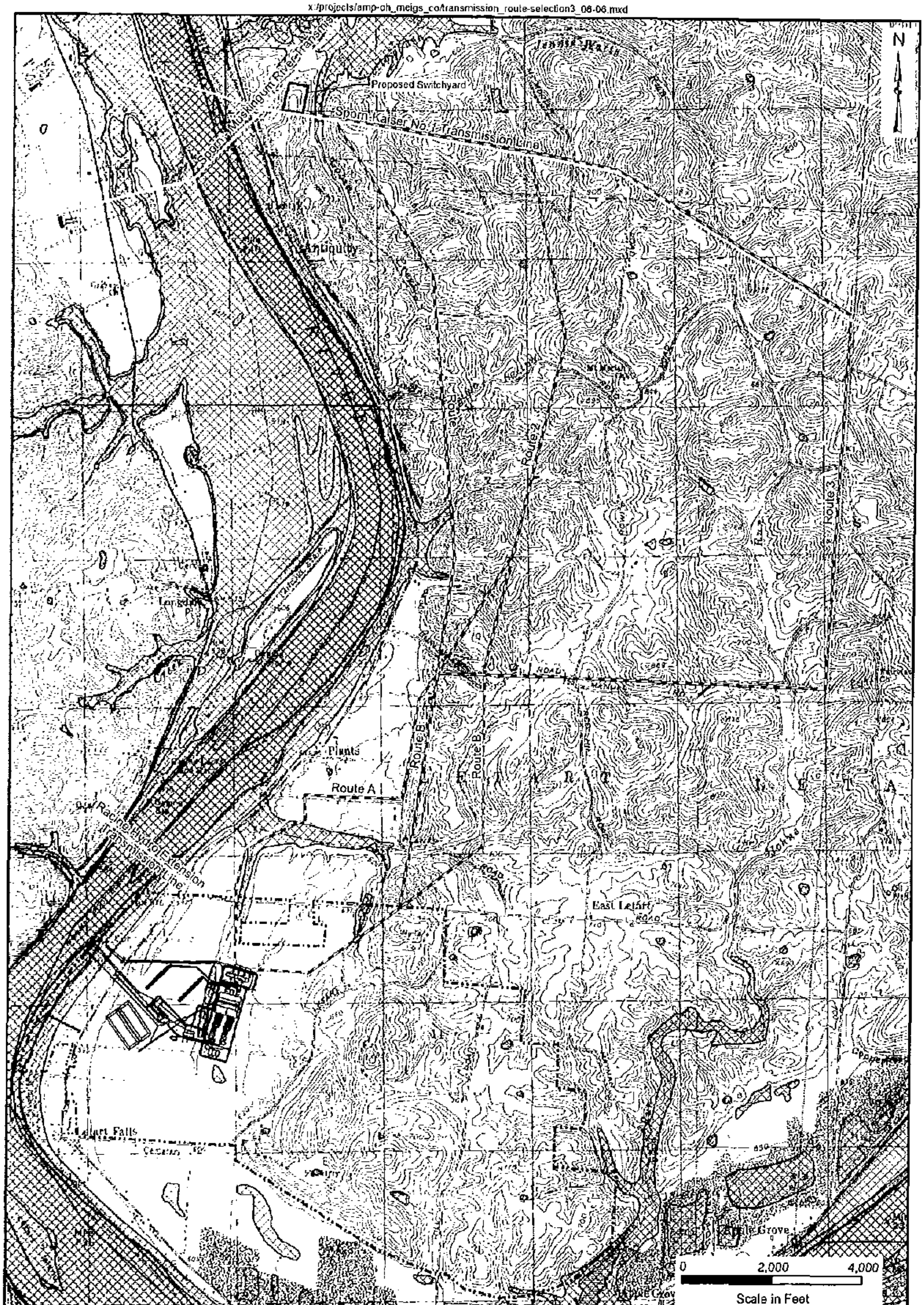
Characteristic	Route 1A	Route 1B (Alternate)	Route 2A	Route 2B (Preferred)	Route 3A	Route 3B
Forest land crossed (feet)	**15,200**	20,700	19,200	23,600	31,500	33,550
Public road crossings (number)	7	5	6	**4**	11	10
Railroad crossings (number)	**0**	**0**	**0**	**0**	**0**	**0**

Notes:

1. Numbers in bold type represent the most favorable value for each characteristic, indicating the route that would have the least contact with undesirable characteristics or the most contact with desirable characteristics.
2. *Sensitive properties include parks, historical sites, recreation areas, schools, churches, cemeteries, and hospitals.

Figure 1. Alternative Transmission Line Routes

(see following page)



LEGEND:

- - - Potential Transmission Line Route
Proposed Property Boundary
100-Year Flood Area (FEMA Q3 data)

Wetlands (USFWS NWI)
Lacustrine
Palustrine
Riverine

BASE MAP SOURCE
USGS 7.5-minute topographic quadrangles
New Haven, WV-OH (1968, photorevised 1987) and
Ravenswood, OH-WV (1960, photorevised 1987)

AMP OHIO

AMPGS
TRANSMISSION PROJECT

FIGURE 1
ALTERNATVE TRANSMISSION
LINE ROUTES

JOB NO. 14946378

URS

OAC 4906-15-04 TECHNICAL DATA

(A) <u>Route Alternatives</u>

(1) Geography and Topography

A map at 1:24,000 scale, including the area 1,000 feet on each side of the proposed transmission line route, is provided as Figure 04-1. This map was developed from the following United States Geological Survey ("USGS") 7-1/2 minute topographic maps:

- New Haven, West Virginia-Ohio 1968 (photorevised 1987),
- Ravenswood, West Virginia-Ohio 1960 (photorevised 1987)

The information on the map was updated through review of aerial photography provided by the United States Department of Agriculture Farm Service Agency ("USDA-FSA") (2004) and project-specific aerial photography taken in November 2005, as well as field reconnaissance conducted in January and February 2006. The information provided in this map includes the following features:

(a) Line Alignments and Turning Points

The proposed alignments for the Preferred and Alternate Routes, including the proposed turning points, are shown in Figure 04-1.

(b) Proposed Substation (Switchyard) Locations

Both the Preferred and Alternate Routes originate at the AMPGS switchyard and terminate at an interconnection switchyard where the transmission line ties into the 345 kV Sporn-Muskingum River transmission line, as applicable for each route. The locations of the switchyards are shown in Figure 04-1.

(c) Major Highways and Railroads

The Preferred and Alternate Routes do not cross any major highways or railroads. State Route 124 parallels the Ohio River and at its closest point comes within approximately 750 feet of the Alternate Route and 2,000 feet of the Preferred Route. Minor roads crossed by both the Preferred and Alternate Routes include, from south to north, Hill Road, Manuel Road and Blind Hollow Road. In addition, the Preferred Route crosses Canter Road, and the Alternate Route crosses McNickle Road and Johnson Road.

(d) Air Transportation Facilities

No active existing or proposed air transportation facilities were identified within 1,000 feet of either Route. A private airstrip (identified as Lieving (Pvt) on the current Cincinnati Sectional Aeronautical Chart) is located on the West Virginia side of the Ohio river approximately 2,500 feet west of the Alternate Route and 3,750 feet west of the Preferred Route.

(e) Utility Corridors

Electric transmission lines within the study corridor include the 345 kV Sporn-Muskingum River, the 138 kV Sporn-Kaiser No. 1, and the 69 kV Racine Hydro Extension electric transmission lines. The transmission project will connect the AMPGS to the existing 345 kV Sporn-Muskingum River transmission line, located approximately 3.5 miles north of the AMPGS site. The alignments of existing transmission lines are shown in Figure 04-1.

(f) Proposed Permanent Access Roads

Where landowner agreements can be obtained and terrain permits, some access roads may remain after construction is complete.

(g) Lakes, Ponds, Reservoirs, Streams, Canals, Rivers, and Swamps

A full description of the lakes, ponds, reservoirs, streams, canals, rivers, and swamps located within 1,000 feet of the proposed Preferred and Alternate Routes is provided in response to OAC 4906-15-07(B)(3), in Figures 3A through 3C. Several surface waters and wetland areas were identified within 1,000 feet of the proposed Routes. No transmission structures will be located within or immediately adjacent to any water bodies. Less than 5 of the 34 headwaters identified along the Preferred Route during field studies are expected to be crossed during construction access to the proposed structure locations. A map at a 1:24,000 scale showing water bodies in the study area is included as Figure 04-1. Smaller scale maps of stream crossings, ponds, and wetlands within 100 feet of the Preferred and Alternate Routes, as delineated with the aid of Global Positioning Systems ("GPS"), are included as Figures 3A through 3C of Appendix 07-1. A field delineation of streams, wetlands, and other water bodies was conducted along the Alternate Route in June 2007.

(h) Topographic Contours

The topographic contours of the study area, provided at 20-foot intervals, are shown in Figure 04-1. The relief of the area ranges from approximately 560 feet at the location of the proposed AMPGS's riverbank area to approximately 900 feet at hilltops and ridges along the transmission line study corridors.

(i) Soil Associations Crossed by the Preferred and Alternate Routes

Figure 4 of Appendix 07-1 shows the soil associations and series in the study area. No soil conditions were identified that could potentially limit the feasibility of the proposed project.

(j) Population Centers and Legal Boundaries

Population centers and legal boundaries within the vicinity of the Preferred and Alternate Routes are shown in Figure 04-1. The Preferred and Alternate Routes are located in southern Meigs County, Ohio. The Preferred and Alternate Routes cross Letart and portions of Sutton Townships. Population estimates and projections for Meigs County, and Letart and Sutton Townships are provided in Table 06-1.

(2) Slope and Soil Mechanics

(a) Soil Description

Slopes in the areas crossed by the Preferred and Alternate Route exceed 12 percent through much of the study area. In general, transmission pole structures will be placed on the ridge tops to allow spanning of stream valleys and reduce the possibility that vegetation will interfere with the line. The pole structures will be placed on stable ridge tops rather than more unstable steep slopes. Slope and soil mechanics will be carefully considered in the decision-making process where access roads must be improved or constructed. In these areas, soils with the lowest slope and erosion characteristics will be used to construct access roads to the transmission pole structure locations. The following paragraphs were summarized from the Soil Survey of Meigs County, Ohio[1] and provide brief descriptions of soils where slopes exceed 12 percent:

- *Conotton gravelly loam; 18-24 percent slopes (CnE):* The Conotton series consists of very deep, well-drained soils formed on terraces along the Ohio River. The surface layer of Conotton gravelly loam is friable gravelly loam. The upper section of the subsoil is friable very gravelly loam and very friable very gravelly coarse sandy loam; the lower section is very friable very gravelly loamy coarse sand and friable extremely gravelly loamy coarse sand. The substratum is loose extremely gravelly coarse sand. This soil has a low available water capacity and rapid permeability. Conotton gravelly loam is widely used for cultivated crops or pasture.

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[1] Soil Conservation Service, 2000. *Soil Survey of Meigs County, Ohio.* U.S. Department of Agriculture, Soil Conservation Service Office.

- *Gilpin silt loam; 8-15 percent slopes (GhC2):* The Gilpin series consists of moderately deep, well-drained soils formed on strongly sloping to very steep hillsides and narrow ridgetops. The surface layer is friable silt loam. The upper section of the subsoil is friable and firm silt loam; the lower section is firm channery loam. The substratum is sandstone and the soil has a low available water capacity and moderate permeability. Gilpin silt loam is mostly used for woodland.

- *Lakin loamy fine sand; 12-18 percent slopes (LaD):* The Lakin series consists of very deep excessively drained soils formed in coarse textured eolian or water-laid materials. Lakin soils are located dominantly on the leeward side of major stream valleys. The surface and subsoil layers of these soils have very weak fine granular structures; and are very friable. These soils are excessively drained and the potential for surface runoff is negligible to low. Permeability is rapid. Slope ranges from 12 to 18 percent.

- *Upshur-Gilpin complex; 8-15 percent slopes, eroded; 15-25 and 25-50 percent slopes (UgC2, UgD, UgE):* The Upshur-Gilpin complex series consists of very deep to moderately deep, well-drained soils formed in residium derived from siltstone, sandstone, and shale. They are typically located on strongly sloping or steep uplands (ridgetops and hillsides). The Upshur soil portion has a friable, surface layer and moderate-fine, granular structure. The subsoil has moderate-medium subangular blocky structure and is firm. The surface layer of the Gilpin soil portion has a weak-fine granular structure and is friable. The subsoil has weak-fine and medium subangular blocky structure and is friable. Slopes range from 8 to 50 percent.

(b) Discussion of Rationales

Inasmuch as the transmission pole structures will be located out of stream valleys and other low-lying areas, it is expected that wet and unstable soils will be avoided. The soil types that may be expected are firmer and may include rock of various qualities. A geotechnical program will be performed that will include soil sampling and testing to evaluate the foundation types and sizes required to support the pole structures. The foundation type expected to be used for the project is a drilled concrete pier or caisson, approximately 5 to 10 feet in diameter and 20 to 40 feet deep. This foundation type is commonly used for transmission pole structures, and it can be installed in most soil conditions. The foundation will be installed by drilling a hole to the required diameter and depth. Reinforcing bars and anchor bolts will be placed and a hole will be filled with concrete.

(B) <u>Layout and Construction</u>

(1) Site Activities

(a) Surveying and Soil Testing

Aerial photographs, Meigs County Auditor's maps, and USGS topographic maps have been used to assist in selecting the Preferred and Alternate Routes. Survey work will involve establishing control points and collecting data on ground elevation, roadways, sidewalks, structures, buried and overhead utilities, property lines, and other information required for the design of the transmission line. This survey work is not expected to require extensive cutting or clearing of trees or brush.

Soil borings will be taken at various locations along the route for the transmission project. The locations of these proposed soil borings will be staked and Ohio Utilities Protection Service ("OUPS") will be notified prior to any soil borings. These soil borings will be taken by using a drop hammer to drive a sampler tube. Soil capacity is determined by the number of blows required to drive the tube 12 inches into the ground. Soil samples will be taken with a split-spoon at 5-foot intervals and will be used to determine soil type. This testing will be performed to a depth of approximately 40 feet. Results of these soil tests will be used to design the structure foundations.

(b) Grading and Excavation

A small amount of grading is expected to be required at most of the pole structure locations in order to construct the transmission line. The existing terrain within the Preferred and Alternate Routes ROW, although somewhat hilly, generally will not require grading. However, each pole structure location will require a graded pad and an augured hole for foundation placement. Each graded pad will be approximately 100 feet by 100 feet. Each foundation excavation will be approximately 5 to 10 feet in diameter and 20 to 40 feet deep. In addition to the pads for the pole structures, grading will be required to construct access roads to some of the structure locations and to construct the interconnection switchyard. The access roads typically will be approximately 14 feet wide in straight sections and 16 to 20 feet wide in curves. The switchyard will cover an area approximately 500 feet by 450 feet.

(c) Access Roads and Trenches

Access is required for each of the proposed pole structure locations. Following selection of the Preferred Route, considerable attention was paid to selecting pole structure and access road locations so as to minimize the construction of new roads.

(d) Stringing of Cable

During wire stringing operations, areas along the transmission project will be used as setup locations for the wire puller, conductor reels, optical groundwire reels, and the wire tensioner. Conductor installation will be accomplished using the tension stringing method. Lightweight cables or ropes will be fed through the stringing sheaves of the sections of lines that require stringing. Conductors will be pulled through under sufficient tension to keep the conductor off the ground to prevent any damage to the conductor. Temporary guard or clearance poles will be used as a safety precaution at locations where the conductors could create a hazard to either crew members or the general public. The locations and heights of clearance poles will be such that conductors are held clear of other electric distribution lines, communication cables, and roadways. The stringing operation will be under the observation of transmission line crew members at all times. The observers will be in radio and/or visual contact with the operator of the stringing equipment.

(e) Removal and Disposal of Construction Debris

Debris generated by the construction of this project will include pallets, material crates and boxes, wire reels and wrappings, and wire scraps. All debris will be collected on a daily basis and placed in commercial dumpsters. No debris will be burned or buried.

Disposal of cleared vegetation will be consistent with the landowner's preferences, wildlife values, and particular site conditions. Debris will be kept out of streams, ponds and other water areas, pastures and fields. Logs may be left in tree lengths, log lengths or as otherwise designated by the property owner. If the owner does not want the logs, AMP-Ohio will dispose of them in a suitable manner. Where slopes exceed 30 percent, material may be scattered over the ROW so that it lies as close to the ground as possible. Where slopes are less than 30 percent, woody debris and brush may be windrowed at either or both sides of the ROW. If areas are accessible to chipping equipment, smaller vegetation debris may be chipped and scattered or removed.

(f) Post Construction Reclamation

Topsoil at pole structure foundation excavations will be stockpiled and protected from erosion. Topsoil will be redistributed over disturbed areas to ensure permanent re-vegetation following construction. Restoration, including temporary and permanent seeding, will be coordinated with construction activities to ensure re-vegetation and soil stabilization at the earliest reasonable time. Following construction, all pole structure sites, material storage sites, and temporary access roads will be seeded with a suitable grass seed mixture as specified in the erosion and sediment control plan. Re-vegetation techniques will enhance the ROW for appropriate wildlife food and habitat. Where stream banks are disturbed, they will be restored (by planting of low-growing species, where necessary) in order to prevent bank erosion. Any lawn or garden areas, or paved areas damaged during the construction of the transmission line, will be restored to original condition. Any landscaping or landscape plantings damaged during construction will also be restored to original condition or replaced. After restoration is complete, the ROW will be inspected to determine conditions of areas of erosion, sedimentation, and inadequate re-vegetation. Upon discovery of such conditions, prompt efforts will be taken to correct them.

(2) Layout for Associated Facilities

(a) Map of Associated Facilities

This project is proposed to support the AMPGS. Details regarding the AMPGS and the switchyard located at the AMPGS are included in a separate application (Case No. 06-1358-EL-BGN). This application includes the interconnection switchyard to be located at the northern end of the AMPGS transmission line. The basic layout of the interconnection switchyard is shown in Figure 04-2.

(b) Reasons for Proposed Layout and Unusual Features

The proposed interconnection switchyard site was selected based on transmission access and topography. The 345 kV Sporn-Muskingum River and 69 kV Racine Hydro Extension transmission lines intersect at the proposed site, allowing the project to interconnect with the local transmission system. The site is located at a relatively high elevation with relatively flat terrain, requiring less site grading than most adjacent areas would require. The site is located out of visual range from any local roads and homes. There are no unusual features to the switchyard site or layout.

(c) Future Modification Plans

AMP-Ohio does not anticipate any future modification plans associated with the transmission line at this time.

(C) <u>Transmission Equipment</u>

(1) Transmission Line Design

(a) Design Voltage

The transmission project will be designed and operated at 345 kV in a double circuit configuration.

(b) Tower Designs, Pole Structures, Conductor Site and Number per Phase, and Insulator Arrangement

The transmission project will be constructed on single shaft, self supported, tubular steel, and double circuit pole structures. Spans between poles will vary from approximately 750 to 1,200 feet. The poles typically will be approximately 150 feet tall. The poles will support two shield wires and two circuits, each consisting of a bundle of two conductors at each phase position. V-string insulator assemblies will be used for all suspension structures, and dead-end assemblies with jumpers will be used at each dead-end structure. All pole structures will be either suspension or dead-end type and will look essentially the same. A typical pole structure with approximate dimensions is shown in Figure 04-3.

(c) Base Foundation and Design

Each transmission pole structure will be supported on a single cast-in-place concrete drilled pier foundation. Each foundation will be approximately 5 to 10 feet in diameter and 20 to 40 feet deep. A reinforcing steel cage will be cast in the foundation along with anchor bolts, to which the pole will be connected.

(d) Underground Cable

Not applicable; there are no underground cables associated with this project.

(e) Other Major Equipment or Special Structures

The major transmission line components include the concrete foundations, steel pole structures, conductors, shield wires, and insulator assemblies.

(2) Electric Transmission Substation Description

Details regarding the associated switchyard at the AMPGS are included in the Generation Application (Case No. 06-1358-EL-BGN). This Application for the transmission project applies to the interconnection switchyard to be located at the northern end of the transmission line (Figure 04-1). The switchyard will cover an area approximately 500 feet by 450 feet, and will be enclosed by a chain link fence. The surface of the switchyard will be covered with a layer of crushed rock.

(a) Breakers

The switchyard is expected to include at least three 345 kV dead tank gas circuit breakers.

(b) Switchgear

The switchyard will include breaker disconnect switches, line disconnect switches, and dead-end structures to allow for individual line and breaker isolation.

(c) Bus Arrangement and Structures

The interconnection switchyard will have dead-end structures for termination of all lines and bus support structures for the bus bar and surge arrestors.

(d) Transformers

The switchyard will include various metering transformers to support operation. No bulk power transformers are proposed for this switchyard.

(e) Control Buildings

The switchyard includes a control building to house protection and communication equipment.

(f) Other Major Equipment

No other major equipment is proposed.

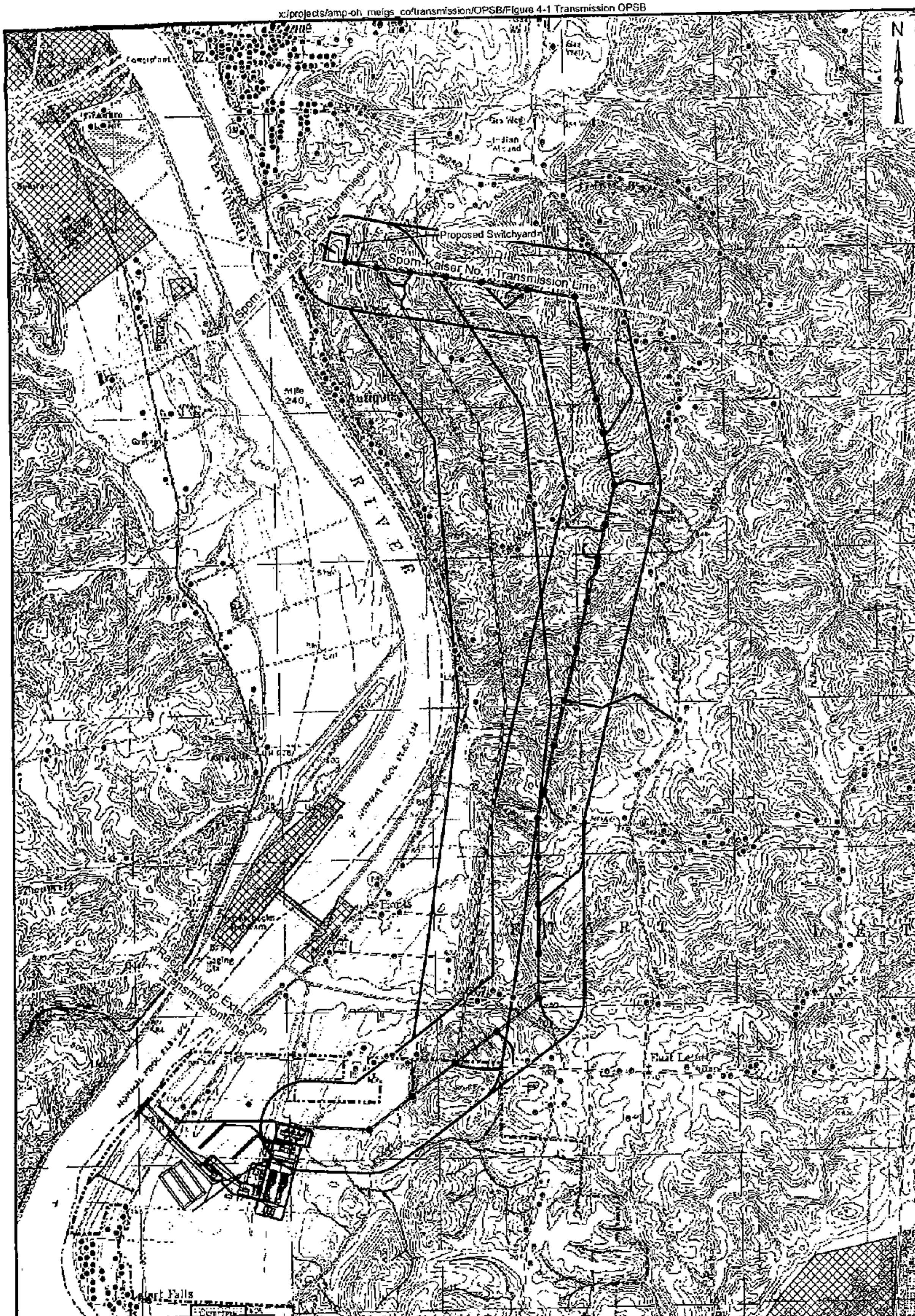
(3) Gas Transmission Line Data

Not Applicable.

(4) Gas Transmission Facilities

Not Applicable.

x:/projects/amp-oh_meigs_co/transmission/OPSB/Figure 4-1 Transmission OPSB



Legend

- Proposed Pole Location
- Preferred Route
- Alternate Route
- Existing Transmission Line
- Access Roads
- Residence
- Alternate Route 1000 Foot Buffer
- Preferred Route 1000 Foot Buffer
- Industrial/Commercial Land Use
- Proposed Property Boundary
- Stream
- Wetland
- Pond

0 2,000 4,000

Scale in Feet

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangle
New Haven, WV-OH (1966, photorevised 1987)
Ravenswood, OH-WV (1960, photorevised 1987)

AMPGS
TRANSMISSION PROJECT

FIGURE 4-1
ROUTE ALTERNATIVES
GEOGRAPHY AND TOPOGRAPHY

JOB NO. 14946376

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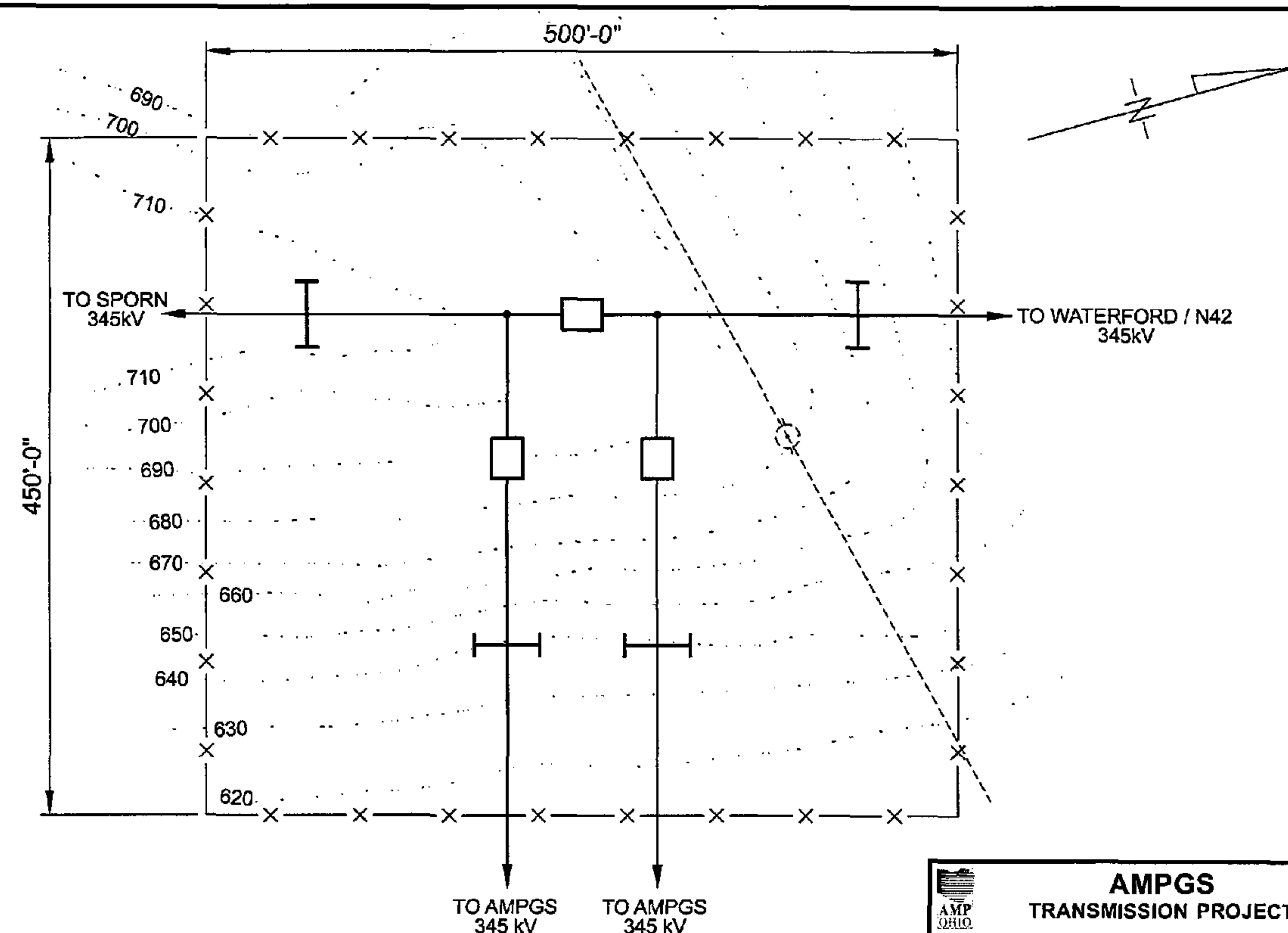

AMPGS
TRANSMISSION PROJECT

FIGURE 04-2
AMP OHIO REMOTE 345kV SUBSTATION

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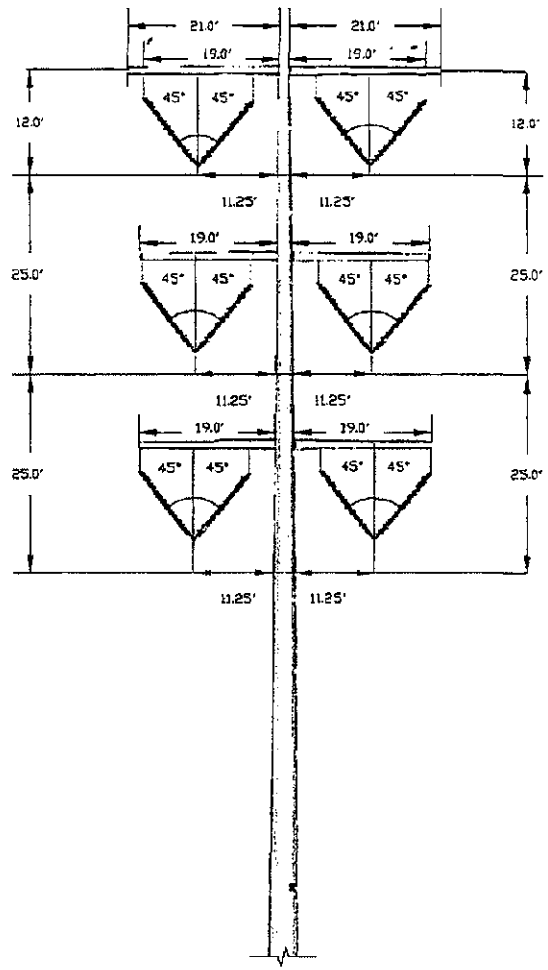


Line Data:

Shield Wire:	7No.8 Alumoweld
345kV Conductor:	1272kcmil ACSR "Pheasant"
Avg. Structure Height:	135'
Ruling Span:	975'
Min. Span:	375'
Max. Span:	1400'

AMPGS
TRANSMISSION PROJECT

FIGURE 04-3
TANGENT V-STRING 345 kV STEEL POLE
0°- 0.5°LINE ANGLE

JOB NO. 14946381

URS

(A) Ownership

The proposed transmission project, including the power line, pole structures, related facilities, and switchyard at the AMPGS site will be owned and operated by AMP-Ohio.[1] However, AEP owns the interconnection switchyard at the 345 kV Sporn-Muskingum River transmission line. With respect to ownership of the ROW, AMP-Ohio will obtain easements from the underlying landowners to construct and site the transmission project.

(B) Electric Capital Costs

Estimates of applicable capital and intangible project costs for the Preferred and Alternate Routes are identified in Table 05-1.

Table 05-1: Estimated Capital Costs (Thousands of dollars)

FERC Electric Transmission Plant Accounts	Preferred Route	Alternate Route
351 Land and Land Rights*	250	250
352 Structure & Improvements	1,270	1,080
353 Interconnection Switchyard Equipment	6,000	6,000
354 Towers & Fixtures	0	0
355 Poles & Fixtures	4,940	4,200
356 Conductor & Devices	2,650	2,260
357 Underground Conduit & Manholes	0	0
358 Underground Conductor	0	0
359 Right-of-way clearing and roads, trails, or other access	1,056	888
TOTAL	**15,110**	**13,790**

* Estimated costs for account 350 include the purchase of easements and overhead. Estimate based upon land values provided by Meigs County Auditors' Office.

(C) Gas Capital Cost

Not applicable.

[1] One of AMP-Ohio's developmental partners, Blue Ridge Power Agency, includes a cooperative, which may for reasons not relevant here, have an individual undivided ownership of less than five per cent (5%) in the AMPGS.

OAC 4906-15-06 SOCIOECONOMIC AND LAND USE IMPACT ANALYSIS

(A) Literature Search and Map Review

A study was conducted to consider the general socioeconomic characteristics and impact on land use due to the transmission project. The study is summarized below and was based on a literature search and map review of materials available from local planning and governmental agencies.

The Preferred and Alternate Routes pass through Letart and Sutton Township in Meigs County, Ohio. Neither the Preferred nor the Alternate Route pass through any incorporated areas. The socioeconomic characteristics of the study areas are the same for both the Preferred and Alternate Routes due to their close proximity. Table 06-1 contains summary information regarding population estimates and projections for the project area.

Table 06-1: Study Area Demographics of Preferred and Alternate Routes

Government Unit	1990 Census	2000 Census	2010 Projections
Meigs County, Ohio	22,987	23,072	23,687
Letart Township	689	641	No Data
Sutton Township	1,529	1,625	Not Available

In 2000, the median household size in Meigs County was 2.47 persons. According to the U.S. Census Bureau, Meigs County's population in 2000 was 23,072. This represents an approximately 0.4 percent increase since 1990. The U.S. Census Bureau projects the population to increase to 23,687 by 2010. Letart Township experienced a slight population decrease from 689 in 1990 to 641 in 2000. Sutton Township experienced a slight population increase from 1,529 to 1,625 in 2000. The population distribution of Meigs County consists of 48.6 percent male compared to 51.4 percent female. The median household income in 2000 for Meigs County was $28,457 with an unemployment rate of 5.4 percent; 9.8 percent of the families lived below the poverty level.

(B) Route Alignments and Land Use

(1) Proposed Routing

Maps at 1:24,000-scale, including the area 1,000 feet on either side of the Preferred and Alternate Route loops, are presented in Figure 06-1 and Figure TL-01. The Preferred and Alternate Routes share common sections along small portions of the southern and northern parts of the routes. The Preferred and Alternate Routes have less than 20 percent of their rights-of-way in common. The proposed interconnection point with the 345 kV Sporn-Muskingum River transmission line is in an area of relatively flat, high ground that would be suitable for the construction of a switchyard. The 138 kV Sporn-Kaiser No. 1 transmission line that passes from the southeast to the northwest is approximately 3.5 miles north of proposed generating station. The 138 kV Sporn-Kaiser No. 1 transmission line crosses the 345 kV Sporn-Muskingum River line near Ohio Route 124. This crossing is the most logical location for interconnection with the 345 kV Sporn-Muskingum River line. The Preferred and Alternate Routes described below begin at this point.

(a) Preferred Route (Route 2B)

5.0-miles: By following the 138 kV Sporn-Kaiser No. 1 line farther to the east than the Alternate Route, the Preferred Route adds some length but avoids areas of active residential development along the bluffs overlooking the Ohio River. The major sections of the Preferred Route are described below.

- The Preferred Route originates at the proposed interconnection switchyard and parallels the north side of the 138 kV Sporn-Kaiser No. 1 line for approximately 5,100 feet to the east-southeast.
- It then proceeds south-southeast through forested hills approximately 4,100 feet and crosses Canter Road (Township Road 101).
- It then proceeds south-southwest through forested hills approximately 7,400 feet, and crosses Blind Hollow Road (Township Road 99).
- It then proceeds due south through forested hills approximately 3,800 feet and crosses Burlingame Road (Township Road 98; also called Manuel Road).
- It then proceeds southwest approximately 4,600 feet. This section of the route crosses Plants Road (Township Road 96) while traversing forested hills, and then descends from the hills on to relatively flat land, where it crosses an unnamed local road.
- It then proceeds west approximately 1,400 feet and reaches the AMPGS switchyard. This section of the route is entirely on the AMPGS site.

(b) Alternate Route (Route 1B)

4.3-miles: The major sections of the Alternate Route are described below:

- The Alternate Route originates at the proposed interconnection switchyard and parallels the north side of the 138 kV Sporn-Kaiser No. 1 line for approximately 800 feet to the east-southeast.

- It then proceeds southeast through forested hills approximately 4,100 feet.
- It then proceeds south-southeast through forested hills approximately 6,200 feet and crosses Johnson Road (Township Road 631), Blind Hollow Road (Township Road 99), and McNickle Road (Township Road 100).
- It then proceeds south-southwest through forested hills approximately 7,800 feet and crosses Burlingame Road aka Manuel Road (Township Road 98) and Plants Road (Township Road 96). This section of the route generally follows the edge of the bluffs overlooking the Ohio River.
- It then proceeds southwest approximately 2,400 feet. This section of the route descends from the forested hills on to relatively flat land, where it crosses an unnamed local road.
- It then proceeds west approximately 1,400 feet and reaches the AMPGS switchyard. This section of the route is entirely on the AMPGS site.

(2) Substations

The Preferred and Alternate Routes originate at the point where the 138 kV Sporn-Kaiser No. 1 and 345 kV Sporn-Muskingum River transmission lines cross. The 138 kV Sporn-Kaiser No. 1 and 345 kV Sporn-Muskingum River lines cross in an area of relatively flat, high ground near Ohio Route 124. This point was considered to be the most logical location for interconnection. The interconnection will require construction of a switchyard, and the proposed interconnection switchyard is addressed in this application. The switchyard proposed for the AMPGS site is included as part of the Generation Application (Case No. 06-1358-EL-BGN).

(3) General Land Use

The project vicinity is dominated by forested land, with residential lands and sparse agricultural areas scattered throughout the study corridor. The southern portion of the project is near Letart Falls, an unincorporated community. There are some residential and agricultural lands located on the eastern and western portion of the project, near the towns of Letart Falls and East Letart. No commercial, institutional, or recreational land uses were identified within 1,000 feet of both the Preferred and Alternate Routes. One Historic Inventory Structure was identified within 1,000 feet of the Alternate Route.

(a) Residential

Scattered residences are located throughout the project area. The areas with the greatest residential densities are located in the southern part of the study area, in Letart Falls, and along Plants Road and Burlingame Road. The Preferred and Alternate Routes avoid residential areas to the extent possible. The construction and operation of the transmission line on either route is not expected to have permanent effects on existing residences. Temporary impacts to existing residences are likely to be limited to occasional low-level construction noise, which will be restricted to daytime hours. No residences will need to be removed as a result of this project as proposed.

Preferred Route: Twelve residences were identified within 1,000 feet of the Preferred Route. Most of these residences are located just north of the proposed generating station property boundary, with others scattered along secondary streets such as Plants and Burlingame Road, throughout the project area. There are no residences located within 250 feet of the Preferred Route.

Alternate Route: Eighteen residences were identified within 1,000 feet of the Alternate Route. Residential clusters generally were similar along the Preferred and Alternate Routes, but the Alternate Route passes near a cluster along the bluffs overlooking the Ohio River that the Preferred Route avoids. There were no residences located within 250 feet of the Alternate Route.

(b) Commercial

There are no commercial land use areas identified within 1,000 feet of both the Preferred and Alternate Routes.

(c) Industrial

There are no industrial land use areas identified within 1,000 feet of both the Preferred and Alternate Routes.

(d) Cultural

Data for known cultural resource landmarks shown on Figures 04-1 were obtained from the following sources:

- The National Register of Historic Places ("NRHP")
- The Ohio Historic Preservation Office ("OHPO")

Preferred Route: No recorded archeological sites were identified within 1,000 feet of the Preferred Route. No Ohio Historic Inventory ("OHI") structures were identified within 1,000 feet of the Preferred Route. No recorded archaeological sites or OHI structures were mapped within 100 feet. No impacts on cultural resources are anticipated as a result of this project. A Phase I Cultural Resources Survey was completed along the Preferred Route in the locations deemed necessary by the OHPO. The archaeological survey of the Preferred Route found eroded soils and logged hill slopes. No cultural resources were documented. No further investigation was recommended for the Preferred Route corridor.

Alternate Route: No recorded archeological sites were identified within 1,000 feet of the Alternate Route. Two OHI structures were identified within 1,000 feet of the Alternate Route. OHI site MEG-051012, identified as a vernacular style Sayre property, is located on State Route 124 approximately 900 feet west of the Alternate Route. OHI site MEG-051112, also identified as a vernacular style Sayre property, is located on State Route 124 and is adjacent to the northwest of OHI site MEG-051012. No archaeological sites or OHI structures were mapped within 100 feet of the Alternate Route.

(e) Agricultural

Agricultural land use areas are mostly concentrated in the vicinity of the proposed generation station site. Based on a review of Meigs County Auditor files, no agricultural district land parcels are crossed by or within 1,000 feet of the Preferred and Alternate Routes.

(f) Recreational

No recreational land use areas were identified within 1,000 feet of the Preferred and Alternate Routes.

(g) Institutional

No institutional land use areas were identified within 1,000 feet of the Preferred and Alternate Routes.

(4) Transportation Corridors

The main transportation corridors within the project vicinity include Plants Road, Burlingame Road, and Blind Hollow Road. These roads are crossed by both the Preferred and Alternate Routes. In addition, since the proposed transmission line runs perpendicular to these roads, they will provide access for construction vehicles and avoid additional socioeconomic and land use impacts. State Route 124 parallels the Ohio River and circumvents the project corridor. No railroads were identified within 1,000 feet of the Preferred and Alternate Routes.

(5) Existing Utility Corridors

Electric transmission lines within the study corridor include the 138 kV Sporn-Kaiser No. 1, the 345 kV Sporn-Muskingum River, and the 69 kV Racine Hydro Extension transmission lines. The 138 kV Sporn-Kaiser No. 1 transmission line runs in a southeast to northwest direction. The 345 kV Sporn-Muskingum River line runs southwest to northeast and intersects the 138 kV Sporn Kaiser No. 1 line at the proposed interconnection switchyard site. The 69 kV Racine Hydro Extension transmission line crosses the Ohio River near the proposed generating station and does not intersect either the Preferred and Alternate Route. The existing utility line corridors are shown on Figures 04-1. The proposed transmission line will ultimately connect to the 345 kV Sporn-Muskingum River transmission line.

(6) Noise Sensitive Areas

The only noise sensitive areas identified within the 1,000-foot corridor of the Preferred and Alternate Routes consist of residences. Twelve homes were identified within 1,000 feet of the Preferred Route, with none of these homes being within 100 feet of the route. Eighteen residences were identified within 1,000 feet of the Alternate Route, with none of these residences located within 100 feet of the route. The Preferred Route and the Alternate Route have no commercial developments within 1,000 feet. Based on the distance of the proposed transmission line from existing residential or commercial areas, little potential exists for construction activities to impact noise sensitive areas.

(7) Agricultural Land

Agricultural areas are mostly concentrated in the vicinity of the proposed power plant site and the corridor along State Route 124. Additional agricultural areas are scattered throughout the project area. Based on a review of Meigs County Auditor files, no agricultural district land parcels are crossed by or within 1,000 feet of the Preferred and Alternate Routes.

(C) Land Use Impacts of the Proposed Project

(1) Impact of Construction

Much of the construction along both the Preferred and Alternate Routes will occur across undeveloped wooded hillsides and ridges. Where possible, construction vehicles will gain access via public roads that cross the project ROW. Additional access route needs will be refined as project engineering moves forward and the locations will be included as part of the Stormwater Pollution Prevention Plan that will be developed for the project in accordance with Ohio EPA requirements. Construction material lay down areas will be located within the existing and proposed ROW. No residences will be destroyed, acquired or removed as a result of the proposed route construction. Based on the absence of identified sensitive land uses, AMP-Ohio does not expect impacts to commercial land, industrial facilities, identified archaeology sites, OHI sites, recreational land use, or institutional land use as a result of construction activities. Due to the lack of identifiable or significant agricultural land or agricultural district land, impacts from construction activities on field operations, such as plowing, planting, spraying, or harvesting are not expected.

AMP-Ohio will work to reduce excavation and soil compaction impacts during construction. The long-term impacts of the project are expected to be limited to the small sections of land lost to the footprint of the pole structures.

(2) Impact of Operation and Maintenance

Operation of the new transmission line is not anticipated to impact any land use in the area. AMP-Ohio will conduct periodic inspections of the transmission line from access points.

(3) Mitigation Procedures

The conversion of forested areas to transmission line ROW is the only anticipated land use change associated with the proposed project. The potential for project-related erosion and sedimentation will be mitigated with the development of a Storm Water Pollution Prevention Plan for the project, which will include the use of silt fence, straw bales, or other appropriate erosion and sedimentation control techniques as required. After construction and final grading are complete, disturbed non-agricultural surface areas will be re-vegetated as appropriate. Any damage resulting from project construction will be repaired to original conditions where deemed necessary by AMP-Ohio in coordination with local landowners.

AMP-Ohio will take necessary measures to ensure that impacts to agricultural lands are minimized. Minimization of soil compaction during and after installation of the required transmission poles and lines, replacement of a portion of the excavated soil for backfill around towers, and the off-site hauling of the excess soil will be used as needed to ensure that agricultural activity can be maintained after construction and during operation of the transmission line.

(D) <u>Public Interaction Information</u>

(1) Townships, Towns, and Villages within 1,000 feet of the Route Alternatives

The Preferred and Alternate Routes cross stretches of Letart and Sutton Township in Meigs County. No incorporated towns or villages are within 1,000 feet of the candidate routes.

(2) Public Interaction

Since the announcement of Meigs County as the selected site for the AMPGS facility, AMP-Ohio has diligently kept open lines of communication with local officials and the general public on both the AMPGS and the associated transmission line. A list of public officials contacted regarding the Application is contained in Appendix 06-1. AMP-Ohio has participated in regular meetings with federal, state and local elected and appointed officials. AMP-Ohio representatives have also attended local meetings and have regularly corresponded as developments have dictated. Membership in the local chamber of commerce has enabled AMP-Ohio to communicate with the business community and provide updates on the project. AMP-Ohio opened an office in Pomeroy, Ohio that is regularly staffed and provides a point of contact for local residents.

(3) Public Information Programs

AMP-Ohio hosts public meetings as required during the siting process and will follow required protocols for these meetings as prescribed. Throughout the siting and construction phases, AMP-Ohio will continue these efforts to keep the public informed on developments. AMP-Ohio has a director of communications assigned the responsibility of working with the news media and coordinating other public education efforts and requests for information. In addition to posting information about the project at the AMP-Ohio office in Pomeroy, Ohio, AMP-Ohio has agreed to post information and updates at the Village Hall in Racine, Ohio, which is the closest incorporated municipality to the proposed plant and transmission line route. AMP-Ohio also has a web site, www.amp-ohio.org, on which it will post regular updates and news from the project.

AMP-Ohio held a public informational meeting on the proposed transmission line on December 5, 2006, in Racine, Ohio at the Southern Elementary School building in conjunction with an informational meeting on the AMPGS project. Public notification of the meeting was published in The Daily Sentinel (Pomeroy, Ohio) on November 21, 2006. Approximately 130 residents attended both meetings, and no comment cards were received regarding the transmission project.

(4) Liability Compensation

AMP-Ohio's insurance program for construction and operation of the proposed facility is outlined below:

For bodily injury and property damage, AMP-Ohio carries primary coverage for the first $1,000,000 for each person or occurrence.

For bodily injury and property damage, AMP-Ohio presently carries additional public liability insurance of $100,000,000 as a result of any one occurrence or account of personal injury, property damage or advertising offense or combination thereof.

AMP-Ohio carries coverage in accordance with the State of Ohio Worker's Compensation Law. This insurance is renewed each year as required by the Industrial Commission of Ohio.

(5) Serving the Public Interest, Convenience, and Necessity

The project will serve the public interest by helping to ensure that increased demands for electricity are met in the future and that existing and future electrical service reliability is enhanced throughout the project area and expanded region. A more detailed discussion of the need for this project and how it will serve the public interest is provided in response to OAC 4906-15-02.

(6) Tax Revenues

State and local tax revenues associated with the transmission project are yet to be determined, but net tax increases will likely be substantial, exceeding several hundred thousand dollars per year.

(7) Impact on Regional Development

The AMPGS (Case No. 06-1358-EL-BGN) will benefit the local and regional communities through employment opportunities and an increased tax base. The transmission line project is a necessary component of the overall AMPGS project.

(E) <u>Health, Safety, and Aesthetic Information</u>

(1) Compliance with Safety Regulations

The 345 kV AMP-Ohio transmission line will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code and AMP-Ohio safety standards. AMP-Ohio will observe all applicable Occupational Safety and Health Administration ("OSHA") and Public Utilities Commission of Ohio ("PUCO") standards.

Safety is the highest priority of AMP-Ohio. This priority of AMP-Ohio towards employee and public safety is exemplified by company policy as stated in the Company Safety Manual. The Manual declares that AMP-Ohio will constantly work to maintain safe and healthy working conditions, consistently adhere to proper operating practices and procedures designed to prevent injuries and illnesses, and conscientiously observe governmental and company safety regulations.

AMP-Ohio also administers a contractor safety program. Contractors working for AMP-Ohio are required to maintain internal safety programs and to provide safety training.

(2) Electric and Magnetic Fields

(a) Calculated Electric and Magnetic Field Levels

Electric and Magnetic Field ("EMF") values have been calculated for the Preferred and Alternate Routes and are included in Table 06-02.

Table 06-02: Calculated EMF Values

	Normal Maximum Line Loading	Winter Normal Conductor Rating	Emergency Line Loading
Current (Amps)	1012	1040	1450
Electric Field at ROW Edge (kV/m)	0.56	0.56	0.56
Max. Electric Field at Centerline (kV/m)	5.23	5.23	5.23
Magnetic Field at ROW Edge (mG)	57	59	84
Max. Magnetic Field at Centerline (mG)	121	124	174

The EMF values were calculated at one meter above the ground for the winter normal conductor rating and the normal maximum line loading conditions. The winter normal conductor rating is defined as the maximum amperage that the conductor can carry under certain wind and ambient air temperature conditions. This condition will produce the greatest calculated line loading that could occur during the most severe single contingency load flow case. Normal maximum loading is the maximum level of line loading when all electrical facilities are in normal operation.

(b) Current State of EMF Knowledge

EMFs are invisible lines of force found throughout nature and around all living things, including every person's central nervous system. In fact, the earth is the largest natural source of magnetic fields, which causes compass needles to point north. Electric and magnetic forces also result from the flow of electric power and are found around all electric appliances, house wiring, and power lines. The strength of these fields decreases rapidly with distance from the source.

As 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 a five-year effort under the National EMF Research Program. The culmination of this project was a final RAPID Working Group report, which was released for public review in August 1998. The Director of the National Institutes of Environmental Health and Sciences ("NIEHS") prepared a final report after receiving public comments.

The NIEHS Director's final report, released to Congress in May, 1999, concluded that extremely low frequency electric and magnetic field ("ELF-EMF") exposure cannot be recognized at this time as entirely safe, but further stated that the conclusion of this report is insufficient to warrant aggressive regulatory concern. The NIEHS also maintains a website (http://www.niehs.nih.gov/health/topics/agents/emf/) where information on EMF can be found.

AMP-Ohio and its consultants follow EMF technical and issue developments through various publications, EPRI research work, and information from professional society meetings. While hundreds of articles have been published over the years, the following publications provide comprehensive assessments and are representative of the current state of knowledge:

National Institute of Environmental Health Sciences. "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields." National Institutes of Health. Triangle Park, North Carolina. June 1999.

National Institute of Environmental Health Sciences. "EMF Questions & Answers, Electric And Magnetic Fields Associated with the Use of Electric Power." June 2002. Available at http://www.niehs.nih.gov/emfrapid/booklet/emf2002.pdf.

Ohio State University Extension. "Are Electromagnetic Fields Hazardous to Your Health?" CDFS-185-96. Available at http://ohioline.osu.edu/cd-fact/.

Electric Power Research Institute (EPRI). "EMF Health Assessment and RF Safety." Various fact sheets, FAQs, and technical information available at http://www.epri.com/emf/default.asp.

American Cancer Society. "The Environment and Cancer Risk, Environmental Factors and Cancer Risk: An Overview." January 2000. Available at http://www.cancer.org/docroot/NWS/NWS_2.asp.

International Agency for Research on Cancer, a part of the World Health Organization. "IARC Monographs Vol. 80, Non-ionizing Radiation, Part I: Static and Extremely Low Frequency (ELF) Electric and Magnetic Fields." 2002. Available at http://www.iarc.fr/IARCPress/index.php.

Minnesota Department of Health. "Electric and Magnetic Fields (EMF)." Available at http://www.health.state.mn.us/divs/eh/radiation/emf/

Public Service Commission of Wisconsin. "EMF- Electric & Magnetic Fields." Available at http://psc.wi.gov/utilityinfo/publications/publications-electric.htm.

(c) Line Design Considerations

The proposed transmission line will be constructed on double circuit 345-kV steel pole structures. Separate circuits will be installed on each side of the structure. Vertical phase arrangements of this kind produce lower levels of EMF than horizontal arrangements. In addition, the phases of the two circuits will be placed in a cross-phase arrangement. On one side of the structure, phases will be arranged A-B-C top to bottom, and phases on the opposite side will be arranged C-B-A top to bottom. This is an accepted technique used to create a canceling effect that reduces EMF levels. The typical pole structure height is approximated at 150 feet.

(d) EMF Public Policy

AMP-Ohio has a well-established procedure to manage EMF inquiries. When AMP-Ohio receives an inquiry about EMF, AMP-Ohio mails a packet of information to the person. The brochure, "Questions and Answers about Electric and Magnetic Fields," is typically included in the packet. The person is requested to review the information and to contact AMP-Ohio if additional information is desired or to request on-site EMF readings. If a person requests, copies of on-site readings are provided.

(3) Aesthetic Impact

The degree of compatibility of a new transmission line will vary with the viewer and the setting. Lines located in wide-open spaces are likely to be identified as having a negative aesthetic impact. New transmission lines are more likely to 'blend-in' with surroundings in areas where existing transmission facilities, industrial and commercial facilities, light poles, other utility facilities, billboards and other larger structures are present. Where these features are not present, routing transmission lines through areas with natural visual screens, such as significant tree cover or topographic barriers, is an effective way to minimize aesthetic impacts. Both the Preferred Route and the Alternate Route predominantly cross areas of forested hills, so a transmission line on either route will be largely screened from clear views. To further reduce aesthetic impacts, the transmission line will utilize monopole structures, as opposed to the larger lattice work.

(a) Views of the Transmission Line

Public views along the Preferred and Alternate Routes from roads, residences, and other potentially sensitive vantage points will be altered as wooded land is replaced with a 150-foot wide ROW along the proposed project corridor. Figure TL-01 provides a cross-sectional view of the Preferred Route. Please refer to Figure 04-3 for a diagram of a typical tower, including tower heights and spans.

(b) Structure Design Features

Engineering requirements primarily dictate the design features of transmission line structures, conductors, and associated hardware. The conductor arrangements and structure designs proposed for the project are discussed in response to OAC Section 4906-15-04(C)(1)(b).

(c) Facility Effect on Site and Surrounding Area

The proposed transmission line will be visible from public roads and a few scattered residences across the project vicinity. However, the steep terrain and wooded nature of much of the area will limit visibility to short distances. The relatively rural and isolated nature of the project vicinity will also reduce the number of individuals potentially impacted. Three electric transmission lines and several distribution lines are currently located in the project vicinity. The proposed project is not expected to have a major negative effect on the area.

(d) Visual Impact Minimization

Engineering requirements, project area topography, existing land use, and project length constrain the ability to minimize the visual impacts of the transmission line. AMP-Ohio has limited the potential aesthetic impacts of the transmission line to the extent possible through the route selection process and use of monopole structures. Visual impacts cannot be limited further because of the terrain and associated engineering constraints present within the project area.

(4) Estimate of Radio and Television Interference

Operation of the transmission line is expected to cause some radio and television signal interference along both the Preferred and Alternate Route. The amount of interference generally should be comparable to the interference caused by operation of the 345 kV Sporn-Muskingum River transmission line.

Table 06-03 contains predicted radio interference "noise" for the proposed transmission line under average fair weather conditions at the edge of the ROW. However, there are no existing residences at the edge of the ROW for both the Preferred and Alternate Route; the nearest existing residences are approximately 300 feet from the route centerline. Therefore, Table 06-03 also shows the predicted radio interference noise at 300 feet from the route centerline.

Table 06-03: Predicted Radio Interference with the Proposed Transmission Line

	Normal Maximum Line Loading	Winter Normal Line Loading
Current (Amps)	1012	1040
Radio Noise at ROW Edge (dB)	42	42
Radio Noise at 300 feet from Centerline (dB)	25	25

The following information relates to the electromagnetic influence of transmission line operation upon both radio frequency interference ("RFI") noise and television interference ("TVI") noise.

Both RFI and TVI are caused by the "corona" produced by an operating transmission line. Corona is the breakdown of air very near the conductors, and it normally occurs when the electric field surrounding the conductors is locally intensified by irregularities, such as scratches or water drops, on the conductor surface. Besides the nuisance aspects of corona, it also results in undesirable power loss over a transmission line. Therefore, the transmission lines incorporate specific conductor and equipment design features to limit or eliminate corona. Abnormally high levels of RFI and TVI can be caused by damaged conductors or insulators, but this type of problem usually can be easily and quickly detected. Once detected, the hardware can be either repaired or replaced, thus eliminating the interference source.

The RFI noise level of an operating transmission line during heavy rain generally is greater than the fair weather noise level. However, the quality of radio reception under typical heavy rain conditions is affected more by atmospheric conditions than by operation of transmission lines.

(F) <u>Cultural Impacts of the Proposed Project</u>

(1) Location Studies

AMP-Ohio commissioned a consultant that performed a review of maps, files, and electronic databases from the following agencies:

- The National Register of Historic Places ("NRHP")
- The Ohio Historic Preservation Office ("OHPO")
- The Ohio Department of Natural Resources ("ODNR")

Further discussion of previously recorded archaeological sites within 1,000 feet of the Preferred and Alternate Routes can be found in response to OAC 4906-15-06(B)(3)(d).

The Phase I survey for the transmission corridor entitled "Addendum Report Phase 1 Archaeology survey, Proposed Baseload Generating Facility, Letart Township, Meigs County, Ohio" did not identify any significant cultural resources. No further studies were recommended for the transmission corridor. The Phase I report was submitted to the OHPO in conjunction with the Phase I report for the AMPGS. In a letter dated December 4, 2006, the OHPO recommended that significant sites identified in the vicinity of the AMPGS be avoided. No significant archaeological sites were identified in the transmission corridor, therefore, no further consultation was deemed necessary.

(2) Construction Impacts on Cultural Resources

Based on the relative flexibility of transmission pole structure placement, no construction impacts on cultural resources are anticipated as a result of this project. In the unlikely event that impacts are unavoidable, coordination will be made with OHPO before proceeding.

(3) Operation and Maintenance Impacts on Cultural Resources

No impacts on cultural resources are anticipated during the operation and maintenance of this line.

(4) Mitigation Procedures

No significant cultural resources were identified during the Phase 1 Survey. Therefore, no mitigation procedures are necessary.

(G) <u>Noise</u>

During the construction phase, noise may temporarily increase as a result of equipment used to install the new transmission line and, where necessary, remove vegetation. Noise impact on nearby sensitive areas is anticipated to be minimal. The total duration of construction for the transmission line on both the Preferred and Alternate Route is estimated at 4 to 6 months. Construction at any one location near residences and other noise sensitive areas is not expected to exceed a total of 4 weeks. Similarly, AMP-Ohio anticipates that noise-sensitive areas will not be significantly affected by the maintenance or operation of the transmission line along both the Preferred and Alternate Route.

(1) Construction

Construction of the transmission line will require short-term use of cranes, augers, compressors, air tampers, generators, trucks, and other equipment. Helicopters may also be needed to transport construction materials, install pole structures, and string conductors on structures. Construction of foundations for structures will require use of a drill rig or large auger at most structure locations.

Typical noise levels at 50 feet for the types of construction equipment expected to be used are listed in Table 06-04 below. This table presents the maximum instantaneous sound level from varied construction equipment as 1-minute averages. Assumed activity for each piece of equipment over a 1-hour and 12-hour period is used to average the instantaneous sound levels to average sound levels over these periods. Since the equipment is assumed to be active for 12 hours over the 12-hour period, the 12-hour Leq is the same as the 1-hour Leq, and the limiting factor is the activity over the 1-hour period.

Construction activities within the area of impact, which includes structure sites, temporary construction and maintenance pads, staging areas, new and improved access, and pull sites, will create both intermittent and continuous noises. Examples of intermittent construction noise include the noise from passing trucks, loading operations, and moments of drilling. Continuous noise will be caused by idling equipment or pumps and generators that operate at constant speeds. The maximum instantaneous construction noise levels will range from 80 to 90 dBA at 50 feet during earthmoving for road construction or up to approximately 99 dBA during helicopter operations for installing the line or certain structures. Continuous noise levels (both 1-hour and 12-hour Leq) from construction generally will be lower, because most equipment will not be operated steadily.

At 50 feet, the 12-hour Leq could range up to approximately 90 dBA (assuming continuous compressor operation). The 12-hour Leq will range up to 84 dBA at 100 feet, and 78 dBA at 200 feet. Beyond 1,000 feet, the12-hour Leq will be less than 70 dBA. No sources of vibration are expected to affect sensitive receptors outside of the work area.

Table 06-04: Typical Noise Levels of Construction Equipment

Equipment	Equipment Activity		Noise Level at 50 Feet (dBA)[1]	
	Min/Hr	Hr/12-Hr	Typical Maximum Leq (1min) dBA	12-Hour Leq(12) dBA
Earth Moving				
Front Loader	30	12	87	84
Backhoe	15	12	84	78
Tractor, dozer	30	12	88	85
Scraper, grader	30	12	89	86
Paver	10	12	89	81
Truck (water, fuel, equip., etc.)	10	12	89	81
Dump Truck	10	12	84	76
Excavator	10	12	85	77
Roller	10	12	80	72
Materials-Handling				
Concrete Truck	10	12	85	77
Concrete Mixer	30	12	85	82
Concrete Pump	30	12	82	79
Crane (movable)	15	12	87	81
Crane (derrick)	15	12	88	82
Stationary				
Drill Rig	60	12	88	88
Generator	60	12	84	84
Compressor	60	12	90	90
Impact				
Pneumatic Tools	15	12	85	79
Jackhammer and Rock Drills	10	12	89	81
Compactor	30	12	82	79
Other				
Helicopter (200 feet)	30	12	95	89-99

Construction will also cause noise offsite, primarily from commuting workers, trucks, and if necessary, helicopters needed to bring materials to the construction sites. Workers will likely meet at various staging areas and then travel to the construction site in crews. Haul trucks transport poles, conductor cable, and other materials to the construction sites and remove excavated material and waste. The peak noise levels associated with passing trucks and commuting worker vehicles will be approximately 75 dBA to 85 dBA at 50 feet. Maximum Leq for passing helicopters is 95 dBA.

[1] Effective Noise Control during Nighttime Construction - Cliff Schexnayder *http://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder_paper.htm*. Instantaneous noise level assumed to be equivalent to one-minute average.

(a) Dynamiting or blasting activities

The pole structure foundations will be constructed using drilled shafts or piers. If hard rock conditions are encountered within the planned depth of the foundation drilling, blasting may be necessary to fracture and loosen the rock and allow for completion of the drilled shaft. If blasting does occur, a Blast Plan will be necessary. The Blast Plan will be in accordance with recognized industrial standards and governmental regulations, and will include the following elements:

- Designation of a qualified individual as "Blast Officer" who has authority over all actions and operations related to blasting;
- List the names, qualification, and detailed responsibilities for all personnel involved with the blasting or who will otherwise be responsible for transporting, handling, or storing the explosives;
- List all incidental personnel and other personnel authorized to be within the danger zone during blasting operations;
- List the dates and location of blasting;
- Identify the type and quantity of explosives and detonating or initiating devices to be used at the site;
- Identify means of transporting explosives to the site;
- Ensure that all applicable permits and licenses have been obtained;
- Identify minimum acceptable weather and static conditions and considerations for stray radio frequency energy and electrical current where electrical initiation will be used;
- List standard procedures for handling, setting, wiring, and firing explosive charges;
- List personal protective equipment ("PPE") to be used or available at the site;
- Identify minimum standoff distance, means for clearing, and controlling access to blast danger area;
- Develop an emergency and/or safe work action plan (e.g., telephone numbers of local emergency response organizations; location/telephone number of nearest medical facility; action to be taken when a person is injured; copy of MSDS);
- Identify placement of blasting mats over designated explosive insertion areas;
- Identify placement of warning signs and safe distance from blasting area; and

- Broadcast over loud speaker a "pre-fire" sequence before blasting and an "all clear" sequence after blasting to allow re-entrance to the area.

(b) Operation of earth moving or excavating equipment

Construction of the transmission line will begin with building unpaved access roads to facilitate entry to individual structure sites. Where possible, access roads will be contained within the transmission line ROW. It is anticipated that access roads will be constructed using a bulldozer, followed by blading to smooth the ground for vehicular and equipment traffic. Front end loaders and dump trucks will be used to move the soil locally or off-site. Typically, 14-foot wide straight sections of roadway and 16- to 20-foot wide sections at curves are required to allow safe movement of construction equipment and vehicles. Construction roads across areas that are not required for future maintenance access will be removed and rehabilitated after construction is completed. In other areas, roads will be left in place to facilitate future access for maintenance and repair purposes. Gates will be installed where required at fenced property lines to restrict general vehicular access from or to the ROW.

After access roads are graded, clearing of individual structure sites will be required to install pole structures. Clearing individual structure sites will be done using a bulldozer to blade the required area. It is anticipated that an area approximately 100 feet by 100 feet will be cleared for construction activities at each structure location. This area will provide a safe working space for placing equipment, vehicles and materials. At structure sites where solid rock is encountered, additional rock hauling and blasting equipment may be required to remove the rock from the excavation area. In locations with little vegetation and relatively flat terrain, minimal clearing will be required. Clearing of structure sites located in rugged terrain or environmentally sensitive locations will be completed primarily with manual labor and small vehicles.

(c) Driving of piles

No pile driving operations are planned for the project. Pole structure foundations will typically be drilled concrete piers. The foundation process will start with the boring of one hole for each tubular steel structure. The holes will be bored using truck-mounted excavators with various diameter augers to match diameter and depth requirements of the foundation sizes. Where solid rock is encountered, additional equipment for rock removal will be required. This could include rock hauling equipment and blasting equipment.

(d) Erection of structures

The pole structures will be assembled at each site, erected, and bolted to the foundations. Steel members for each pole structure will be delivered to each location by flatbed truck. The steel members will be bolted together and assembled on the ground. Assembly will be facilitated with a small truck-mounted crane. Following assembly, the pole structure will be lifted onto the foundation with a large crane that will move along the ROW for structure erection purposes.

(e) Truck traffic

Beyond construction equipment access and pole and hardware equipment delivery, no other additional truck traffic is anticipated for the project.

(f) Installation of equipment

Conductor, shield wire, and fiber optic ground wire stringing will begin with the installation of insulators and stringing sheaves. Sheaves are rollers that are temporarily attached to the lower end of the insulators and allow the conductor to be pulled, or "strung," along the line. Prior to stringing any lines, temporary clearance structures, typically consisting of vertical wood poles with cross arms, will be installed at road crossings and at crossings of energized electric and communication lines to prevent the conductors from sagging onto roadways or other lines during the operation. In some cases, bucket trucks can also be used for crossings.

The initial stringing operation will consist of pulling a "sock line" through the sheaves along the line. Pulling the sock line is accomplished by either pulling it with a vehicle traveling along the ROW or, at the construction contractor's option, with a small helicopter flying the ROW. The sock line will then be attached to a "hardline" and pulled through the sheaves. The hardline will then be attached to the conductor, which will be pulled into place.

Pulling and tensioning sites will be required approximately every 1 to 4 miles along the transmission line route. The sites are needed to set up the tractors and trailers with reels of conductors, as well as the trucks with tensioning equipment. To the greatest extent practical, pulling and tensioning sites will be located within the transmission ROW. However, some pulling and tensioning sites may be located outside the ROW. Each of these sites requires clearing an area of approximately 1 to 2 acres, which may coincide with clearing the work pads for the pole structures. Depending on topography, some incidental grading may be required at pulling and tensioning sites to create level pads for equipment.

After installing the conductor and fiber optic shield wire, sagging and clipping activities are performed. This process involves adjusting the tension of conductors and shield wires, removing stringing sheaves, and permanently attaching the conductor to insulators with specialized hardware.

At the conclusion of construction, the ROW will be cleaned of packing crates, hardware and all construction debris. Disturbed areas not required for access roads or for maintenance areas around pole structures will be restored as appropriate.

(2) Operation and Maintenance

AMP-Ohio does not anticipate significant noise impacts from operation of the proposed transmission line. Audible noise may be generated from corona discharge and would usually be experienced as a crackling or hissing sound. Corona noise generally is most significant during rain or fog conditions. Besides the nuisance aspects of corona, it also results in undesirable power loss over a transmission line. Therefore, the design of transmission lines incorporates specific conductor and equipment designs to limit or eliminate corona.

Table 06-05 shows the predicted audible noise for the proposed transmission line under relatively adverse conditions (a medium intensity rainfall) at the edge of the ROW. However, there are no existing residences at the edge of the ROW for both the Preferred and Alternate Route; the nearest existing residences are approximately 300 feet from the route centerline. Therefore, Table 06-05 also shows the predicted audible noise at 300 feet from the route centerline

Table 06-05: Predicted Audible Noise Levels for the Transmission Line

	Normal Maximum Line Loading	Winter Normal Line Loading
Current (Amps)	1012	1040
Audible Noise at ROW Edge (dB)	40	40
Audible Noise at 300 feet from Centerline (dB)	34	34

The predicted audible noise levels at the ROW edge and at 300 feet from the centerline are below typical ranges of common sounds encountered in outdoor and in home settings. For example, in an indoor setting, a refrigerator has a higher audible sound level range than the proposed transmission line at the ROW edge, at a range of approximately 46 to 68 dB. Outdoors, an automobile at 50 feet also has a higher audible sound level range than the proposed transmission line, at approximately 60 to 90 dB.

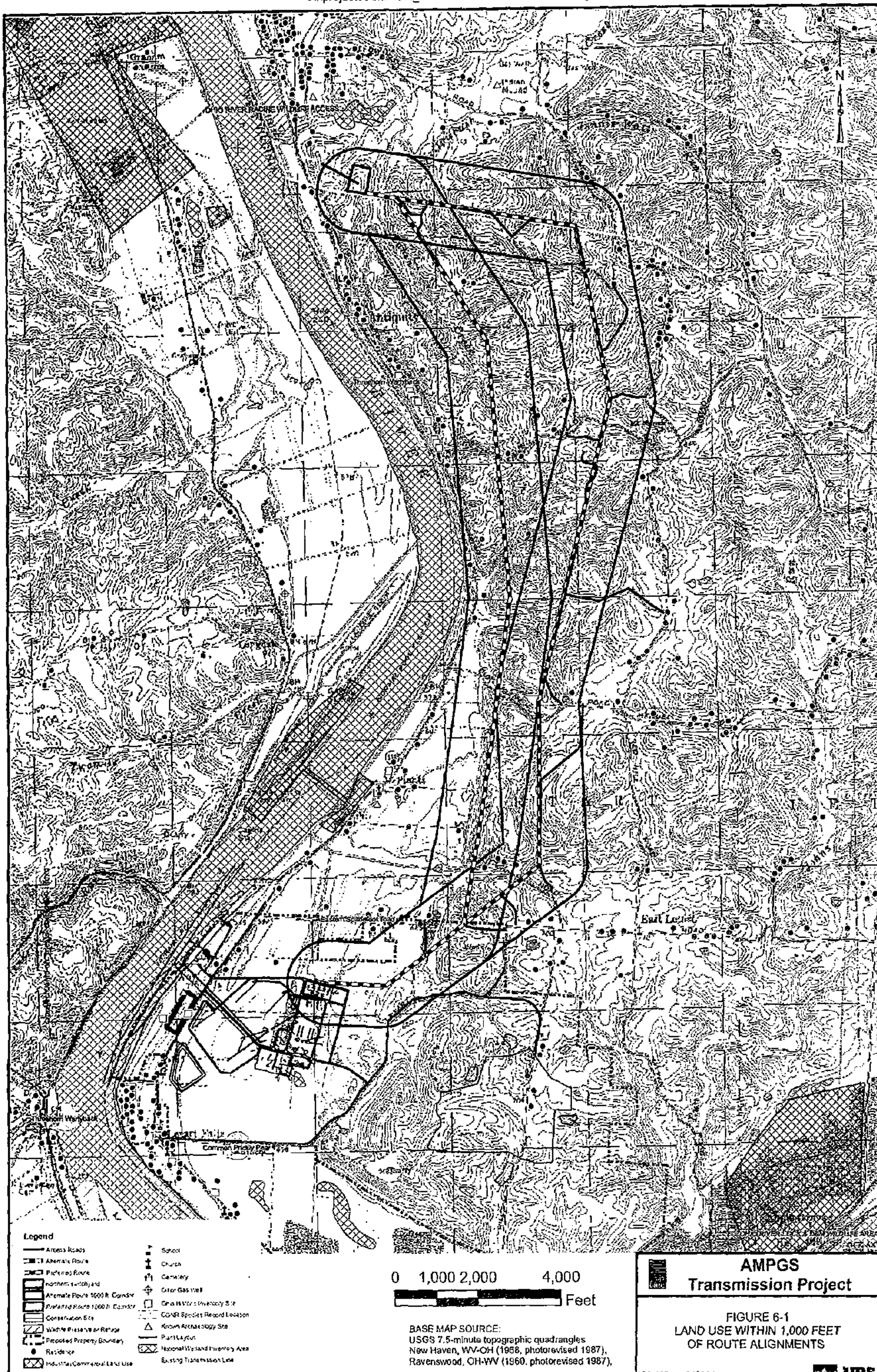
Periodic maintenance noise will include vehicle use for inspections, ROW clearing, and very infrequent maintenance of the structures or conductors. Routine inspection and maintenance activities will be accomplished with either ground access or occasional helicopter fly-over. This may cause short-term, intermittent noise increases in the areas of inspection or maintenance.

(3) Mitigation Procedures

Mitigation procedures will include properly maintained construction equipment with mufflers, construction during daylight hours, and noise-related procedures performed according to OSHA requirements. No additional noise mitigation is expected, as noise impacts will be temporary and limited to construction areas.

(H) Other Significant Issues

There are no other significant socioeconomic or land use impact issues anticipated beyond those addressed elsewhere in this Application.



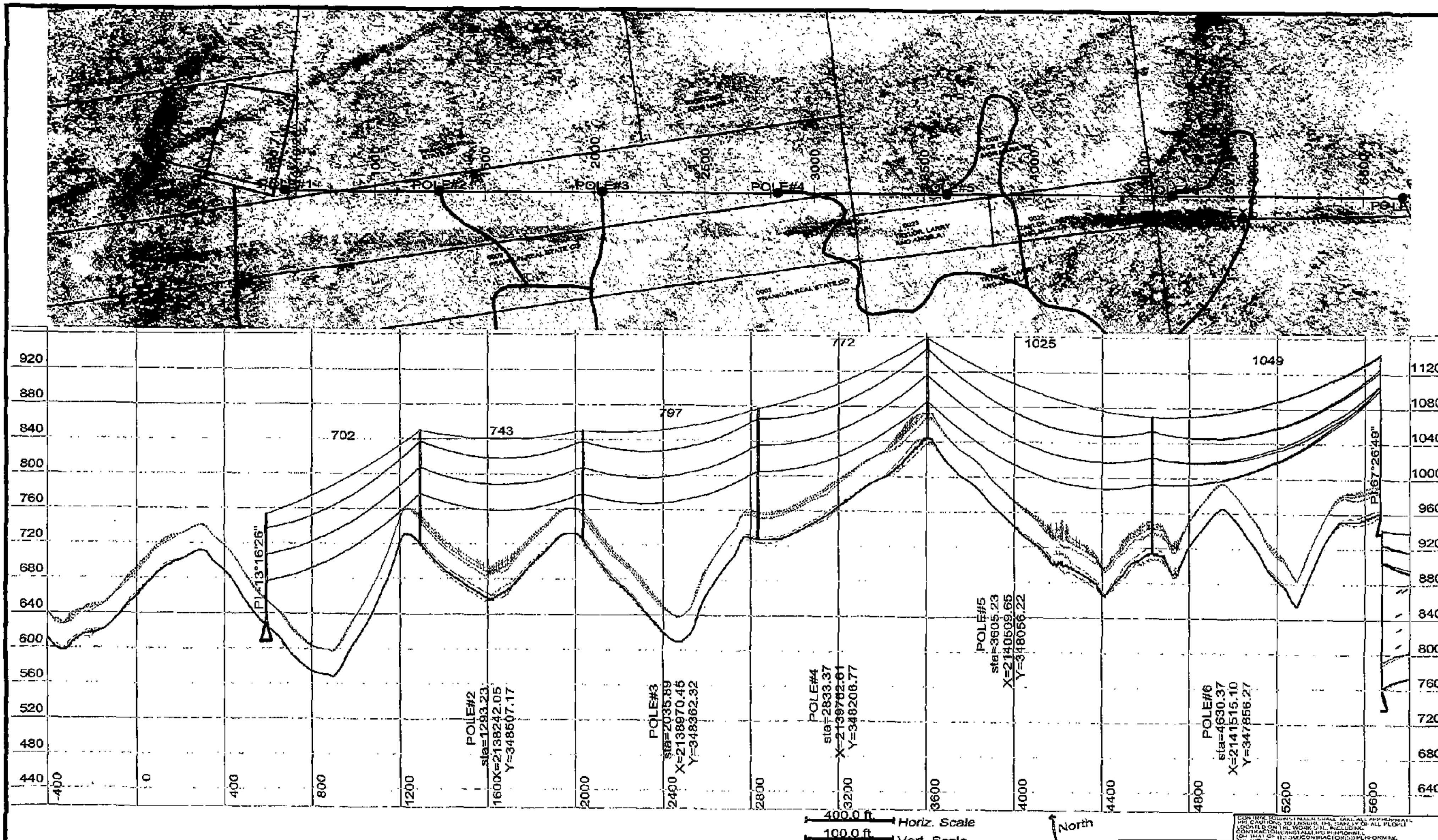
BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangles
New Haven, WV-OH (1958, photorevised 1987),
Ravenswood, OH-WV (1960, photorevised 1987),

AMPGS Transmission Project

FIGURE 6-1
LAND USE WITHIN 1,000 FEET
OF ROUTE ALIGNMENTS

JOB NO. 14946381

URS



DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	01-20-2006	MPD	JLV		PRELIMINARY
1	05-26-2006	MPD	JLV		PRELIMINARY - NEW ROUTE FROM SPEC DATED 4-18-06
2	06-10-2006	MPD	BCW		PRELIMINARY - ADDED ACCESS ROADS
3	07-10-2006	MPD	JLV		FOR COMMENTS

CONTRACTOR/SUBCONTRACTOR SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR/INSTALLER PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

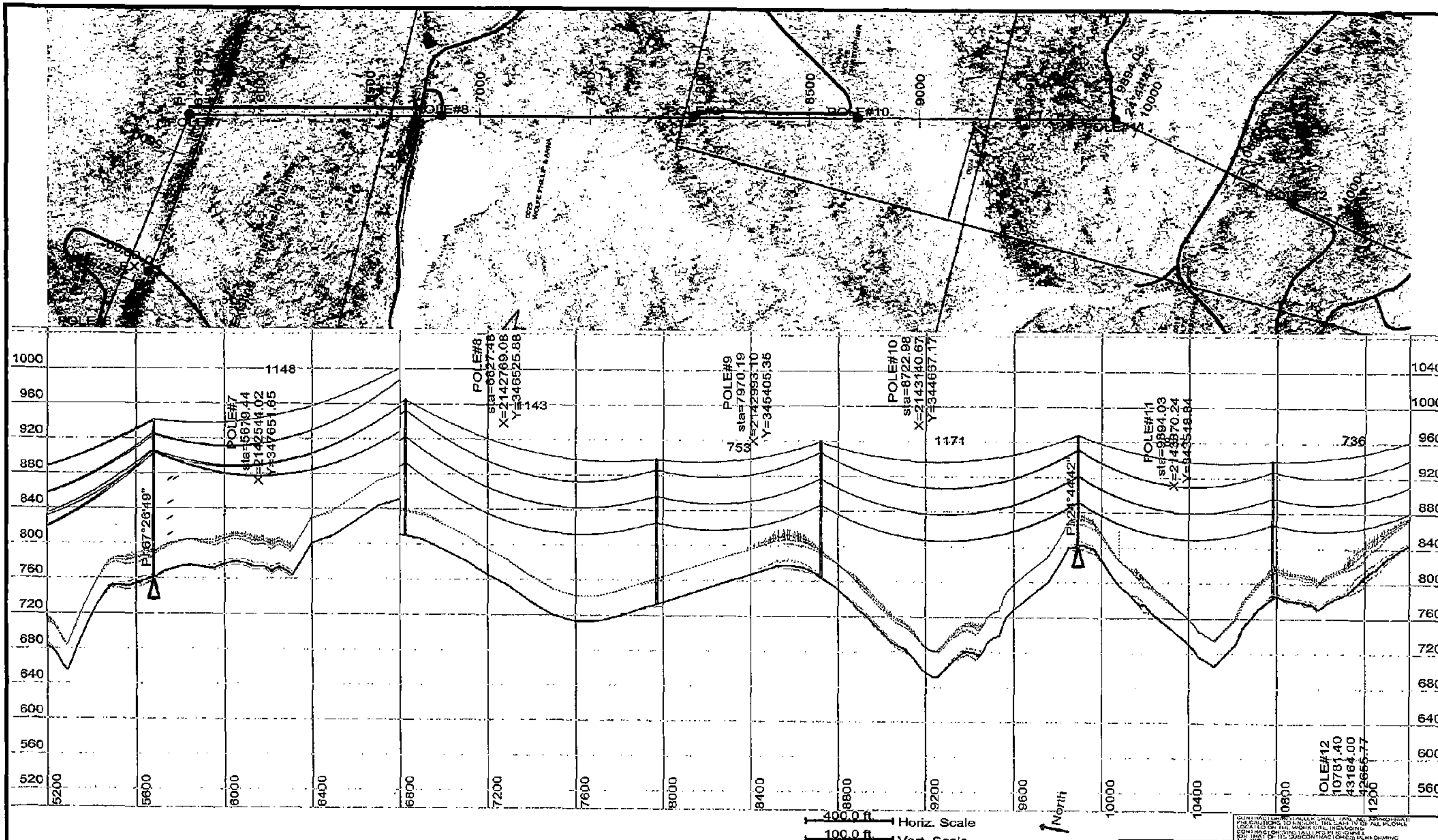
PROJECT NUMBER 11501-042

GENERAL ALIGNMENT PLAN
345kV TRANSMISSION LINE
BASE LOAD FACILITY

AMERICAN MUNICIPAL POWER

Sargent & Lundy

DRAWING NO. TL-01 REV. 1
SHEET 1 OF 6



REV.	DATE REVD.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	01-20-2006	MPB	JLV		PRELIMINARY
1	05-20-2006	MPB	JLV		PRELIMINARY - NEW ROUTE FROM SPEC DATED 4-10-06
2	06-10-2006	MPB	BCW		PRELIMINARY - ADDED ACCESS ROADS
3	07-10-2006	MPB	JLV		FOR COMMENTS

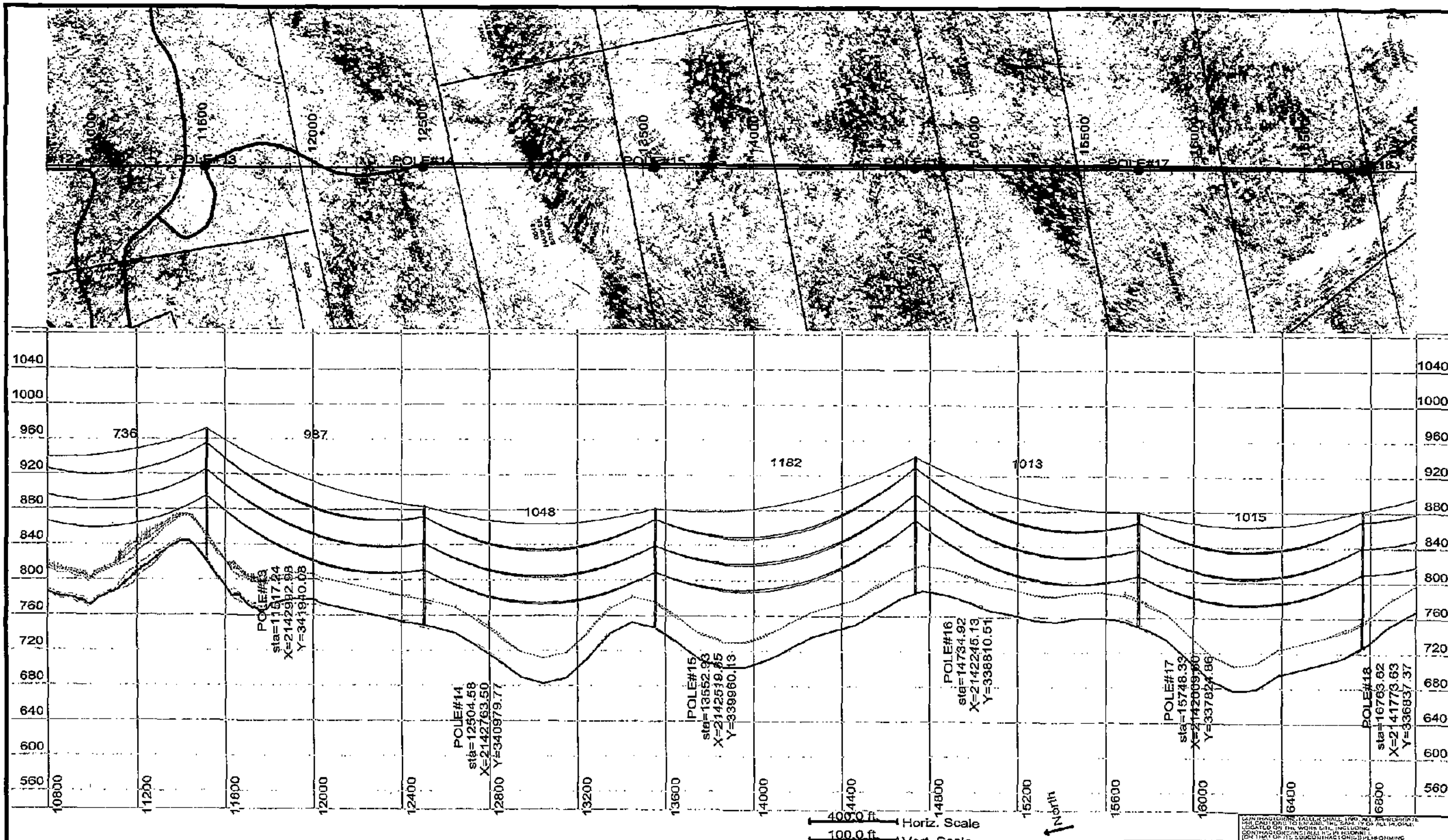
PROJECT NUMBER 11501-042

GENERAL ALIGNMENT PLAN
345KV TRANSMISSION LINE
BASE LOAD FACILITY

AMERICAN MUNICIPAL POWER

Sargent & Lundy

DRAWING NO. TL-01 REV. 1



REV.	DATE ROLD.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	01-20-2006	MPB	JLV		PRELIMINARY
1	05-20-2006	MPB	JLV		PRELIMINARY - NEW ROUTE FROM SPEC DATED 4-18-06
2	06-16-2006	MPB	DCW		PRELIMINARY - ADDED ACCESS ROADS
3	07-10-2006	MPB	JLV		FOR COMMENTS

FILENAME: ga-01.dgn

PROJECT NUMBER 11601-042

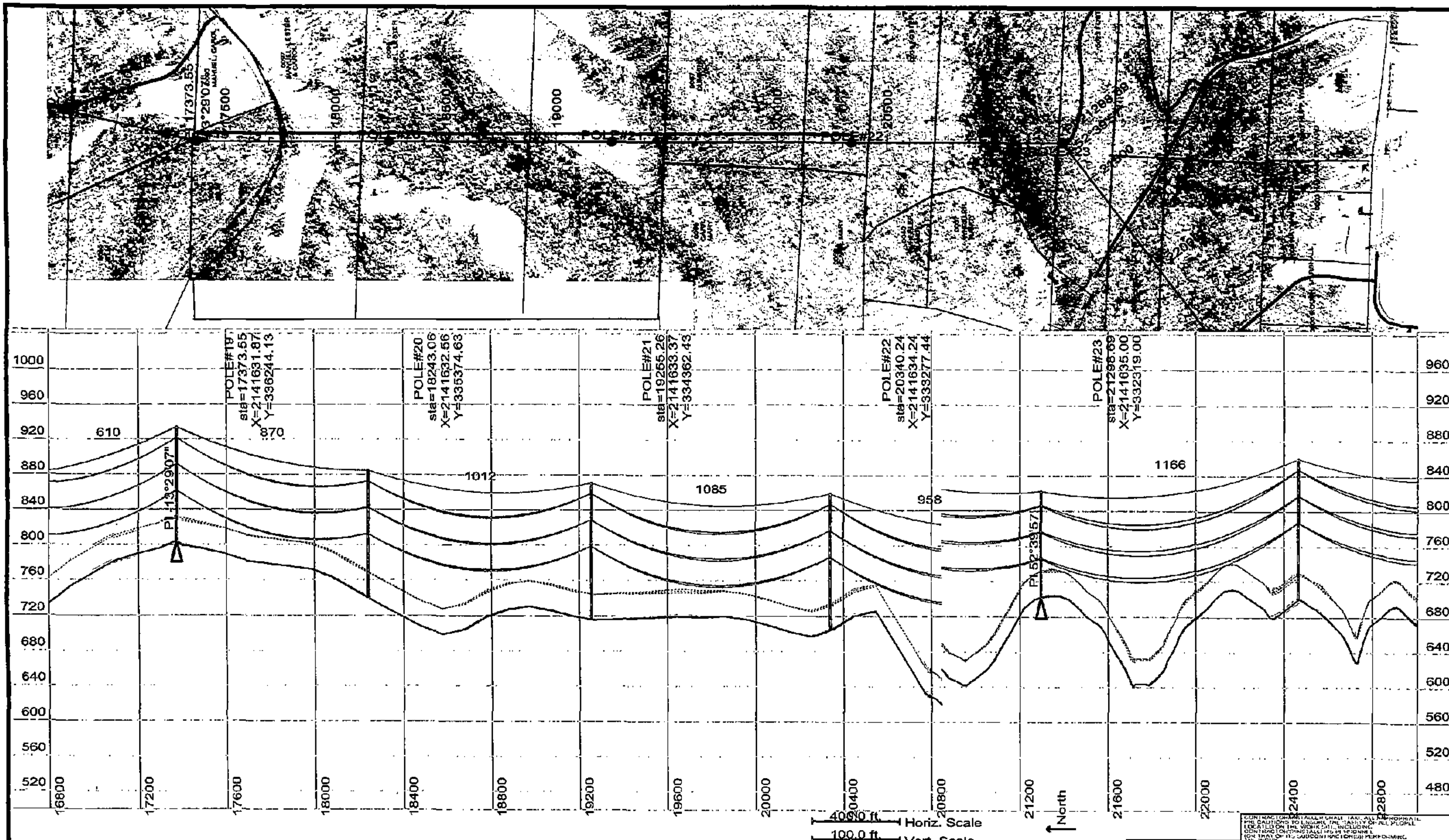
GENERAL ALIGNMENT PLAN
345kV TRANSMISSION LINE
BASE LOAD FACILITY

AMERICAN MUNICIPAL POWER

Sargent & Lundy

DRAWING NO. TL-01 REV. 1

SHEET 3 OF 6



CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S INSTALLER'S PERSONNEL OR THAT OF ITS SUBCONTRACTOR(S) PERFORMING THE WORK

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	01-20-2006	MPB	JLV		PRELIMINARY
1	05-25-2006	MPB	JLV		PRELIMINARY - NEW ROUTE FROM SPLC DATED 4-18-06
2	06-16-2006	MPB	DCW		PRELIMINARY - ADDED ACCESS ROADS
3	07-10-2006	MPB	JLV		FOR COMMENTS

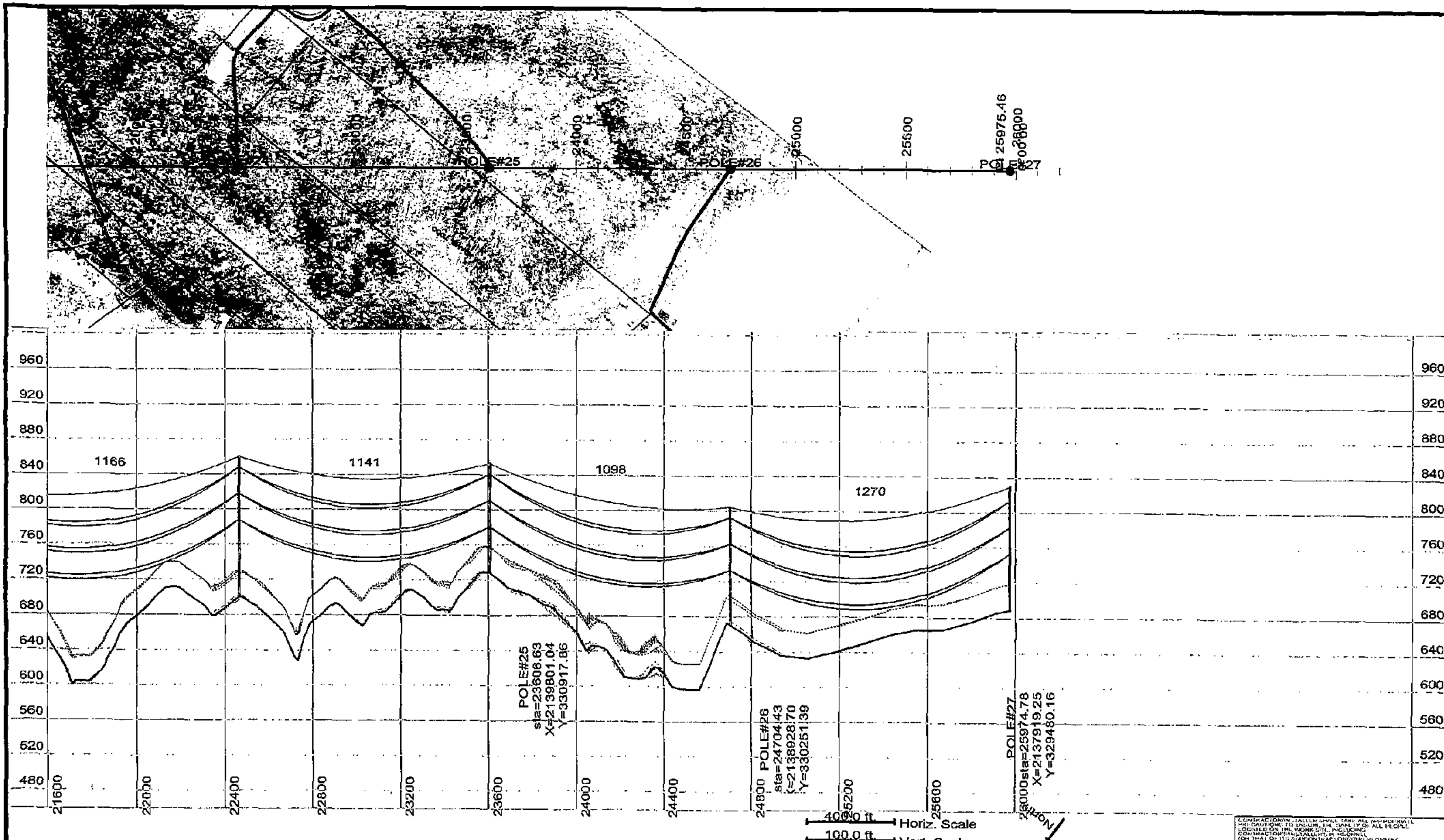
PROJECT NUMBER 11501-042

GENERAL ALIGNMENT PLAN
345kV TRANSMISSION LINE
BASE LOAD FACILITY

AMERICAN MUNICIPAL POWER

Sargent & Lundy

DRAWING NO. TL-01 REV. 1



DRAWING RELEASE RECORD

REV.	DATE RELD.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	01-20-2006	MPO	JLV		PRELIMINARY
1	05-26-2006	MPO	JLV		PRELIMINARY - NEW ROUTE FROM SPEC DATED 4-18-06
2	06-16-2006	MPO	BCW		PRELIMINARY - ADDED ACCESS ROADS
3	07-10-2006	MPO	JLV		FOR COMMENTS

DRAWING RELEASE RECORD

REV.	DATE RELD.	PREPARED	REVIEWED	APPROVED	PURPOSE

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

FILENAME: tl-01.dgn

SCALE

PROJECT NUMBER 11601-042

GENERAL ALIGNMENT PLAN
345kV TRANSMISSION LINE
BASE LOAD FACILITY

AMERICAN MUNICIPAL POWER

Sargent & Lundy

DRAWING NO. TL-01 — SHEET 5 OF 5 — REV. 1

APPENDIX 06-1

PUBLIC OFFICIALS CONTACTED AND RESPONSES

PUBLIC OFFICIAL CONTACTED

Name	Title	Organization	Street Address	City, State Zip	Phone
Michael Davenport	President, Board of Commissioners	Meigs County	100 East Second Street	Pomeroy, OH 45769	740-992-2895
Jim Sheets	Meigs County Commissioner	Meigs County	100 East Second Street	Pomeroy, OH 45769	740-992-2895
Jeff Thornton	Meigs County Commissioner	Meigs County	100 East Second Street	Pomeroy, OH 45769	740-992-2895
Mary Hill	Auditor	Meigs County	100 East Second Street	Pomeroy, OH 45769	740-992-2698
Perry Varnadoe	Executive Director Office of Economic and Workforce Development	Meigs County	238 West Main Street	Pomeroy, OH 45769	740-992-3034
Larry Marshall	Health Commissioner	Meigs County Health Department	112 East Memorial Drive	Pomeroy, OH 45769	740-992-6626
Joe Bolin	Chairman	Meigs County SWCD	33101 Hiland Road	Pomeroy, OH 45769	740-992-6646
Robert Morris	Trustee	Letart Township	49435 Lighthouse Road	Racine, OH 45771	740-247-3421
Dave Graham	Trustee	Letart Township	47794 State Route 124	Racine, OH 45771	740-949-2281
Chris Wolfe	Trustee	Letart Township	48580 Blind Hollow Road	Racine, OH 45771	740-949-2773
Scott Hill	Mayor	Village of Racine	5th & Main Street	Racine, OH 45771	740-949-2296
Ike Spencer	President of Council	Village of Racine	5th & Main Street	Racine, OH 45771	740-949-2693

OAC 4906-15-07 ECOLOGICAL DATA

(A) Summary of Ecological Impact Studies

As part of the preparation of this Application, ecological surveys were conducted within the Preferred and Alternate Route corridors, each of which consisted of an approximately five-mile long, two hundred foot wide project corridor. AMP-Ohio's consultant conducted site delineation and assessment work in August 2006 (Preferred Route) and June 2007 (Alternate Route). A pedestrian field reconnaissance was conducted for the entire length of both routes. The results of the ecological field surveys are discussed under the appropriate headings throughout the remainder of this section and documented in Appendix 07-1.

Ecological information within 1,000 feet of the proposed transmission centerlines was supplemented through the review of available aerial photography from the National Agriculture Imagery Program ("NAIP"), project images, the United States Geological Survey ("USGS") Digital Orthophoto Quarter Quadrangles ("DOQQs"), USGS maps, National Wetlands Inventory ("NWI") maps, and soil survey maps for Meigs County. Additional information regarding endemic vegetation and wildlife was obtained from the Ohio Department of Natural Resources - Division of Natural Areas and Preserves ("ODNR-DNAP"), ODNR Division of Real Estate and Land Management ("ODNR-DRELM"), ODNR Division of Wildlife ("ODNR-DOW"), and the United States Fish and Wildlife Service ("USFWS").

(B) Ecological Features

A map at a scale of 1:24,000 illustrating the proposed Preferred and Alternate Routes, including 1,000 feet on each side of the proposed transmission line, is presented as Figure 04-1. Features within 1,000 feet of the project centerline were derived from published data and where possible supplemented by the field survey. The focus of the field survey was the 200-foot wide corridor formed by a 100-foot boundary on either side of the project centerline. The maximum transmission line ROW width for the Preferred and Alternate Route is 75 feet on either side of the transmission line centerline, which, when combined, forms a 150-foot wide corridor.

(1) Route Alignments

The proposed route alignments, including turning points, are presented for both the Preferred and Alternate Routes on Figure 04-1 and are discussed further in Section 4906-15-04(A)(1)(a) of this Application.

(2) Substations

The proposed 345 kV transmission line will ultimately interconnect with the 345 kV Sporn-Muskingum River transmission line. The transmission line interconnection switchyard will be located southeast of the intersection of State Route 124 and Yellowbush Road. The site is currently undeveloped woodlot. The AMPGS switchyard is included as part of the Generation Application (Case No. 06-1358-EL-BGN).

(3) Areas Currently Not Developed For Agricultural, Residential, Commercial, Industrial, Institutional, or Cultural Purposes

(a) Streams and Drainage Channels

Surface water features within the Preferred and Alternate Routes, including ponds, perennial and intermittent streams, and ephemeral ditches were noted in field surveys and are depicted on Figures 3A (revised) through 3C (revised)[1] of Appendix 07-1. One Ohio EPA Qualitative Habitat Assessment Index ("QHEI") and 33 Ohio EPA Primary Headwater Habitat Evaluation Index ("HHEI") data forms were completed for the perennial and intermittent streams and ditches within the Preferred Route and are provided in Appendix 07-1. Seventeen HHEI assessments were performed within the Alternate Route and are provided in Appendix 07-1. These streams were identified using USGS topographic maps, aerial photography, *The Soil Survey of Meigs County, Ohio*, and field reconnaissance.

(b) Lakes, Ponds, and Reservoirs

No major lakes, ponds, or reservoirs were identified within 100 feet of the Preferred and Alternate Routes.

(c) Marshes, Swamps, and Other Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated (hydric) soil conditions. Wetlands within 1,000 feet of both routes were evaluated by reviewing the appropriate USFWS NWI maps. Wetlands within 100 feet of the entire Preferred and Alternate Routes were evaluated by conducting a desktop study followed by a field delineation, which included an evaluation of hydrophytic vegetation, hydric soils, and wetland hydrology, in accordance with the COE *Manual for Identifying and Delineation of Jurisdictional Wetlands* (1987). U.S. Department of Agriculture

[1] These figures from the wetland and stream delineation report for the Preferred Route have been updated with the results of the June 2007 wetland and stream delineation for the Alternate Route.

Natural Resource Conservation Service ("USDA-NRCS") (formerly the Soil Conservation Service) soil survey and hydric soil lists for Meigs County, Ohio were also reviewed for the Preferred and Alternate Routes. The field wetland delineation conducted for the Preferred Route identified two wetlands, totaling 1.82 acres. Wetland 1 is a Category II, 1.81-acre PEM/PSS/PFO wetland in a former irrigation pond at the foot of the slope to the northeast of the AMPGS. According to a local contact, a small earth dam at the northern end of the pond was breached in a rainstorm leaving the water level sufficiently high for wetland formation. The second wetland is a Category II 0.01 acre PEM wetland.

Preferred Route Wetland 1 described above is also crossed by the Alternate Route (at this point the Preferred and Alternate Routes share the same centerline). A second, 0.27-acre wetland was identified within the Alternate Route in association with stream 3. Total observed wetland acreage within the Alternate Route is 2.08 acres. Maps showing field delineated and determined wetlands within 100 feet of the Preferred and Alternate Routes are shown at 1:7,200 scale on Figures 3A (revised) through 3C (revised) of Appendix 07-1.

(d) Woody and Herbaceous Vegetation Land

The Preferred and Alternate Routes are dominated by woodlots, with some areas of scrub/shrub, old-field, and agricultural cropland. A variety of woody and herbaceous lands, as described below in section (E), are present within the 1,000-foot corridor of the Preferred and Alternate Routes.

(e) Locations of Threatened and Endangered Species

The USFWS, ODNR-DOW, ODNR-DRELM, and ODNR-DNP were contacted regarding the potential for occurrence of rare, threatened and endangered species within the project corridors. Three records of plant species of concern were identified within the vicinity of the project study area and include the mud-plantain (*Heteranthera reniformis*), the common prickly pear (*Opuntia humifusa*), and the smooth buttonweed (*Spermacoce glabra*). ODNR-DNAP reported records of one threatened mussel species and three fish species of concern within the vicinity of the project study area. These species include the threehorn wartyback mussel (*Obliquaria reflexa*), the channel darter (*Percina copelandi*), the goldeye (*Hiodon alosoides*), and the speckled chub (*Macrhybopsis aestivalis*). In addition, AMP-Ohio's consultant conducted a literature review of available USFWS resources regarding species of concern in the project vicinity. The USFWS identified the study site to be in the historic range of three state and federally endangered species of mussels. These species include the pink mucket pearly mussel (*Lampsilis orbiculata*), the fanshell mussel (*Cyprogenia stegaria*), and the sheepnose mussel (*Plethobasus cyphyus*). The eastern spadefoot *(Scaphiopus holbrooki)*, the only frog identified on Ohio's endangered species list, was previously recorded by ODNR to be in the vicinity of the project study area. ODNR-DNAP reported previous records of cobblestone tiger beetle *(Cicindela marginipennis)* within the vicinity of the project study area. The proposed project is located within the range of the federally endangered Indiana Bat (*Myotis sodalis*). This Application discusses those listed species that are likely to inhabit areas within the transmission line corridors.

(4) Soil Associations in the Corridor

According to the *Soil Survey of Meigs County, Ohio,* (Natural Resource Conservation Service, 2000), all of the soils within the project area are included in the Upshur-Gilpin, Cidermill-Lakin-Gallipolis, or Omulga-Licking-Vincent associations. Fifteen soils from eight soil series are mapped within the limits of the study area and include Chagrin silt loam (Cg), Cidermill silt loam (CkA, CkB), Conotton gravelly loam (CnC, CnE), Gilpin silt loam (GhC2), Lakin loamy fine sand (LaB, LaC, LaD), Licking silt loam (LkC2), Omulga silt loam (OmB, OmC), Upshur-Gilpin complex (UgC2, UgD, UgE). None of these soils are listed as hydric on the national, state, or county lists. Maps showing soil series and their respective associations within 1,000 feet of the Preferred Route are provided at 1:24,000 scales in Figure 2 (revised) of Appendix 07-1.

(C) <u>Streams and Bodies of Water</u>

Surface water features within the Preferred and Alternate Routes, including ponds, perennial and intermittent streams, and ephemeral ditches, were noted in field surveys and are depicted on Figures 3A (revised) through 3C (revised) of Appendix 07-1. Streams 31, 33, and 34 were common to both the Preferred and Alternate Routes. These streams and bodies of water were identified using USGS topographic maps, aerial photography, *The Soil Survey of Meigs County, Ohio*, and field reconnaissance.

<u>Preferred Route:</u> One QHEI and 33 HHEI were conducted on the streams identified within the preferred project corridor. The evaluations were conducted at or near the proposed transmission line crossing of each stream. These streams were identified using USGS topographic maps, aerial photography, *The Soil Survey of Meigs County, Ohio*, and field reconnaissance.

<u>QHEI:</u> Based on the QHEI methods, the survey identified one crossing of a warmwater habitat ("WWH") stream. AMP-Ohio notes that Ohio EPA determines aquatic life use designations for particular surface waters.

HHEI: The survey identified the following HHEI stream classes: 14 Class I streams, 1 Modified Class I stream, 10 Class II streams, and 8 Class III streams.

- *Class I Headwater Streams* – Fourteen Class I headwater streams were identified during the August 2006 field investigation with scores ranging from a low of 9 to a high of 27 out of a maximum of 100 points. The substrate composition of these streams is generally limited to sand, silt, clay, leaf pack/woody debris and gravel. The maximum pool depth is less than 10 centimeters and the bank full width generally does not exceed 1.0 meter.

- *Modified Class I Headwater Streams* – One Modified Class I headwater stream was identified during the August 2006 field investigation with a score of 26. This stream shows evidence of stream channel modification, including channelization and culverting. This modification results in this stream scoring a Modified Class I designation. Similar to a Class I headwater stream, the substrate of this stream is silt, sand, and leaf pack or woody debris. The maximum depth is less than 5 centimeters with a bank full width not exceeding 1.5 meter.

- *Class II Headwater Streams* – Ten Class II headwater streams were identified during the August 2006 field investigation with scores ranging from a low of 30 to a high of 56 out of a maximum of 100 points. The substrate composition of these streams is generally dominated by sand and gravel. Leaf pack, silt, clay, cobble, boulder, and boulder slabs are also noted as less dominant substrate types in this class of stream. The maximum pool depth is less than 22.5 centimeters. The bank full width for this group of streams is generally less than 3 meters.

- *Class III Headwater Streams* – Eight Class III headwater streams were evaluated during the August 2006 field investigation with scores ranging from a low of 45 to a high of 82 out of a maximum of 100 points. Some of the streams in this category were elevated from Class II due to evidence of aquatic salamander larvae and adults. The main features of these streams that distinguish them from the Class I and II streams include a natural channel (i.e. no indication of stream channel modification), generally high percentages of boulder, boulder slab, cobble, and gravel substrate, maximum pool depths ranging from 5 to approximately 30 centimeters, and a bank full width generally between 1.5 and 3 meters.

No major bodies of water are located within the transmission line corridors.

Alternate Route: Seventeen HHEI evaluations were conducted at stream crossings within the Alternate Route corridor. Scores for these headwater channels ranged from a low of 11 to a high of 57. Two Class I, 13 Class II, 2 Modified Class II, and no Class III headwater channels were identified during the June 2007 field survey. Streams 31, 33, and 34 were common to both the Preferred and Alternate Routes. No QHEI evaluations were conducted for the Alternate Route.

- *Class I Headwater Streams* – Two Class I headwater streams were identified during June 2007 field investigation with scores of 11 and 15. The substrate identified in Stream 1 consisted of clay, sit, and muck. The substrate in Stream 3 consisted of silt, fine detritus, clay, and muck. Bankfull width of the streams did not exceed three feet. No water was present in either channel at the time of observation

- *Class II Headwater Streams* – Thirteen Class II headwater streams with scores ranging from a low of 31 to a high of 57 were identified during the June 2007 field investigation within the Alternate Route. Substrate composition was varied, but was generally dominated by cobble, silt, gravel, boulder, and boulder slabs. Substrate types in less abundance were leaf pack, sand, clay, and bedrock. Bankfull widths ranged from 3.5 feet to 11.5 feet, with the majority of streams around 8 feet. No water was present in any of the Class II channels at the time of observation.

- *Modified Class II Headwater Streams* – Two Modified Class II headwater streams were identified within the Alternate Route with scores of 37 and 45. These streams show evidence of stream channel modifications such as channelization. These modifications result in a classification of Modified Class II rather than Class II. Substrate in Stream 2 consisted of gravel, muck, and cobble and had a bankfull width of 10 feet. Substrate composition in Stream 8 was cobble, gravel, silt, and boulder and had a bankfull width of 8 feet. No water was present in either channel at the time of observation.

(1) Construction Impact

Construction of the transmission lines will require vehicles to access the pole locations. No wetlands will be impacted either by the transmission line or by access to pole locations. This access will, in some cases, require vehicles to cross headwater channels. Four of the 33 streams identified on the Preferred Route will be crossed for construction access to poles. Access roads have not been identified for the Alternate Route to date; however, the crossing methods would be similar. The crossing method will be assessed on a case-by-case basis depending on the conditions, terrain, and assessed quality of the streams. The following methods are proposed:

- Temporary Stream Ford

- Culvert Stream Crossings

- Temporary Access Bridge

Diagrams of these crossing methods are provided in Appendix 07-2.

Temporary stream fords are proposed for crossing Class I and modified Class I streams. This will involve minimum clearing necessary to gain access to the stream and for passage of construction vehicles. Stone, rock or aggregate of ODOT No.1 as a minimum size will be placed in the channel to provide a solid base for vehicle passage.

- Disturbance of the stream will be kept to a minimum, streambank vegetation will be preserved to the maximum extent practical and the stream crossing width will be kept as narrow as possible. Clearing will be done by cutting rather than grubbing. Roots and stumps will be left in place to aid stabilization and to accelerate vegetation

- Sediment laden runoff will be prevented from flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fence and straw bales will be used as needed according to local topographic conditions.

- Aggregate stone and rock used for this type of stream crossing will not be removed. It will be formed such that it does not create an impoundment, impede fish passage or cause erosion of the stream banks.

- Following completion of the work, the areas cleared for the temporary access crossing will be stabilized through plantings of woody species where appropriate. Areas of exposed soil will be stabilized in accordance with the Storm Water Pollution Prevention Plan for the project.

Culvert stream crossings are proposed for crossing Class II and modified Class II streams. These crossings are intended to remain in place in order to provide maintenance access to the line.

- Disturbance of the stream will be kept to a minimum, streambank vegetation will be preserved to the maximum extent practical and the stream crossing width will be kept as narrow as possible. Clearing will be done by cutting rather than grubbing. Roots and stumps will be left in place to aid stabilization and to accelerate revegetation.

- Sediment laden runoff will be prevented from flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fence and straw bales will be used as needed according to local topographic conditions.

- Culvert pipe will be placed on the existing streambed to avoid a drop or waterfall at the downstream end of the pipe, which would be a barrier to fish migration. Crossings will be placed in shallow areas rather than pools.

- Culvert will be sized to be at least three times the depth of the normal stream flow at the crossing location. The minimum diameter culvert that will be used is 18 inches.

- There will be a sufficient number of culvert pipes to completely cross the stream with no more than a 12-inch space between each pipe.

- Stone, rock or aggregate of ODOT No.1 as a minimum size will be placed in the channel and between culverts. To prevent washouts larger stone may be used with or without gabion mattresses. No soil will be placed in the stream channel.

- After completion of construction, aggregate used for the crossing will be left in place. Care will be taken so that aggregate does not create an impoundment or impede fish passage. Structures such as culvert pipe and gabion mattresses will be removed.

- Stream banks will be stabilized and woody species planted as appropriate.

Temporary Access Bridge will be used for Class III stream crossings.

- Disturbance of the stream will be kept to a minimum, streambank vegetation will be preserved to the maximum extent practical, and the stream crossing width will be kept as narrow as possible. Clearing will be done by cutting rather than grubbing. Roots and stumps will be left in place to aid stabilization and to accelerate revegetation.

- Sediment laden runoff will be prevented from flowing from the access road directly into the stream. Diversions and swales will be used to direct runoff to stormwater management locations. Silt fence and straw bales will be used as needed according to local topographic conditions.

- Bridges will be constructed to span the entire channel. If the channel width exceeds 8 feet then a floating pier or bridge support may be placed in the channel. No more than one pier, footing or support will be allowed for every 8 feet of span width. No footings, piers or supports will be allowed for spans of less than 8 feet.

- No fill other than clean stone free from soil will be placed within the stream channel.

AMP-Ohio will supplement these methods with protocols discussed with OEPA and OPSB on a case-by-case basis as specific stream conditions dictate. In addition, these crossings will be addressed in the Stormwater Pollution Prevention Plan for the project. Some of the access routes may be left in place for maintenance activity. Appendix 07-2 (Best Management Practices for Stream Crossings) provides details regarding the proposed access road stream crossing methods.

(2) Operation and Maintenance Impact

It is not anticipated that operation of the transmission line will adversely impact any of the headwaters identified. ROW maintenance within 25 feet of the headwater streams will be accomplished by hand and will be limited to selective cutting of potential high growing trees. No major lakes, ponds, or reservoirs will be affected by the operation or maintenance of the Preferred or Alternate Route.

(3) Mitigation Procedures

Mitigation is not required as no streams or wetlands will be filled as part of the project. AMP-Ohio will perform stream restoration measures as described in the discussion of stream crossings above. If any impacts occur, they will be assessed on a case-by-case basis with appropriate mitigation measures.

(D) Wetlands

According to NWI maps of the Ravenswood, West Virginia-Ohio and New Haven, West Virginia-Ohio quadrangles, seven NWI wetlands are located within 1,000 feet of the project transmission line corridors. Four of these NWI wetlands are identified as Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded (PUBHh). One NWI wetland was designated as Palustrine, Emergent, Scrub/Shrub, Broad-leaved Deciduous, Seasonally Flooded, Partially Drained/Ditched (PEM/SSCd) One NWI wetland was designated as Palustrine, Unconsolidated Bottom, Semi-permanently Flooded, Diked/Impounded (PUBFh). One NWI wetland was designated as Palustrine, Unconsolidated Bottom, Intermittently Exposed, Diked/Impounded (PUBGh) (USFWS).

Preferred Route Wetlands: The field wetland delineation conducted for the Preferred Route identified two wetlands, totaling 1.82 acres, within the two hundred foot wide project study area. One of these wetlands, totaling 0.01 acre, was classified as palustrine emergent (PEM). The remaining 1.81 acre wetland is classified as palustrine emergent with scrub-shrub and forested components (PEM/PSS/PFO). The location and approximate boundaries of these wetlands are shown on Figures 3A (revised) through 3C (revised) of Appendix 07-1.

Alternate Route Wetlands: The field wetland delineation conducted for the Preferred Route identified one wetland, totaling 0.278 acre, within the two hundred foot wide project study area. This wetland was classified as palustrine emergent (PEM). The location and approximate extent of this wetland is shown on Figures 3A (revised) through 3C (revised) of Appendix 07-1.

(1) Construction Impact

Wetlands identified within the proposed Preferred and Alternate Routes of the transmission line corridor are comprised of palustrine emergent, scrub/shrub, and forested type wetlands. There is no wetland impact expected with the construction of the transmission line within the Preferred Route.

No impacts are anticipated if the route were constructed within the Alternate Route.

(2) Operation and Maintenance Impact

Wetland areas will not be significantly affected by the operation or maintenance of this transmission line within either the Preferred or Alternate Route. It is not anticipated that such activities would result in erosion or water quality degradation of the wetland areas.

(3) Mitigation Procedures

No wetland impacts are expected, therefore no mitigation procedures are proposed. Natural re-vegetation in any disturbed wetland areas will begin immediately after construction has been completed in the area. No dredge or fill will occur within wetlands identified within either candidate route. No U.S Army Corps of Engineers 404 or Ohio EPA 401 permitting is required for the project. As a consequence, no permitting requirements for wetland mitigation exist for the project as proposed.

(E) Naturally Occurring Vegetation

The Preferred and Alternate Routes cross woodlots, scrub/shrub, old-field, and agricultural cropland. A variety of woody and herbaceous lands, as described below, are present within the 1,000-foot corridor of the Preferred and Alternate Routes. Habitat descriptions for naturally occurring vegetation, applicable to both the Preferred and Alternate Routes, are provided below, followed by a description of expected impacts from construction, operation and maintenance and mitigation procedures.

Agricultural Cropland: Agricultural cropland within the Preferred and Alternate Routes is limited to the common portion of the transmission route as it leaves the AMPGS site. This totals approximately 2,500 feet. Since site observations began in 2005, this area has been used to grow corn and tomatoes.

Upland Woodland: Upland woodlands are abundant within the Preferred and Alternate Routes. Woody species dominating these areas included sugar maple, sycamore, tulip tree, and white oak. Areas that had been historically disturbed tend to have a higher portion of invasive species including Osage orange, tree of heaven, Japanese honeysuckle and multiflora rose.

Riparian Woodland: Riparian woodlands are limited to indistinct, narrow bands within the edges of intermittent and perennial streams draining the study area. No specific change in the vegetation was noted from the upland forest that is described above. The headwater streams flow very occasionally and as such do not appear to significantly alter the micro environment enough to favor riparian species.

Scrub/Shrub: Scrub/shrub habitats represent the successional stage between old-field and second growth forest. This cover type has a highly variable plant community ranging from an herbaceous community similar to that of old field habitat with few woody species, to a community dominated by woody species and few herbaceous species. Very little scrub/shrub habitat is present within either the Preferred or Alternate Routes.

Old Field: Herbaceous cover exists near roads, field borders, and unused agricultural fields within the 1,000-foot corridor of the Preferred and Alternate Routes in the form of successional old-field communities. These communities are the earliest stages of recolonization by plants following disturbance. This community type is typically short-lived, giving way progressively to shrub and forest communities unless periodically re-disturbed, in which case they remain as old fields. The old-field areas within the transmission line corridors and adjacent areas are relatively homogeneous in nature and are vegetated by native shade-intolerant species, domestic and agricultural escapees, and species from adjacent shrub and forest communities.

(1) Construction Impact

The potential impacts on woody and herbaceous vegetation within the Preferred or Alternate Route will be limited to clearing within the proposed new transmission line ROW, where required. Construction impacts to agricultural cropland are expected to be temporary in nature and limited to vehicle access and temporary lay down activities.

Assuming a 150 foot ROW, approximately 88 acres of woodland will be cleared for construction within the Preferred Route. Construction within the Alternate Route will require clearing 74 acres of woodland. These calculations include estimated acreage cleared for access roads.

Impacts to agricultural areas are minor for the Preferred and Alternate Routes. The transmission line includes approximately 4 poles in agricultural land. Most of this will be within the AMPGS fence line.

Scrub/shrub will be cleared as part of the initial ROW clearing. Around the headwater streams, the shrub layer will be left in place to the extent practical to reduce potential erosion and to provide continued cover for the streams.

Impacts to old field vegetation will be negligible since there is little existing oldfield in the study area. Since this is a transitional land cover, old field may be created during clearing and will succeed into scrub shrub over time.

(2) Operation and Maintenance Impact

No impacts to naturally occurring vegetation species are expected from the operation of the transmission line within the proposed routes, with the exception of the few square feet occupied by each structure or pole. During operation of the transmission line within either the Preferred or Alternate Route, the impacts on vegetated land will be minor. The undeveloped land not disturbed by construction will retain its current vegetation composition and continue successional development at a normal rate. Periodic mowing or cutting within the transmission line ROW will prevent the establishment of taller tree species, but this is not expected to result in a significant environmental impact on nearby vegetation communities. Vegetation that represents an operational concern to the transmission line, e.g., tall tree species, will be removed as needed. Periodic spraying of vegetation in upland areas may be required as part of routine maintenance and will be performed with U.S. EPA-approved herbicides by licensed applicators.

(3) Mitigation Procedures

The Preferred and Alternate Routes have been examined in the field and reviewed on aerial photographs by experienced biologists and environmental scientists. No vegetated areas (other than riparian areas previously described) that would require mitigation will be impacted.

(F) Commercial, Recreational, and Threatened/Endangered Species

The undisturbed portions of the transmission line corridors are suitable habitat for several major wildlife species. The following descriptions are of major species observed within, expected to inhabit, or reported to have a range (for protected species) that includes the transmission line corridors. No survey of major aquatic species was conducted, since no suitable habitat exists for aquatic species within the transmission line corridors.

Details on the expected impacts of construction, operation and maintenance, and mitigation procedures can be found following the commercial, recreational, and threatened and endangered species descriptions.

Commercial Species: The commercially important species within the proposed routes consist of those hunted or trapped for fur or other byproducts, including the following:

- Beaver *(Castor canadensis)*: Beavers are found in forested lakes, rivers, and streams throughout Ohio. This species is likely to inhabit the transmission line corridors.

- Coyote (*Canis latrans*): Historically, coyotes have preferred open territory, but in Ohio they have shown preference to hilly farmland mixed with wooded areas. This species is likely to inhabit the transmission line corridors.

- Gray and red fox: Both the gray fox (*Urocyon cinereoargenteus*) and red fox (*Vulpes vulpes*) occur throughout Ohio in generally similar habitats. The red fox is most prevalent in areas of maximum interspersion of woodland and agricultural lands, while the gray fox is usually observed in less fragmented habitat. It is likely that both species inhabit the transmission line corridors.

- Mink (*Neovison vison*): Mink are found throughout Ohio residing in brushy and forested areas near marshes lakes, ponds, streams, and rivers. This species is likely to inhabit the transmission line corridors.

- Muskrat *(Ondatra zibethicus)*: The muskrat is abundant throughout Ohio and is generally found in areas near intermittent streams, drainage courses, and farm ponds. It is the most extensively trapped fur-bearer in the State of Ohio. This species is likely to inhabit the transmission line corridors.

- Opossum (*Didelphis virginiana*): The opossum is abundant and widespread throughout Ohio. Opossum can be found in natural, rural, suburban, and farmland areas. The opossum prefers wooded pastures adjacent to woodland streams and ponds. This species is likely to inhabit the transmission line corridors.

- Raccoon *(Procyon lotor):* The raccoon is abundant and widespread in Ohio. Raccoons are found principally around aquatic and woodland habitats, with occasional forages into croplands. This species is likely to inhabit the transmission line corridors.

- Striped skunk *(Mephitis mephitis):* The skunk is found primarily in semi-open habitat of mixed woods, brush, farmland, open grassland, and small caves in close proximity to water. These mammals are common statewide. This species is likely to inhabit the transmission line corridors.

- Long-tailed weasel *(Mustela frenata):* The long-tailed weasel is found throughout the state of Ohio in areas adjacent to rivers, lakes, streams, or marshes, where they feed on small mammals. This species is expected to inhabit the transmission line corridors.

Recreational Species: Recreational terrestrial species consist of those hunted as game. Recreational species likely to inhabit areas within the transmission line corridors include the following:

- American crow (*Corvus brachyrhynchos*): Crows are vastly widespread and are found in every county within Ohio. Though found in various habitats, including urban and suburban settings, they are generally more abundant in heavily farmed areas with access trees. This species is likely to inhabit the transmission line corridors.

- Coyote (*Canis latrans*): Historically, coyotes have preferred open territory, but in Ohio they have shown preference to hilly farmland mixed with wooded areas. This species is likely to inhabit the transmission line corridors.

- Eastern cottontail (*Sylvilagus floridanus*): The eastern cottontail is Ohio's number one game species. It is abundant in both rural and urban areas and is primarily found within field borders, brushy areas, and thicket habitats that can be found in the study area. This species is likely to inhabit the transmission line corridors.

- Gray and red fox (*Urocyon cinereoargenteus*) and (*Vulpes vulpes*): Both the gray fox and red fox occur throughout Ohio in generally similar habitats. The red fox is most prevalent in areas of maximum interspersion of woodland and agricultural lands while the gray fox is usually observed in less fragmented habitat than the red fox. It is likely that the both species inhabit the transmission line corridors

- Gray, red, and fox squirrels (*Sciurus carolinensis, Tamiasurius hudsonicus, Sciurus niger*): These tree squirrels occur throughout Ohio. The fox squirrel (*Sciurus niger*) is primarily an inhabitant of small, isolated woodlots. The gray squirrel (*S. carolinensis*) and red squirrel (*Tamiasurius hudsonicus*) prefer more extensive woodland areas. All three of these squirrels are likely to inhabit wooded areas within the transmission line corridors.

- Long-tailed weasel (*Mustela frenata*): The long-tailed weasel is found throughout the state of Ohio in areas adjacent to rivers, lakes, streams, or marshes, where they feed on small mammals. This species is likely to inhabit the transmission line corridors.

- Mourning dove (*Zenaida macroura*): The mourning dove is an abundant resident of all counties in Ohio. They can be found in suburban and rural areas, farmlands, and edges of woodlands. This species is likely to be found in areas within the transmission line corridors.

- Northern bobwhite (*Colinus virginianus*): This game bird species is typically found in forest edge habitat. It uses grasslands, scrublands, and forest for nesting, breeding, and foraging activities. This species is likely to be found areas within the transmission line corridors and the call of this species was heard during field investigations.

- Opossum *(Didelphis virginiana)*: The opossum is abundant and widespread throughout Ohio. Opossum can be found in a variety of natural habitats, but also in rural and suburban areas and farmland. Wooded pastures adjacent to woodland streams and ponds seem to be preferred. This species is likely to inhabit the transmission line corridors.

- Raccoon *(Procyon lotor)*: The raccoon is abundant and widespread in Ohio, even in many suburban areas. Raccoons are found principally around aquatic and woodland habitats, with occasional forages into croplands. This species is likely to inhabit the transmission line corridors near wooded and residential areas.

- Ring-necked pheasant *(Phasianus colchicus)*: The ring-necked pheasant is a bird native to Asia that was introduced to the U.S. as a recreational species. Ring-necked pheasants have two specific habitat requirements that must be met: there must be cover for undisturbed nesting and enough thermal cover and food in winter months. Heavily farmed areas near old fields are ideal. This species is likely to inhabit areas within the transmission line corridors.

- Ruffed grouse *(Bonasa umbellus)*: Ruffed grouse habitat includes three general forest types: mixed species stands of hardwood shrubs, saplings, and brush-vine tangles; moist areas with dense clumps of shrubs interspersed with lush herbaceous growth; and young forest stands of mixed hardwoods. Females prefer to nest on the edges of second growth hardwoods near logging trails or small clearings seeded with clover or other lush herbaceous vegetation during the summer. It is likely that ruffed grouse inhabit areas within the transmission line corridor.

- Striped skunk *(Mephitis mephitis)*: The skunk is found primarily in semi-open habitat of mixed woods, brush, farmland, open grassland, and small caves in close proximity to water. These mammals are common statewide. This species is likely to inhabit the transmission line corridors.

- White-tailed deer *(Odocoileus virginianus)*: White-tailed deer occur commonly throughout Ohio. They are found primarily in wooded areas in close proximity to agricultural fields, pastures, and other open areas. White-tailed deer are likely to inhabit areas within the transmission line corridors.

- Wild turkey *(Meleagris gallopavo)*: Wild turkeys are very adaptable animals. Although they prefer mature forests, with substantial cover and suitable food sources, they can live successfully in areas with as little as 15 percent forest cover. Wild turkeys are likely to inhabit areas within the transmission line corridors.

- Woodchuck *(Marmota monax)*: The woodchuck, or groundhog, is a common large rodent found throughout Ohio. It is found in mostly open grasslands, pastures, and woodlands. This species is likely to inhabit areas within the transmission line corridors.

Threatened/Endangered Species: An assessment of threatened and endangered species reported by ODNR within vicinity of the project area is summarized below.

- Mud-plantain (*Heteranthera reniformis*): This perennial aquatic herb is known to occur submersed or floating in ponds, ditches or rivers, or creeping within muddy river margins. The potential hazard to this species of concern is generally limited to impacts or disturbances to the aquatic habitat. This plant species of concern was not identified during the August 2006 and June 2007 field investigations.

- Common Prickly Pear (*Opuntia humifusa*): This hardy cactus with oblong, flattened pads was previously recorded south of the study area, in the vicinity of the Letart Falls cemetery. This species of concern prefers areas of full sun on well-drained soils, such as sandy fields and hillsides. The primary hazard to this species of concern is overgrowth by woody species as a consequence of succession. This plant species of concern was not identified during the August 2006 and June 2007 field investigations.

- Smooth Buttonbush (*Spermacoce glabra*): This perennial herb is most commonly found on the muddy shores and low banks of the Ohio River, but is also found in swamps and wet woods. This plant was not identified during the August 2006 and June 2007 field investigations.

- The Eastern Spadefoot (*Scaphiopus holbrookii*): The eastern spadefoot was previously recorded by ODNR to be in the vicinity of the AMPGS site. This amphibian typically occurs in brush-covered, forested, and/or cultivated areas that consist of loose sediments such as gravel, sand, and sandy loam. With the exception of emerging from the soil to eat or possibly reproduce, the eastern spadefoot generally remains burrowed underground. Potential habitat for this species of concern exists on the lower river terraces of the site.

  Because of the documented occurrence of a breeding population of eastern spadefoots near the proposed AMPGS site, AMP-Ohio retained the services of Dr. Scott Moody to assess the potential habitat for the eastern spadefoot on the plant site and the Preferred Route. Dr. Moody met with AMP-Ohio staff on July 20, 2006. Although a formal report was never prepared, Dr. Moody confirmed the presence of habitat and collected several tadpole samples from the Tupper Run temporary pool. Identification of the tadpole samples was never completed.

  AMP-Ohio subsequently retained the services of Jeffrey Davis to provide a habitat assessment. Mr. Davis met with AMP-Ohio staff on April 6, 2007 and identified the upper river terrace areas as habitat for eastern spadefoots. Mr. Davis further recommended that a standard survey be performed to identify the presence of spadefoots and, if present, habitation and breeding areas.

  AMP-Ohio accepted Mr. Davis' standard survey proposal. The first standard survey site visit with AMP-Ohio staff occurred on June 13, 2007 after a small rain event (preceded by a long period of drought). Even though the Tupper Run breeding pool was dry, Mr. Davis and his assistant, Eric Chapman, collected four juveniles near the intersection of Hill Road and Plants Road.

A second site visit occurred on June 28, 2007 after a significant rain event. All known breeding pools were full. Full spadefoot chorusing was observed in the Tupper Run and North Adams Road (off the project site) breeding pools. Spadefoot chorusing was also observed in the Letart Cemetery and the Hill Road breeding pools.

A third site visit occurred on July 12, 2007 to verify the presence of eastern spadefoot tadpoles. Spadefoot tadpoles were observed and collected in the Letart Cemetery and Hill Road pools. Spadefoot tadpoles were also observed, but not collected, in the Tupper Run and Adams Road breeding pools.

After 14 days, the spadefoot tadpoles had developed rear legs. In a few cases, front legs were starting to develop. Although the June 28 breeding event was successful, it could not be classified as a major breeding event due to insufficient tadpole densities.

Following a suggestion from a local resident during the June 28 site survey, the survey crew explored a former irrigation impoundment east of Adams Road. According to local information, the dam was breached a few years ago during a large rainstorm. The dam was never repaired. No temporary pools were observed, and it seems unlikely that eastern spadefoots are living in this area.

A copy of the eastern spadefoot report prepared by Jeffrey Davis will be provided to the OPSB as a supplement to this Application. AMP-Ohio is also consulting with ODNR-DOW to develop a mitigation plan for potential impacts to the eastern spadefoot. Once it is completed, AMP-Ohio will provide a copy of the eastern spadefoot mitigation plan to the OPSB as a supplement to this Application.

- Indiana Bat *(Myotis sodalis)*: According to ODNR-DOW, the historic range of the Indiana Bat falls within the project corridors. The Indiana Bat is considered to be an endangered species by the federal government and the State of Ohio. This species is a possible inhabitant of Meigs County. The Indiana Bat is a migratory species, wintering in a few limestone cave hibernacula principally located in Indiana, Kentucky and Missouri. Summer roosting and foraging areas are typically farther north in the glaciated regions of Indiana, Illinois, and Ohio. Males and gravid females may arrive in northern regions in April and remain until October. The bat typically roosts under the exfoliating (loose) bark of live or dead trees of various rough-barked tree species. The 8- to 10-inch size classes of several species of hickory (*Carya* sp.), oak (*Quercus* sp.), ash (*Fraxinus* sp.), and elm (*Ulmus* sp.) are utilized in live form as roost trees. These tree species and many others may be used when dead, if there are adequately sized patches of loosely adhering bark or open cavities. The structural configuration of forest stands favored for roosting includes; (1) a mixture of favored loose-barked trees with 60 to 80 percent canopy closure and (2) a low density sub-canopy (less than 30 percent between about 6 feet high and the base canopy).

The wooded areas within the transmission line corridors may be suitable habitat for this species. There are several areas within the study corridor not suitable as habitats for Indiana Bats due to either no forest cover or a thick subcanopy. These are located between the proposed power plant and the first proposed pole at the southern end of the route, to the west of wetland 1 (W1) and stream 1 (S1), in between streams 4 (S4) and 5 (S5), and also south of stream 15 (S15) for about 1500 feet.

An Indiana Bat mist-net survey was performed by BHE Environmental in July and August, 2007. No Indiana Bats were captured during the mist-net survey. While these results do not necessarily rule out presence of Indiana Bats in the area of the proposed project, the results do indicate that it is unlikely that this project will adversely affect the Indiana Bat. A copy of the Indiana Bat Survey Report has been provided to the OPSB as Supplement No. 4 to the Generation Application (Case No. 06-1358-EL-BGN).

(1) Construction Impact

To avoid direct impacts to potential Indiana Bat roosting and foraging habitat, USFWS typically recommends that mechanized tree clearing be done between September 15 and April 15 or that field data be collected to substantiate that Indiana Bats are not using the area for summer roosting and foraging. Bat mist netting work was conducted in July and August. 2007. No bats were captured during the survey; however, AMP-Ohio proposes to limit tree removal activities to those times outside of the summer roosting months for this species. The results of the survey have been provided to the OPSB and will help determine the schedule for tree clearing. No other protected and/or high interest animal species that could inhabit the transmission line corridors during any part of the year should be significantly impacted by construction of the project within either the Preferred or Alternate Route. This conclusion takes into account the species' existing distributions, preferred habitats (community types), and the minimal acreages of these community types disturbed by clearing and construction within either of the proposed routes.

(2) Operation and Maintenance Impact

Although highly unlikely, any impacts on protected species during operation of the transmission line are expected to be minor. While portions of the transmission line corridors will need periodic clearing, the intervening long periods without disturbance will provide suitable conditions for flora and fauna to flourish.

(3) Mitigation Procedures

The Preferred and Alternate Routes have been examined in the field and reviewed on aerial photographs by experienced biologists and environmental scientists. To date, the field studies have indicated only one threatened/endangered species present within 1,000 feet of the Preferred and Alternate Routes. The eastern spadefoot was observed in both study corridors at the southern end. AMP-Ohio is proposing to set aside an area adjacent to the north of the AMPGS site as breeding habitat and will identify and establish a similar area suitable for eastern spadefoot winter dormancy habitat. As stated above, AMP-Ohio is consulting with ODNR to develop a mitigation plan for potential impacts to the eastern spadefoot and will provide this plan to the OPSB once completed.

The presence of Indiana Bat has not been established, and impacts will be avoided through clearing at the appropriate time of year. Therefore, no mitigation is proposed at this time for impacts to the Indiana Bat.

(G) Slopes and Erodible Soils

According the *Soil Survey of Meigs County, Ohio,* (Natural Resource Conservation Service, 2000), fifteen soils from eight soil series are mapped within the limits of the study area and include Chagrin silt loam (Cg), Cidermill silt loam (CkA, CkB), Conotton gravelly loam (CnC, CnE), Gilpin silt loam (GhC2), Lakin loamy fine sand (LaB, LaC, LaD), Licking silt loam (LkC2), Omulga silt loam (OmB, OmC), and Upshur-Gilpin complex (UgC2, UgD, UgE). None of these soils are listed as hydric on the National, State, or County lists.

Descriptions of highly sloping soils and those that pose erosion hazards can be found below. Details on the soils not described in this document can be found in the Wetland Delineation, Stream Assessment, and Threatened and Endangered Species Habitat Survey included as Appendix 07-1.

Information on the expected impacts of construction, operation and maintenance, and mitigation procedures on slopes and erodible soils are provided after the soil descriptions.

Conotton gravelly loam; 6-12 and 18-24 percent slopes (CnC, CnE): The Conotton series consists of very deep, well-drained soils formed on terraces within the Ohio River. The surface layer of Conotton gravelly loam is friable gravelly loam. The upper section of the subsoil is friable very gravelly loam and very friable very gravelly coarse sandy loam; the lower section is very friable very gravelly loamy coarse sand and friable extremely gravelly loamy coarse sand. The substratum is loose extremely gravelly coarse sand. This soil has a low available water capacity and rapid permeability. Slope ranges from 6 to 24 percent. Conotton gravelly loam is widely used for cultivated crops or pasture.

Gilpin silt loam; 8-15 percent slopes (GhC2): The Gilpin series consists of moderately deep, well-drained soils formed on strongly sloping to very steep hillsides and narrow ridgetops. The surface layer is friable silt loam. The upper section of the subsoil is friable and firm silt loam; the lower section is firm channery loam. The substratum is sandstone, and the soil has a low available water capacity and moderate permeability. Gilpin silt loam is mostly used for woodland. Slope ranges from 0 to 70 percent.

Lakin loamy fine sand; 1-6, 6-12, and 12-18 percent slopes (LaB, LaC, LaD: The Lakin series consists of very deep, excessively drained soils formed in coarse textured eolian or water-laid materials. Lakin soils are located dominantly on the leeward side of major stream valleys. The surface and subsoil layers of these soils have very weak fine granular structures and are very friable. These soils are excessively drained, and the potential for surface runoff is negligible to low. Permeability is rapid. Slope ranges from 1 to 18 percent.

Licking silt loam; 6-12 percent slopes, eroded (LkC2): The Licking series consists of deep, moderately well drained soils found on terraces prone to erosion. The surface layer of Licking silt loam is friable silt loam. The upper section of the subsoil is mottled, firm silty clay loam; the lower section is mottled, firm silty clay. The substratum of this soil is mottled firm silty clay. This soil has a moderate available water capacity and slow permeability. Slopes range from 6 to 12 percent. Areas of Licking silt loam are commonly used for pasture or hay. This soil is ill suited for most agriculture due to erosion.

Omulga silt loam; 2-6 and 6-12 percent slopes (OmB, OmC): The Omulga series consists of very deep, moderately well drained soils formed in loess, colluvium, or old alluvium, and in most areas by underlying lacustrine sediments. These soils are on valley fills in abandoned preglacial drainage systems in the Allegheny Plateau. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 2 to 12 percent. Soils are friable within the surface layer and have a weak, fine granular structure. The structure of the subsoil layer is weak, fine, subangular, and blocky. These soils are best suited to be used as pasture.

Upshur-Gilpin complex; 8-15 percent slopes, eroded; 15-25 and 25-50 percent slopes (UgC2, UgD, UgE): The Upshur-Gilpin complex series consists of very deep to moderately deep, well-drained soils formed in residium derived from siltstone, sandstone, and shale. They are typically located on strongly sloping or steep uplands (ridgetops and hillsides). The Upshur soil portion has a friable, surface layer and moderate-fine, granular structure. The subsoil has moderate-medium subangular blocky structure and is firm. The surface layer of the Gilpin soil portion has a weak-fine granular structure and is friable. The subsoil has weak-fine and medium subangular blocky structure and is friable. Slopes range from 8 to 50 percent

(1) Construction Impact

Slopes of the soils listed within the transmission line corridors range from 0 to 50 percent. Some of these soils, such as Licking silt loam, may pose an erosion hazard during construction. Others, such as the Upshur-Gilpin complex, may pose additional hazards due to steep slopes. In these areas of concern, construction will take place on hilltops and ridges to avoid potential erosion and slope hazards. Care will be taken to place towers/poles on relatively flat areas both to minimize construction on steep slopes, and to span stream valleys.

(2) Operation and Maintenance Impact

Once the transmission line is in place, disturbed areas will be stabilized and re-vegetated in accordance with the Stormwater Pollution Prevention Plan prepared as part of the NPDES Stormwater Permit. No impacts or erosion hazards are expected. Maintenance activities that involve excavation around towers are anticipated to be extremely rare, but in these cases, standard measures will be implemented to prevent soil erosion and run off into any nearby streams and wetlands.

(3) Mitigation Procedures

No special mitigation procedures on slopes or easily eroded soils are anticipated. Best Management Practices consisting of silt fence, straw bale barriers, and coconut mesh coir rolls will be used as required when construction takes place adjacent to drainage channels, streams, and wetlands. An Ohio EPA Stormwater Pollution Prevention Plan will be generated for the project and the requirements of Ohio EPA General Permit No. OHC000002 will be followed for erosion and sedimentation control.

(H) <u>Other Significant Issues</u>

No other significant issues are anticipated.