~~ERF-0956-R4~~
ASO-CX-261

Environmental Review Form for Argonne National Laboratory

Click on the blue question marks (?) for instructions, contacts, and additional information on specific line items.

(?)**Project/Activity Title**: Installation of a 138kV Substation at Building 202 and Modification of Substation 549A

(?)**ASO NEPA Tracking No.** ASO - CX - 261 (?)**Type of Funding**: ARRA
B&R Code

(?)**Identifying number**: ERF-0956R4 WFO proposal # CRADA proposal #
Work Project # 01223 ANL accounting # (item 3a in Field Work Proposal)
Other (explain) ESQ Log #799

(?)**Project Manager**: J. Uppal Signature: Date: 3/24/10

(?)**NEPA Owner**: Phil Rash Signature: Date: 3/24/10

ANL NEPA Reviewer: *M. A. Kamiya* Signature: Date: 3/25/2010

I. (?)**Description of Proposed Action:**

This revised ERF includes the proposed changes that relocate the proposed construction site for the 202 sub-station from north of Building 202 to northeast of Building 202 coordinating the site location with the Site Modernization Plan. In addition, this revised ERF describes the installation details of the 138 kV electrical substation near Building 202, the design details for the duct bank, the modification of 549A substation, and the overhead lines associated with the substation work.

A new 100 foot by 300 foot 138 kV substation is proposed northeast of Building 202. The facility would be constructed in two phases. The initial phase would include the east half of the substation, the removal of overheads lines north of Building 202 and the installation of the replacement duct bank service between the new substation and west to Northgate Road, and the modification to the existing overhead power lines east of the site near Outer Circle Road that would connect to the east side of the new substation. The west half/second phase of the proposed facility would include the extension of the substation yard to the west, the addition of transformers/supports and connections inside the existing yard. The second phase may be constructed in the future depending on long term Laboratory development guided by the annually updated Site Modernization Plan, as well as approval of funding by DOE.

At the new 138kV substation yard, site clearing including grading and tree removal and excavations would be made for about 4000 SF of concrete foundations-spill containment structures and one control building. The 138kV substation yard and service driveways would be excavated and a pervious gravel surface would be installed in the yard, driveways, and around all the high voltage equipment. In addition, a safety and security fence would be installed to surround the 138kV substation. The sub-grade (lower limit of the excavation) would be graded to guide storm water landing on the gravel surface uniformly toward the undisturbed wetland. The gravel sub-base would be large stones with ample water storage capabilities and the gravel surface would be pervious and allow all storm water to filter into the gravel sub-base. This subsurface area would store storm event water and allow for a slow infiltration into the buffer area between the wetland and the substation yard.

Existing overhead power lines would be removed and replaced by an underground concrete duct bank between the new sub-station and existing underground service near Northgate Road and 94th Street to the west. Existing overhead lines to the east along the existing utility right of way near

Outer Circle and 94th Street would be rerouted to the enter the east side of the new 138kV substation.

The 138kV substation yard at Building 202 would include transformers, electrical switching systems, containment facilities around the oil filled transformers, and a power control building. The existing sanitary and laboratory sewer lines would be rerouted around the proposed electrical substation yard to mitigate potential safety risk involved with maintenance of the sewer lines.

At Substation 549A, the existing yard would be expanded to include the addition of a new switch gear to coordinate the electrical service that would feed the new 138kV substation at Building 202. The work would include the excavation for and placement of equipment foundations, electrical concrete underground duct banks, and associated gravel driveway including security fencing around the modified Substation 549A.

All disturbed areas not receiving an improved surface would be reconstructed using topsoil, grass seed and mulch.

II. (?)**Description of Affected Environment:**

The work at the existing substation 549A would take place in previously disturbed areas. The work at the site of the new 138 kV substation near Building 202 would include work in previously undisturbed areas. The work at the 202 substation would also occur within 50 feet of an existing wetland. An isolated grove of trees would be removed and recycled. Minor impacts could occur to the wetland but the proposed design and temporary site storm water controls would alleviate impacts.

III. (?)**Potential Environmental Effects:** (Attach explanation for each "yes" response. **See Instructions for Completing Environmental Review Form)**

A. Complete Section A for all projects.

1. (?)Project evaluated for Pollution Prevention and Waste Minimization opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable. Tops soil and clay removed from the site would be recycled on site either at the project or in the Argonne's earth material storage areas. Yes X No ____

2. (?)Air Pollutant Emissions Yes X No ____
   Minor emissions from cars and light-duty vehicles will occur. No impact to air quality on site is expected.

3. (?)Noise Yes X No ____
   General construction noises are expected. Any noises above the OSHA standards would require the workers to wear the appropriate personal protective equipment. Standard operation of construction equipment at this site would not disrupt activities of adjacent buildings.

4. (?)Chemical Storage/Use Yes X No ____
   Standard construction chemicals such as grease, adhesives, gasoline, and oil would be used. The materials would be stored in proper containers and protected from spillage per the erosion control plan.

5. (?)Pesticide Use Yes ____ No X

6. (?) Polychlorinated Biphenyls (PCBs) Yes ____ No X

7. (?) Biohazards — Yes ____ No X

8. (?)Liquid Effluent (wastewater) — Yes X No ____

The results of the construction activities would generate some storm water effluent. The control building would have a basement and sub-grade drainage that would be pumped to the surface at the building edge and allowed to enter the porous surfaces of the substation yard. The oil containment structures would have drains. The water would be checked for oil sheens prior to discharge to the substation's porous surface. If oil sheens are noted, the water would be removed and treated prior to disposal. Any storm water discharges during construction would be filtered prior to discharge. All temporary storm water discharges would be directed east and not allowed to enter the wetland area. The concrete washout from the trucks would be collected and recycled at the existing 800 Area recycling station or in temporary washout areas per the erosion control plan.

Secondary containment is not part of the standard transformer design. Secondary containment for the 138 kV substation yard transformers would be provided for via concrete foundations and retaining walls that would support and surround the transformers to control and monitor potential spills from any oil filled transformers. Silt fencing would control the excess storm water runoff from outside the site from entering the site and filter runoff from the site. The lab and sanitary sewers would be re-routed to go around the facility but no discharges would occur. A pump by-pass system would be setup to control and contain the temporary re-routing of the untreated sewer water.

9. (?)Waste Management

a) Construction or Demolition Waste — Yes X No ____

Small amounts of general debris are expected from this project. Existing power poles would be removed and likely reused at the Argonne site. Topsoil and clay not reused at the construction site would be recycled at Argonne's 800 Area Soil Storage Area. Wood limbs and small branches would be chipped and recycled at the Laboratory. Larger trees, generally greater than 6" in diameter would be removed and recycled off site. Concrete debris would be recycled through the Laboratory's waste removal contractor. Miscellaneous packaging debris such as wood pallets and paper would be recycled through the Argonne recycling program or by the contractor.

b) Hazardous Waste — Yes ____ No X

None expected

c) Radioactive Mixed Waste — Yes ____ No X

None expected

d) Radioactive Waste — Yes ____ No X

None expected

e) PCB or Asbestos Waste — Yes ____ No X

None expected

f) Biological Waste — Yes ____ No X
None expected

g) No Path to Disposal Waste — Yes ____ No X

h) Nano-material Waste — Yes ____ No X

10. (?)Radiation — Yes ____ No X

11. (?)Threatened Violation of ES&H Regulations or Permit Requirements — Yes ____ No X

12. (?)New or Modified Federal or State Permits — Yes ____ No X

13. (?)Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste — Yes ____ No X

14. (?)Public Controversy — Yes ____ No X

15. (?)Historic Structures and Objects — Yes ____ No X

16. (?)Disturbance of Pre-existing Contamination — Yes ____ No X

17. (?)Energy Efficiency, Resource Conserving, and Sustainable Design Features — Yes X No ____
Transformers would be high efficiency design. Recycled materials would be used where appropriate. All excavated materials would be recycled on site. High efficient lighting would be incorporated in the design.

B. For projects that will occur outdoors, complete Section B as well as Section A.

18. (?)Threatened or Endangered Species, Critical Habitats, and/or other Protected Species — Yes ____ No X

19. (?)Wetlands — Yes X No ____
Although no work would take place within any existing wetlands, the part of the new 138 kV substation yard near Building 202 would be within 50 feet of a medium quality wetland. Refer to the attached Wetlands Assessment for location and additional details about the scope of work designed to off-set the potential impacts to the wetland area. Erosion control measures would be required to protect these areas. A detailed Storm Water Pollution Prevention Plan including an Erosion Control Plan would be required to isolate and protect the adjacent wetland and control storm sewer runoff in general.

There are potential impacts that could occur during construction. All areas that would be down gradient of the work areas including areas of high vehicle use would be protected using standard erosion control methods including silt fence installation and immediate surface repairs. Restrictions would be put in place to control excessive vehicular traffic in the grass areas in the work zone such as temporary culverts at the adjacent street swale and rumble zones to remove loose dirt.

The proposed actions to reduce wetland impacts described in this ERF and the attached Wetlands Assessment would be incorporated into the proposed design and executed during construction. The proposed actions and the mitigation actions would result in minimal if any impact to the wetland.

20. (?)Floodplain — Yes ____ No X

21. (?)Landscaping — Yes X No ____
Native grasses would be planted in disturbed areas outside the fenced site and along the new gravel roads. Only the necessary, minimal amount of trees would be removed during the construction activities. Since the construction activities would be done in two phases, only the vegetation in the immediate work areas would be disturbed in each phase. Existing lay down areas would be used.

22. (?)Navigable Air Space — Yes ____ No X

23. (?)Clearing or Excavation — Yes X No ____
There would be excavation activities during this project. A detailed Storm Water Pollution Prevention Plan and erosion control plan would be developed and applied to all activities in the multiple work areas.

The existing poles being removed and the new poles would generate temporary disturbances of the earth during the installation. Temporary spoils from pole work would be removed or covered with grass promptly. Any gravel stored for the pole installation would be protected via the use of bagged containers or covering of the storage piles.

Some surface disturbances would come from excessive vehicle use in the work areas. Restrictions would be put in place to control vehicle use. In addition, erosion control systems must be put in place to control any run-off from the work areas and no construction equipment or site runoff would be allowed into the wetland areas.

For the construction of the both substation structure foundations, duct banks, and control building including site clearing will involve extensive excavation and tree removal activities. About 300 CY of material will be excavated for the equipment pads and building and another 700 CY for the substation yards. Sub-base rip-rap and surface gravel would be placed to create a pervious surface and detention area per the Wetland Assessment within the fenced area at the 138kV substations and access driveways. At the 549A substation, a standard gravel working surface would be installed. Fencing post would be set in concrete. Removed trees will be mulched and/or otherwise recycled. Excavated materials including excess spoils would be removed immediately and all would be recycled on the Argonne site.

24. (?)Archaeological Resources — Yes ____ No X
The work area planned for the 138 kV substation at Building 202 would take place on land not previously disturbed. The site was surveyed for archaeological resources. The survey was completed in November, 2009

and none were found. Argonne is preparing the SHPO notification for submittal.

25. (?)Underground Injection — Yes ____ No X

26. (?)Underground Storage Tanks — Yes ____ No X

27. (?)Public Utilities or Services — Yes ____ No X

28. (?)Depletion of a Non-Renewable Resource — Yes ____ No X

C. For projects occurring outside of ANL complete Section C as well as Sections A and B. N.A

29. (?)Prime, Unique, or Locally Important Farmland — Yes ____ No ____

30. (?)Special Sources of Groundwater (such as sole source aquifer) — Yes ____ No ____

31. (?)Coastal Zones — Yes ____ No ____

32. (?)Areas with Special National Designations (such as National Forests, Parks, or Trails) — Yes ____ No ____

33. (?)Action of a State Agency in a State with NEPA-type Law — Yes ____ No ____

34. (?)Class I Air Quality Control Region — Yes ____ No ____

IV. http://www.eshtraining.anl.gov/courses/nepa/q47.html**Subpart D Determination: (to be completed by DOE/ASO)**

Are there any extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal? Yes ____ No X

Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts? Yes ____ No X

If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211? Yes ____ No ____

Can the project or activity be categorically excluded from preparation of an Environment Assessment or Environmental Impact Statement under Subpart D of the DOE NEPA Regulations? Yes X No ____

If yes, indicate the class or classes of action from Appendix A or B of Subpart D under which the project may be excluded. B. 4.11, Construction of power substations of less than 230 KV and/or modification of existing substations and support facilities.

If no, indicate the NEPA recommendation and class(es) of action from Appendix C or D to Subpart D to Part 1021 of 10 CFR.

ASO NEPA Coordinator Review: Ken Chiu

Signature: Ken Chiu Date: 3/29/2010

ASO NCO Approval of CX Determination:

The preceding pages are a record of documentation that an action may be categorically excluded from further NEPA review under DOE NEPA Regulation 10 CFR Part 1021.400. I have determined that the proposed action meets the requirements for the Categorical Exclusion identified above.

Signature: _____ Date: 4/5/10

Peter R. Siebach
Acting Argonne Site Office NCO

ASO NCO EA or EIS Recommendation: N.A.

Class of Action: _____

Signature: _____ Date: _____

Peter R. Siebach
Acting Argonne Site Office NCO

Concurrence with EA or EIS Recommendation:

CH GLD: _____

Signature: _____ Date: _____

ASO Manager Approval of EA or EIS Recommendation:

An ____ EA ____ EIS shall be prepared for the proposed _____ and

_____ shall serve as the document manager.

Signature: _____ Date: _____

Joanna M. Livengood
Acting Manager

ASO-CX-261
Attachment

WETLAND ASSESSMENT OF THE EFFECTS OF CONSTRUCTION AND OPERATION OF A 138 kV SUBSTATION AT ARGONNE NATIONAL LABORATORY

March 16, 2010

CONTENTS

FIGURES

WETLAND ASSESSMENT OF THE EFFECTS OF CONSTRUCTION AND OPERATION OF A 138 kV SUBSTATION AT ARGONNE NATIONAL LABORATORY

1.0 Introduction

The U.S. Department of Energy (DOE) proposes to construct and operate a 138 kV substation and upgrade power lines as part of a building electrical service upgrade at Argonne National Laboratory, Du Page County, Illinois. The substation would provide power to new buildings in the 200 Area. This floodplain/wetland assessment has been prepared by DOE, pursuant to Executive Order 11990 (*Protection of Wetlands*) and DOE regulations for implementing this Executive Order as set forth in 10 CFR 1022 (*Compliance with Floodplain and Wetland Environmental Review Requirements*), to evaluate potential impacts to wetlands from the construction and operation of the proposed facility at the preferred and alternative locations.

2.0 Description of the Proposed Action and Alternatives

2.1 Proposed Action

DOE proposes to upgrade a section of the electrical utility system at Argonne National Laboratory, DuPage County, Illinois. This action would modify the 549A substation, reuse existing overhead lines, install new buried conduit encased in concrete duct banks, and construct a new 138 kV substation near Building 202. The proposed substation and ancillary power lines and equipment would provide additional power to a recently constructed building, Building 240, and power to newly DOE- approved projects to be located in the 200 Area. These approved projects consist of installation of a new supercomputer in Building 240, construction of a Chiller Plant and construction of the Environmental Sciences Building.

A number of activities associated with the proposed action would not result in impacts to wetlands, including the modification of the 549A substation, the reuse of the overhead lines, and the installation of an underground duct bank. However, the preferred location of the 138 kV substation is located adjacent to an existing wetland and warrants a Wetland Assessment.

The original project location, north of Building 202 was previously approved by DOE on April 3, 2009, in a categorical exclusion document entitled "Panel Board and Electrical Substation (200 Area)." In this Wetland Assessment, the technical scope of the project has not changed but the location has changed to approximately 400 ft (100 m) east of the originally proposed location. This new location would maximize available space in the event that future projects are proposed and approved by DOE.
The proposed 138 kV substation would be constructed in the northern portion of the Argonne site (Figure 1). The fully completed substation would be approximately 1.2 ac.

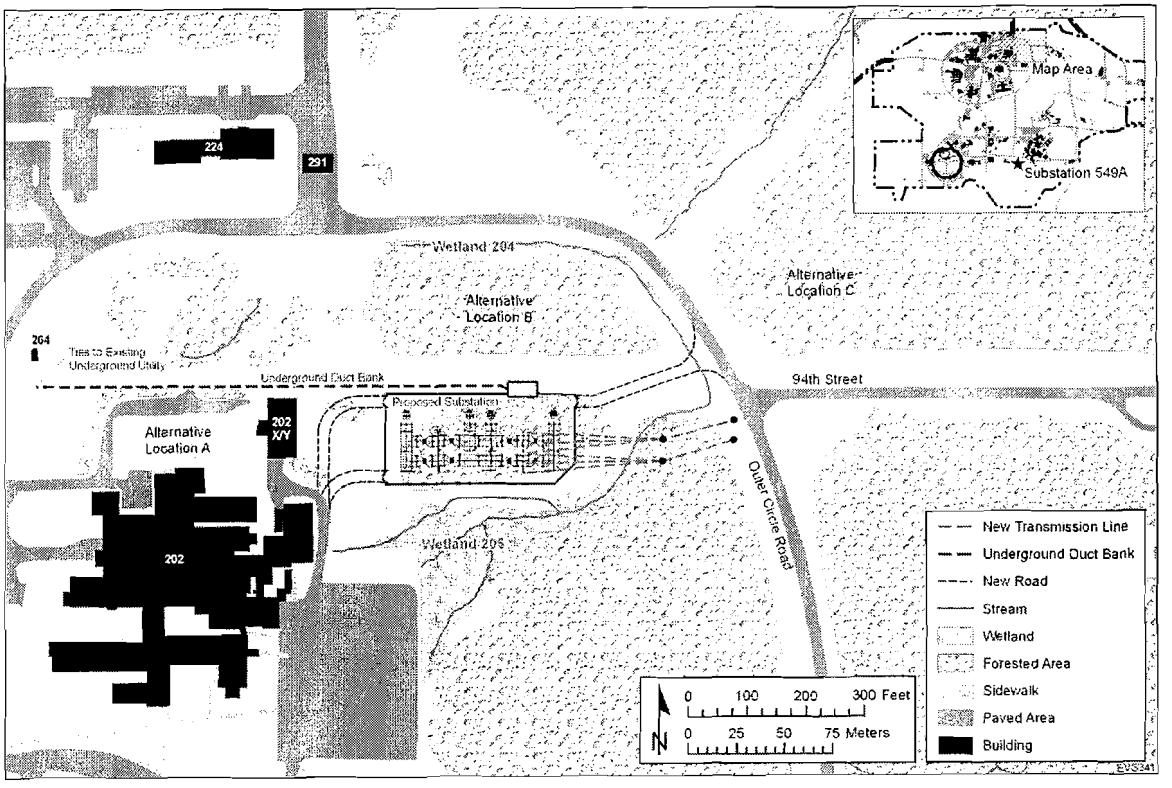

Figure 1. Proposed New 138 kV Substation

(0.49 ha) or 100 ft X 300 ft (30 m X 90 m) in size, and would be constructed in two phases. The eastern portion of the substation would be constructed in 2010 (100 ft X 150 ft (30 m X 46 m)). The remaining portions may be constructed in 10 to 15 years. This Wetland Assessment bounds both phases of construction of the substation project. Site preparation would include the removal of an isolated grove of trees present at the location, and grading. The majority of the site foot print, 94%, would be porous gravel. A small portion would be solid concrete equipment pads and a building roof. All the storm water from the non-porous surfaces would be discharged onto the porous gravel surface. Following the removal of topsoil and necessary sub-grade clays, a layer of rock rip-rap would be placed on the existing sub-grade followed by a top layer of crushed limestone. Access roads to the east and west sides of the substation would also be constructed in the same way. New transmission poles and overhead lines would be placed east of the substation and an underground duct bank would be installed west of the substation.

Design features would be incorporated to minimize hydrologic changes that could affect an adjacent wetland. These features would include (1) the creation of pervious surfaces with storm water detention capabilities to eliminate any surface runoff to the wetland from the gravel substation footprint, (2) construction of the sub-base and gravel roads to promote the infiltration of storm water, (3) set up of the sub-grade slope under the substation rip-rap to maintain the sub-surface runoff flow in the present direction, toward

the wetland, and (4) the maintenance of a 37-ft (11 m) buffer between the substation fence line and the adjacent wetland.

These features would provide a broadly distributed path for gradual infiltration of the precipitation that falls on the gravel area and maintain the similar volume of storm water leading to the existing wetland prior to the construction. In addition, appropriate temporary wetland protection would be provided via mitigation measures such as silt fencing, restrictions to vehicle access, and minimum storage of spoils within the water shed. These mitigation measures would be established and managed in an Erosion Control Plan that would be approved prior to construction.

2.2 Alternative locations

Three alternative locations for the new substation would be: (A) the originally proposed location directly north of Building 202, in an area currently occupied by a gravel parking lot, (B) directly north of the proposed location, in an undisturbed managed oak savanna area, and (C) northeast of the proposed location, in an undisturbed, managed wooded area northeast of the intersection of Outer Circle Road and 94th Street (Figure 1).

2.3 No-Action Alternative

Under the no-action alternative, a new substation would not be built and no wetlands would be affected Increased electric service to the 200 Area would not be available, which may affect the placement of the new supercomputer in Building 240, and construction of the Chiller Plant and the Environmental Sciences Building.

3.0 Description of Wetlands

The preferred site for the new 138 kV substation is near a small wetland, identified as Wetland 205 (Van Lonkhuyzen and LaGory 1994). Wetland 205 is approximately 1.0 ac (0.4 ha) in size, and extends from near the northeast corner of the Building 202 paved parking lot to near the intersection of Outer Circle Road and 94th Street (Figure 1). Wetland 205 is a palustrine wetland with persistent emergent vegetation (Cowardin et al. 1979).

The federal guidelines for wetland delineation (Environmental Laboratory 1987, USACE 2008) were used to delineate the wetland boundary in the project area in August, 2009 (see Appendix A). Areas that met the three criteria necessary for jurisdictional wetlands (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) were included within the boundary of Wetland 205.

Wetland 205 is positioned within a shallow swale, and was likely the location of a naturally occurring intermittent stream prior to the development of ANL. This wetland receives shallow groundwater inflows from the surrounding watershed as well as surface flows from two discharges to the west. These surface discharges are associated with Building 202 storm drains. Surface flows exit Wetland 205 at the eastern end, where they

enter a drainage ditch along Outer Circle Road. Wetland 205 has a moderate overall gradient, with an elevation drop of approximately 18 ft (5.5 m) from the western edge to the eastern exit point. Soils in much of the wetland remain saturated at or near the surface through most of the year, with shallow inundation early in the growing season along the swale bottom. Soils in the remainder of the wetland are saturated early in the growing season, but the water table lies more than 16 in (41 cm) below the soil surface during the later months.

The wetland 205 watershed is approximately 8.6 ac (3.5 ha), which includes the 1.2 ac (0.49 ha) Building 202 paved parking lot. Soils of Wetland 205 are classified as Ashkum Silty Clay Loam (Soil Conservation Service 1979), a poorly drained soil included on the Illinois list of hydric soils. Surrounding upland soils are classified as Morley Silt Loam. Native woodland plant communities are the predominant vegetation cover over much of the watershed, with the remaining areas outside of Wetland 205 supporting a mosaic of native prairie species and non-native herbaceous species.

The plant community of Wetland 205 is composed primarily of native herbaceous species. The dominant species are narrow-leaved cattail (*Typha angustifolia*), elderberry (*Sambucus canadensis*), sawtooth sunflower (*Helianthus grosseserratus*), and riverbank grape (*Vitis riparia*). Sixty-four native species have been recorded in Wetland 205 (Appendix B), ranging in coefficient of conservatism (C value) from 0 to 8, with a mean C value of 3 and a Floristic Quality Index (FQI) of 22, indicating a moderate quality plant community (mean C value of 3-4 and FQI of 15-25). Species native to the Chicago region range in C value from 0 (non-conservative, weedy species tolerant of disturbance) to 10 (conservative species which are found most often in high quality, undisturbed native habitats) (Swink and Wilhelm 1994). The native mean C value is the average C value of all native species recorded. The FQI is calculated by multiplying the mean C value by the square root of the number of native species present (Swink and Wilhelm 1994).

Wetland functions associated with Wetland 205 include maintenance of a high water table, accumulation of inorganic sediments, and maintenance of characteristic plant communities (NRC 1995).

Alternative Location A is occupied by a gravel parking lot. An association of native and non-native woody and herbaceous species forms a dense thicket immediately to the north of the gravel lot. No wetlands are located on Alternative Location A.

At Alternative Location B, the new 138 kV substation would be located near a small wetland, identified as Wetland 204 (Van Lonkhuyzen and LaGory 1994). Wetland 204 is approximately 0.1 ac (0.06 ha) in size, and extends along Outer Circle Road near 94th Street (Figure 1). Wetland 204 is a palustrine wetland with persistent emergent vegetation (Cowardin et al.1979). Areas that met the three criteria necessary for jurisdictional wetlands were included within the boundary of Wetland 204.

Wetland 204 is positioned within a shallow roadside drainage channel. This wetland receives shallow groundwater inflows from the surrounding watershed as well as surface

flows from a discharge to the west, associated with storm drains from Buildings 203 and 221, and drainage from Wetland 205 to the east. Surface flows exit Wetland 204 near the eastern end, where they enter a drainage channel that passes under Outer Circle Road. This channel continues as an intermittent stream to Argonne's north fence line. This stream is a tributary of Sawmill Creek. Wetland 204 has a moderate overall gradient. Soils in much of the wetland remain saturated at or near the surface through most of the year, with shallow inundation early in the growing season along the drainage bottom.

Soils of Wetland 204 are classified as Morley Silt Loam, an upland soil, and Ashkum Silty Clay Loam (Soil Conservation Service 1979), a poorly drained soil included on the Illinois list of hydric soils. Surrounding upland soils are classified as Morley Silt Loam. A native oak savanna plant community is the predominant vegetation cover over much of this location, with the remaining areas outside of Wetland 204 supporting a mosaic of native prairie species and non-native herbaceous species.

The plant community of Wetland 204 is composed primarily of native herbaceous species. The dominant species are narrow-leaved cattail (*Typha angustifolia*), Sweetflag (*Acorus calamus*), rice cut grass (*Leersia oryzoides*), Dark green rush (*Scirpus atrovirens*), and grass-leaved goldenrod (*Solidago graminifolia nuttallii*). Thirty-nine native species have been recorded in Wetland 204 (Appendix B), ranging in C value from 0 to 7, with a mean C value of 3 and a FQI of 18, indicating a moderate quality plant community.

Wetland functions associated with Wetland 204 include maintenance of a high water table, accumulation of inorganic sediments, and maintenance of characteristic plant communities (NRC 1995).

At Alternative Location C, the new 138 kV substation would be located near a small unnamed intermittent stream which is a tributary of Sawmill Creek. This stream exits Wetland 204 south of Outer Circle Road. Much of the stream bed is unvegetated, however, several small areas along the stream support wetland communities. The stream receives shallow groundwater inflows from the surrounding watershed as well as surface flows from Wetland 204. The stream bed has a moderate overall gradient and soils in much of the wetland remain saturated at or near the surface through most of the year, with surface flows during much of the growing season.

Soils along and adjacent to the stream are classified as Ashkum Silty Clay Loam (Soil Conservation Service 1979) a poorly drained soil included on the Illinois list of hydric soils. Surrounding upland soils are classified as Morley Silt Loam. A native oak woodland plant community is the predominant vegetation cover over much of this location, with the remaining areas outside of the intermittent stream supporting a mosaic of native prairie species and non-native herbaceous species.

4.0 Impacts to Wetlands and other Environmentally Sensitive Areas

At the preferred site, the new substation would be located near Wetland 205; however, no construction activities would occur within the wetland. Therefore, no direct impacts to Wetland 205 would occur as a result of the proposed action. The closest proximity of the substation perimeter to the wetland boundary would be 37 ft (11 m). New transmission poles would be located approximately 13 ft (4 m) from the wetland boundary near the eastern end of Wetland 205. The U.S. Army Corps of Engineers recommends a buffer of at least 50 ft (15 m) between construction of permanent structures and any wetland boundary, to protect wetland functions.

A small isolated grove of trees would be cleared during site preparation. The loss of trees and topsoil would reduce the infiltration and water holding capacity of ground surfaces within the footprint of the substation, which could result in increased surface runoff to Wetland 205. The construction of access roads within the watershed and tree removal for pole and line placement could also contribute to increased runoff. In addition, impervious surfaces would have a total surface area of 4,000 ft^2 (400 m^2) and would include equipment pads and control buildings.

Increases in surface flows due to construction within a watershed can result in greater fluctuations in water levels in wetlands. Direct runoff from constructed surfaces can also increase sediment or contaminant inputs to down gradient wetlands. Hydrologic alterations can potentially result in degradation of the wetland plant community. Species that are less tolerant of disturbance tend to decrease in occurrence, or are eliminated, while disturbance-tolerant species increase.

However, design features that would minimize hydrologic changes would be incorporated to reduce the potential impacts to Wetland 205. The design features would provide a pervious surface and detention of storm water within the foot print of the facility. Such features would promote the gradual infiltration of precipitation falling within the substation footprint and on the access roads while retaining the water within the watershed. As a result, runoff velocities would not be expected to increase, and infiltration and filtering would continue to occur via the detention area within voids around the Rip-Rap in the gravel area. In addition, the southeast corner of the substation would be truncated to increase the distance to the wetland. With the effective mitigation of hydrologic alterations, wetland impacts would be minor.

The installation of an underground concrete duct bank north of the new substation would not result in impacts to Wetland 204 or Wetland 205 because the duct bank would be located 200 ft (60 m) or more from either wetland. Following installation of the duct bank, surface soils would be regraded over the excavated area. Installation of the duct bank would not increase surface runoff to the wetlands, and no alterations to wetland hydrology would occur.

Constructing the new substation at alternative location (A), directly north of Building 202, would not result in wetland impacts, since the ground surface has been previously

significantly disturbed. Intact soils and plant communities do not occur in this location. Additional hydrological alterations in adjacent areas due to substation construction would be unlikely. A separate environmental review evaluating the construction of the substation at this location indicated that adverse impacts to wetlands would not occur.

Constructing the new substation at alternative location (B), directly north of the proposed location, would result in potential impacts similar to those of the proposed action. Wetland 204 occurs immediately adjacent and down gradient of this location. Indirect impacts, as described for Wetland 205, would also be expected to occur at this alternative location. In addition, a small, high-quality upland oak savanna would be removed at this location. The view-shed, as visitors to the Laboratory arrive, would be of a large electrical station instead of a high-quality savanna.

Constructing the new substation at alternative location (C), northeast of the intersection of Outer Circle Road and 94th Street, would also result in potential impacts similar to those of the proposed action. A tributary of Sawmill Creek is located adjacent and down gradient of this location. Indirect impacts, such as increased surface flows and water level fluctuations as described for Wetland 205, would also be expected to occur at this alternative location. In addition, a large portion of a high quality oak woodland would be removed at this location. Trees remaining along the margin adjacent to the substation would be exposed to increased light levels and moisture loss, resulting in additional tree mortality. Herbaceous species present in nearby open areas, potentially including non-native invasive species, would likely colonize woodland areas near the substation and potentially decrease habitat quality.

Under the no-action alternative, a new 138 kV substation would not be constructed. Existing conditions at Wetland 205 would remain unchanged. Therefore, no impacts to wetlands would occur.

5.0 Conclusions

Executive Order 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial uses of wetlands. Title 10 of the *Code of Federal Regulations*, Part 1022 (10 CFR 1022), sets forth DOE regulations for implementing Executive Order 11990. No construction activities would occur within Wetland 205 under the proposed action, therefore no direct impacts to wetlands would occur. With the implementation of appropriate mitigation measures to minimize hydrologic alterations, indirect adverse impacts to Wetland 205 would be expected to be minor.

6.0 References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979, *Classification of wetlands and deepwater habitats of the United States*, FWS/OBS-79/31. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Government Printing Office, Washington, D.C.

National Research Council (NRC), 1995, *Wetlands: Characteristics and Boundaries*, Committee on Characterization of Wetlands, National Academy Press, Washington, D.C.

Environmental Laboratory, 1987, *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Reed, P.B., Jr., 1988, *National List of Plant Species that Occur in Wetlands: North Central (Region 3)*, U.S. Fish and Wildlife Service Biological Report 88 (26.3).

Soil Conservation Service, 1979, Soil Survey of DuPage and Part of Cook Counties, Illinois, U.S. Department of Agriculture, Illinois Agricultural Experiment Station Report No. 108.

Swink, F., and G. Wilhelm, 1994, *Plants of the Chicago Region*, 4th ed., Indianapolis: Indiana Academy of Science.

U. S. Army Corps of Engineers. 2008. *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-27. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Van Lonkhuyzen, R.A., and K.E. LaGory, 1994, *Wetlands of Argonne National Laboratory-East, DuPage County, Illinois*, ANL/EAD/TM-12, Argonne National Laboratory, Argonne, Ill.

APPENDIX A

WETLAND DELINEATIONS

The current U.S. Army Corps of Engineers guidelines for wetland delineation were used to delineate the wetland boundary in the project area in August, 2009. These guidelines are found in the 1987 Corps of Engineers Wetlands Delineation Manual and the 2008 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. Jurisdictional wetlands (those under the jurisdiction of Section 404 of the Clean Water Act) must meet three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. The areas that met the three criteria necessary for jurisdictional wetlands were included within the boundary of Wetland 205, located near the preferred location. Wetland 204 had been previously delineated. The indicators for these criteria for Wetland 205 are presented in the Table 1 and for Wetland 204 in Table 2.

Table 1 Wetland 205 Indicators of Wetland Criteria

Sampling Point 1 **Hydrophytic Vegetation: Dominant Species**		
Scientific Name	Common Name	Indicator Status
Impatiens capensis	Orange jewelweed	FACW
Phalaris arundinacea	Reed canary grass	FACW+
Ribes americanum	Wild black currant	FACW
Salix nigra	Black willow	OBL
Sambucus canadensis	Elderberry	FACW-
Solidago gigantea	Late goldenrod	FACW
Vitis riparia	Riverbank grape	FACW-
Hydric Soil		
Depleted Below Dark Surface		
Depleted Matrix		
Wetland Hydrology		
Oxidized Rhizoshheres on Living Roots		
Drainage Patterns		
Geomorphic Position		
Sampling Point 2 **Hydrophytic Vegetation: Dominant Species**		
Scientific Name	Common Name	Indicator Status
Helianthus grosseserratus	Sawtooth sunflower	FACW-
Parthenocissus inserta	Thicket creeper	FACU

Sambucus canadensis	Elderberry	FACW-
Vitis riparia	Riverbank grape	FACW-
Hydric Soil		
Redox Dark Surface		
Wetland Hydrology		
Drainage Patterns		
FAC-Neutral Test		

[a] Wetland Indicator Status is based on the estimated probability of a plant species occurring in wetlands or non-wetlands as follows: OBL (Obligate Wetland): plants that, under natural conditions, almost always occur in wetlands (estimated probability >99%). FACW (Facultative Wetland): plants that usually occur in wetlands (estimated probability 67%-99%), but occasionally are found in nonwetlands. FAC (Facultative): equally likely to occur in wetlands and nonwetlands (estimated probability 34%-66%). FACU (Facultative Upland): plants that sometimes occur in wetlands (estimated probability 1%-33%), but usually occur in nonwetlands. UPL (Upland): plants that, under natural conditions, almost always occur in nonwetlands (estimated probability >99%). A positive sign (+) following the indicator designation indicates a frequency toward the higher end of the frequency category, while a negative sign (-) indicates a frequency toward the lower end.

Table 2 Wetland 204 Indicators of Wetland Criteria

Sampling Point 1 **Hydrophytic Vegetation: Dominant Species**		
Scientific Name	Common Name	Indicator Status
Acorus calamus	Sweetflag	OBL
Solidago graminifolia nuttallii	Grass-leaved goldenrod	FAC
Hydric Soil		
Gleyed or Low-Chroma Colors		
Wetland Hydrology		
Surface Water		
Drainage Patterns		
Sampling Point 2 **Hydrophytic Vegetation: Dominant Species**		

Scientific Name	Common Name	Indicator Status
Typha angustifolia	Narrow-leaved cat-tail	OBL
Hydric Soil		
Gleyed or Low-Chroma Colors		
Wetland Hydrology		
Surface Water		
Drainage Patterns		

[a] Wetland Indicator Status is based on the estimated probability of a plant species occurring in wetlands or non-wetlands as follows: OBL (Obligate Wetland): plants that, under natural conditions, almost always occur in wetlands (estimated probability >99%). FACW (Facultative Wetland): plants that usually occur in wetlands (estimated probability 67%-99%), but occasionally are found in nonwetlands. FAC (Facultative): equally likely to occur in wetlands and nonwetlands (estimated probability 34%-66%). FACU (Facultative Upland): plants that sometimes occur in wetlands (estimated probability 1%-33%), but usually occur in nonwetlands. UPL (Upland): plants that, under natural conditions, almost always occur in nonwetlands (estimated probability >99%). A positive sign (+) following the indicator designation indicates a frequency toward the higher end of the frequency category, while a negative sign (-) indicates a frequency toward the lower end.

APPENDIX B

PLANT SPECIES OF THE WETLANDS

Table 1 Plant Species Occurring Within Wetland 205.

Scientific Name	Common Name	IS[a]	C[b]
Acalypha rhomboidea	Three-seeded Mercury	FACU	0
Acer negundo	Box elder	FACW-	0
Agrimonia gryposepala	Tall agrimony	FACU+	2
Agrimonia parviflora	Swamp agrimony	FAC+	7
Agrostis alba	Redtop	FACW	-[c]
Ambrosia trifida	Giant ragweed	FAC+	0
Amphicarpa bracteata	Upland hog peanut	FAC	4
Asclepias incarnata	Swamp milkweed	OBL	4
Aster novae-angliae	New England aster	FACW	4
Aster simplex interior	Marsh aster	OBL	3
Atriplex patula	Common orach	FACW-	-
Bidens connata	Purple-stemmed tickseed	OBL	5
Bidens frondosa	Common beggar's ticks	FACW	1
Boehmeria cylindrica	False nettle	OBL	2
Brassica nigra	Black mustard	UPL	-
Bromus inermis	Smooth brome	UPL	-
Carex vulpinoidea	Fox sedge	OBL	2
Celastrus orbiculatus	Oriental bittersweet	UPL	-
Circaea lutetiana canadensis	Enchanter's nightshade	FACU	1
Cirsium vulgare	Bull thistle	FACU-	-
Convolvulus sepium	Hedge bindweed	FAC	1
Cornus racemosa	Gray dogwood	FACW-	1
Coronilla varia	Crown vetch	UPL	-
Cyperus esculentus	Field nut sedge	FAC+	0
Cyperus strigosus	Long-scaled nut sedge	FACW	1
Echinochloa crusgalli	Barnyard grass	FACW	0
Epilobium coloratum	Cinnamon willow herb	OBL	3
Equisetum arvense	Horsetail	FAC	0
Erigeron strigosus	Daisy fleabane	UPL	5
Eupatorium maculatum	Spotted joe pye weed	OBL	4
Geum canadense	White avens	FAC	1
Geum laciniatum trichocarpum	Rough avens	FACW	2
Gleditsia triacanthos	Honey locust	FAC	2

Scientific Name	Common Name	IS[a]	C[b]
Glyceria striata	Fowl manna grass	FACW	4
Helianthus grosseserratus	Sawtooth sunflower	FACW-	2
Helianthus strumosus	Pale-leaved sunflower	UPL	5
Impatiens capensis	Orange jewelweed	FACW	3
Lycopus americanus	Common water horehound	OBL	5
Mentha arvensis villosa	Wild mint	OBL	5
Monarda fistulosa	Wild bergamot	FACU	4
Onoclea sensibilis	Sensitive fern	FACW	8
Oxalis europaea	Tall wood sorrel	FACU	0
Parthenocissus inserta	Thicket creeper	FACU	1
Parthenocissus quinquefolia	Virginia creeper	FAC-	2
Penthorum sedoides	Ditch stone crop	OBL	5
Phalaris arundinacea	Reed canary grass	FACW+	-
Phleum pratense	Timothy	FACU	-
Pilea pumila	Clearweed	FACW	5
Plantago rugelii	Red-stalked plantain	FAC	0
Poa pratensis	Kentucky blue grass	FAC-	-
Polygonum convolvulus	Black bindweed	FAC-	-
Polygonum hydropiper	Water pepper	FACW	2
Polygonum persicaria	Lady's thumb	FAC-	-
Polygonum punctatum	Smartweed	OBL	6
Polygonum scandens	Climbing false buckwheat	FAC	1
Prunella vulgaris lanceolata	Self heal	FACU	0
Prunus serotina	Wild black cherry	FACU	1
Pycnanthemum virginianum	Common mountain mint	FACW+	5
Rhamnus cathartica	Common buckthorn	FACU	-
Rhus radicans	Poison ivy	FAC+	2
Ribes americanum	Wild black currant	FACW	7
Rubus occidentalis	Black raspberry	UPL	2
Rumex crispus	Curly dock	FAC+	-
Salix nigra	Black willow	OBL	4
Sambucus canadensis	Elderberry	FACW-	1
Scirpus atrovirens	Dark green rush	OBL	4
Scutellaria lateriflora	Mad-dog skullcap	OBL	5
Solanum dulcamara	Bittersweet nightshade	FAC	-

Scientific Name	Common Name	IS[a]	C[b]
Solidago altissima	Tall goldenrod	FACU	1
Solidago gigantea	Late goldenrod	FACW	4
Solidago graminifolia nuttallii	Grass-leaved goldenrod	FAC	3
Teucrium occidentale	Germander	FACW	3
Typha angustifolia	Narrow-leaved cattail	OBL	1
Typha latifolia	Broad-leaved cattail	OBL	1
Verbena hastata	Blue vervain	FACW+	4
Verbena urticifolia	White vervain	UPL	5
Vernonia missurica	Missouri ironweed	FAC+	4
Viburnum lentago	Nannyberry	FAC+	5
Vitis riparia	Riverbank grape	FACW-	2

[a] WI = Wetland Indicator (Reed 1988). Wetland indicators are based on the estimated probability of a plant species occurring in wetlands or non-wetlands as follows: OBL (Obligate Wetland): plants that, under natural conditions, almost always occur in wetlands (estimated probability >99%). FACW (Facultative Wetland): plants that usually occur in wetlands (estimated probability 67%-99%), but occasionally are found in nonwetlands. FAC (Facultative): equally likely to occur in wetlands and nonwetlands (estimated probability 34%-66%). FACU (Facultative Upland): plants that sometimes occur in wetlands (estimated probability 1%-33%), but usually occur in nonwetlands. UPL (Upland): plants that, under natural conditions, almost always occur in nonwetlands (estimated probability >99%). A positive sign (+) following the indicator designation indicates a frequency toward the higher end of the frequency category, while a negative sign (-) indicates a frequency toward the lower end.
[b] C = Coefficient of Conservatism (Swink and Wilhelm 1994).
[c] Non-native species are not assigned a C value.

Table 2 Plant Species Occurring Within Wetland 204.

Scientific Name	Common Name	IS[a]	C[b]
Acorus calamus	Sweetflag	OBL	7
Agrostis alba	Redtop	FACW	-[c]
Alisma triviale	Large-Flowered Water Plantain	OBL	4
Ambrosia artemisiifolia elatior	Common Ragweed	FACU	0
Bidens frondosa	Common Beggar's Ticks	FACW	1
Brassica nigra	Black Mustard	UPLAND	-
Carex bebbii	Bebb's Rush	OBL	6

Scientific Name	Common Name	IS[a]	C[b]
Carex vulpinoidea	Fox Sedge	OBL	2
Cirsium arvense	Canada Thistle	FACU	-
Coronilla varia	Crown Vetch	UPLAND	-
Cyperus esculentus	Chufa	FACW	0
Echinochloa crusgalli	Barnyard Grass	FACW	0
Epilobium coloratum	Cinnamon Willow Herb	OBL	3
Geum canadense	White Avens	FAC	1
Geum laciniatum trichocarpum	Rough Avens	FACW	2
Glechoma hederacea	Ground Ivy	FACU	-
Glyceria striata	Fowl Meadow Grass	FACW	4
Helianthus strumosus	Pale-Leaved Sunflower	UPLAND	5
Juncus tenuis	Roadside Rush	FACU+	0
Juncus torreyi	Torrey's Rush	FACW	4
Leersia oryzoides	Rice Cut Grass	OBL	4
Lycopus americanus	Common Water Horehound	OBL	5
Mentha arvensis villosa	Wild Mint	OBL	5
Parthenocissus inserta	Thicket Creeper	FACU	1
Parthenocissus quinquefolia	Virginia Creeper	FAC-	2
Phalaris arundinacea	Reed Canary Grass	FACW+	-
Pilea pumila	Clearweed	FACW	5
Polygonum lapathifolium	Heartsease	FACW+	0
Polygonum persicaria	Lady's Thumb	FACW	-
Polygonum punctatum	Smartweed	OBL	6
Populus deltoides	Eastern Cottonwood	FAC+	2
Prunella vulgaris lanceolata	Self Heal	FACU	0
Pycnanthemum virginianum	Common Mountain Mint	FACW+	5
Ribes americanum	Wild Black Currant	FACW	7
Rumex crispus	Curly Dock	FAC+	-
Salix interior	Sandbar Willow	OBL	1
Sambucus canadensis	Elderberry	FACW-	1
Scirpus atrovirens	Dark Green Rush	OBL	4
Scirpus validus creber	Great Bulrush	OBL	5
Scutellaria lateriflora	Mad-Dog Skullcap	OBL	5
Solidago altissima	Tall Goldenrod	FACU	1
Solidago graminifolia nuttallii	Grass-Leaved Goldenrod	FAC	3

Scientific Name	Common Name	IS[a]	C[b]
Teucrium occidentale	Germander	FACW-	3
Typha angustifolia	Narrow-Leaved Cat-Tail	OBL	1
Verbena hastata	Blue Vervain	FACW+	4
Vernonia missurica	Missouri Ironweed	FAC+	4
Vitis riparia	Riverbank Grape	FACW-	2

[a] IS = Wetland Indicator Status(Reed 1988). Wetland indicators are based on the estimated probability of a plant species occurring in wetlands or non-wetlands as follows: OBL (Obligate Wetland): plants that, under natural conditions, almost always occur in wetlands (estimated probability >99%). FACW (Facultative Wetland): plants that usually occur in wetlands (estimated probability 67%-99%), but occasionally are found in nonwetlands. FAC (Facultative): equally likely to occur in wetlands and nonwetlands (estimated probability 34%-66%). FACU (Facultative Upland): plants that sometimes occur in wetlands (estimated probability 1%-33%), but usually occur in nonwetlands. UPL (Upland): plants that, under natural conditions, almost always occur in nonwetlands (estimated probability >99%). A positive sign (+) following the indicator designation indicates a frequency toward the higher end of the frequency category, while a negative sign (-) indicates a frequency toward the lower end.
[b] C = Coefficient of Conservatism (Swink and Wilhelm 1994).
[c] Non-native species are not assigned a C value.