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**Wetland Assessment for Proposed
Tennessee Valley Authority
Substation and Associated Transmission Lines
at the Paducah Gaseous Diffusion Plant Site,
Paducah, Kentucky**



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Tennessee Valley Authority
Substation and Associated Transmission Lines
at the Paducah Gaseous Diffusion Plant Site,
Paducah, Kentucky**

Issued—May 2019

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under Contract DE-EM0004895

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ACRONYMS

<i>CFR</i>	<i>Code of Federal Regulations</i>
D&R	deactivation and remediation
DOE	U.S. Department of Energy
EO	Executive Order
PEM	palustrine emergent
PFO	palustrine forested
PGDP	Paducah Gaseous Diffusion Plant
TVA	Tennessee Valley Authority

1. INTRODUCTION

This wetland assessment has been prepared in accordance with 10 *CFR* Part 1022, “Compliance with Floodplain and Wetland Environmental Review Requirements,” for the purpose of fulfilling U.S. Department of Energy (DOE’s) responsibilities under Executive Order (EO) 11990, “Protection of Wetlands.” EO 11990 requires that federal agencies minimize the destruction or degradation of wetlands, and avoid undertaking new construction located in wetlands unless they find there is no practicable alternative to such construction.

A wetland is defined under 10 *CFR* Part 1022 as an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.

DOE is proposing that the Tennessee Valley Authority (TVA) construct a substation and associated transmission lines and towers on DOE property at the Paducah Gaseous Diffusion Plant (PGDP) near Paducah, Kentucky. TVA would construct and operate the substation for a period of 10 years. The purpose of the new substation and transmission lines is to provide reliable power of up to 40 megawatts (MW) to support ongoing deactivation and remediation (D&R) activities at PGDP. DOE’s proposed project is prompted by the expiration of the TVA and Electric Energy, Inc., power service contracts and the condition of the aging transmission infrastructure at PGDP. The proposed project will reconfigure the transmission in the area to keep ties intact, while eliminating connections through PGDP switchyards that will be decommissioned.

The substation construction would not encroach on wetlands. Six transmission towers will be constructed; two of these towers would be located within wetland areas. The proposed transmission lines would require clearing of forested wetlands to establish transmission right-of-way. The forested wetland area would be converted to emergent wetland area and be maintained as such for the long-term. Access roads will not include placement of fill within wetlands; the roads will be constructed at grade.

The proposed substation site is in proximity to the industrialized area at PGDP. The proposed site is an existing gravel lot that is large enough to support the substation. The lot is between two existing transmission corridors, which minimizes the length of new transmission lines.

DOE prepared this wetland assessment to evaluate the potential impacts of implementing a portion of the proposed project within a wetland (i.e., proposed Wetland Action), as required by 10 *CFR* Part 1022.

2. PROJECT DESCRIPTION

TVA will design, construct, and operate a new 161-kV substation for DOE with new power delivery points to replace the existing C-531 switchyard at PGDP. The proposed substation would be east of and adjacent to PGDP within the DOE property boundary. This location is an existing gravel lot that is being used as an equipment staging area. The site would be graded in accordance with the TVA Site Development Grading Plan to accommodate the new substation. Easement and right-of-way on DOE property will be provided, as required. The TVA 161-kV transmission lines that currently serve the C-531 switchyard would be rerouted to the new TVA substation.

As part of the site development, some trees will be removed around the perimeter of the existing gravel lot to provide adequate space for the substation components, electrical manholes/vaults, and substation security fence. Impacts to the aquatic environment will be limited to 0.345 acre of wetland impacts. TVA review indicated no impacts to endangered, threatened, or special status species would occur.

Approximately 5 acres consisting mostly of previously disturbed land would be used for the project. Land within the proposed project footprint includes approximately 2 acres for the substation, approximately 0.5 acre for a laydown area, up to 2 acres for access roads and transmission structure placements, and 0.345 acre of forested wetland that would be cleared for a new transmission line.

The substation would include two transformer banks, metering, relays, circuit switchers, high side switches, capacitor banks, and bank relays. TVA would construct two new transmission lines from the substation to existing TVA transmission lines east and west of the proposed substation.

The proposed substation and transmission lines at PGDP would be constructed immediately east of the industrialized area of PGDP (Figure 1). The substation would be on an existing gravel lot between two existing transmission corridors, and the new transmission lines would be constructed to connect the substation with each of those corridors. The access roads would be at-grade gravel roads within the existing or proposed transmission corridors. The roads would be approximately 15-ft wide with no shoulders. The width of the transmission corridors would be approximately 100-ft wide. All proposed components would be on DOE property.

3. WETLAND IMPACTS

TVA completed a wetland delineation and value assessment in accordance with U.S. Army Corps of Engineers standards (TVA Rapid Assessment Method) for the proposed project vicinity (Environmental Laboratory 1987; TVA 2019; Figure 1). Six wetlands were identified within the project vicinity; the six include four emergent wetlands (identified as wetlands 001, 003, 005, and 006) and two forested wetlands (identified as wetlands 002 and 004). Under the U.S. Fish and Wildlife classification system (Cowardin et al. 1979), the emergent wetlands are classified as palustrine emergent (PEM) wetlands, and the forested wetlands are classified as palustrine forested (PFO) wetlands. The PFO wetlands contain minor areas of emergent and scrub/shrub wetland that are not of sufficient size to warrant separate classification. All wetlands within the project vicinity were assessed as moderate quality wetlands. Wetlands 001, 002, and 003 scored well into the moderate range. Wetlands 004, 005, and 006 scored in the gray zone between low and moderate quality and were assessed as moderate, as allowed under the TVA Rapid Assessment Method when more intensive assessment is not conducted.

The substation would not be constructed within the wetlands and would not affect any cultural resources values. The storm-water secondary containment would be located within the substation and would not be constructed within wetlands. The drainage from the secondary containment basin and the substation cable ditch will be routed to a DOE Kentucky Pollutant Discharge Elimination System-permitted outfall. Appropriate construction of storm-water controls would be implemented to prevent indirect impacts to wetlands during construction of the substation.

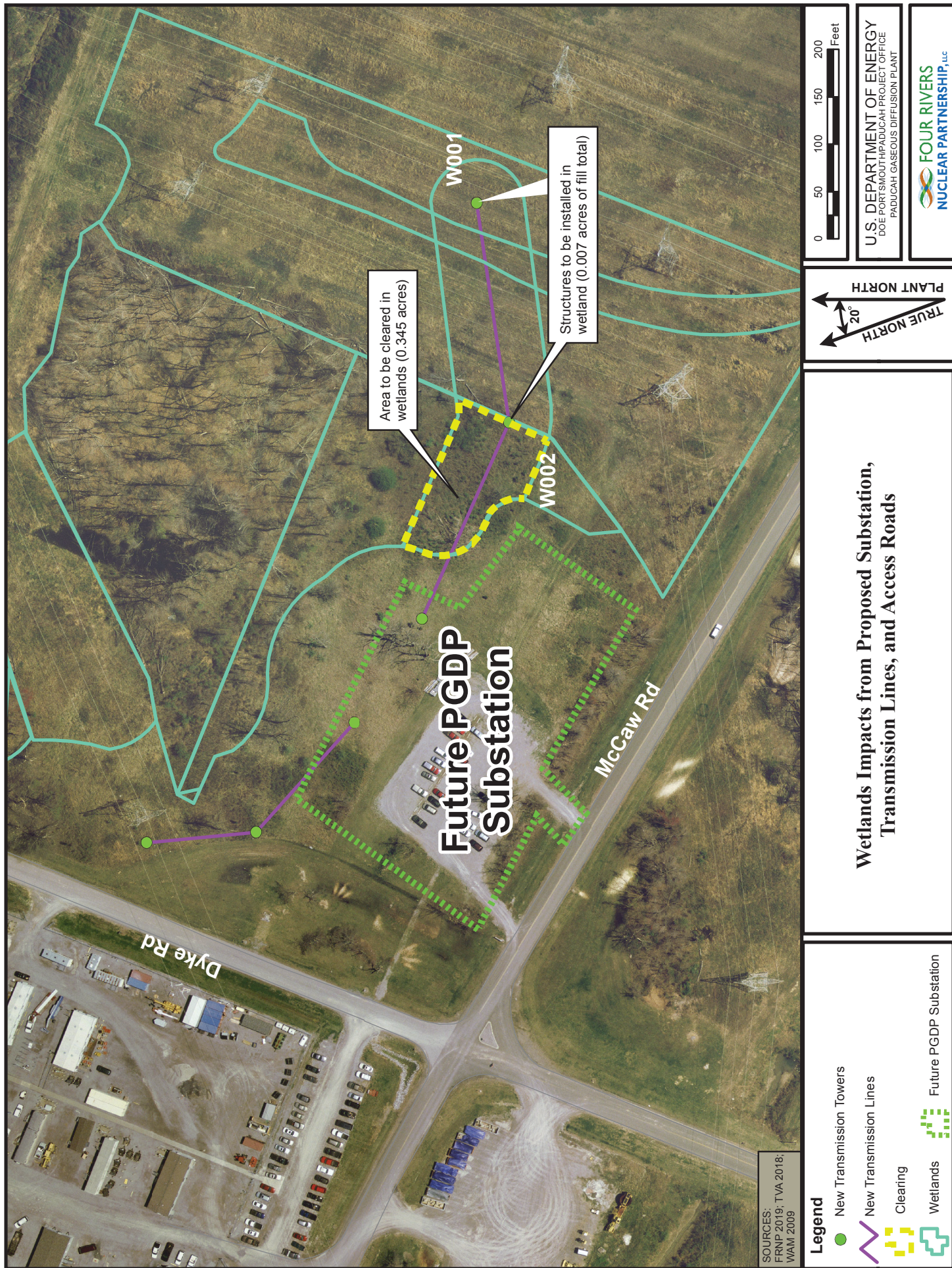


Figure 1. Wetland Impacts from Proposed Substation Transmission Lines, and Access Roads

Clearing for new transmission right-of-way would result in direct impacts to W002 through conversion of 0.345 acre of PFO wetland into PEM wetland. The clearing would result in conversion of approximately 9% of W002 into PEM wetland. The converted area would be maintained as emergent wetland because that is the desirable vegetation type for the transmission right-of-way. The loss of trees would be a direct impact to the forested wetland due to the loss of forested habitat and an indirect impact to the wetland as a result of the long-term revegetation with herbaceous plant species tolerant of full exposure to sunlight. There would be a loss of vegetation community interspersed, microtopography, and vertical heterogeneity following conversion of the forested area to emergent conditions. Canopy and subcanopy trees would be removed, and the current shade-tolerant forest understory would change to herbaceous species adapted to full-sun conditions. Potential amphibian breeding pools would become unsuitable due to increased solar exposure and change to an unsuitable temperature regime. Habitat for tree-nesting bird species would be lost and the maintained right-of-way would not provide suitable habitat for grassland nesting species due to the regular mowing. There would be an increase in emergent wetland habitat, but no appreciable increase in wetland functions and values compared to what is provided by the emergent wetland already in the area. There would be a net reduction in wetland functions and values due to the conversion of the PFO wetland to emergent wetland. There would be temporary indirect and permanent indirect impacts to 0.345 acres of PFO wetland.

Two of the six proposed transmission towers would be placed within PEM wetlands. One tower would be located within Wetland 001 (W001) in the existing transmission right-of-way, and the other would be located within the portion of W002 that would be converted into PEM wetland for the new transmission right-of-way. Impacts for these towers would be limited to the installation of the footings for the transmission towers. Fill for the two towers would be 0.0035 acre in each wetland. Approximately 0.09% of W001 would be filled. Approximately 1.0% of the converted portion of W002 would be filled, which would be approximately 0.09% of the entire wetland. This will result in a permanent direct impact to 0.007 acres of PEM wetland. The indirect impacts are accounted for within the transmission line right-of-way construction.

There would be incidental temporary disturbance of wetlands from operation of equipment during construction. This temporary disturbance would be minimized through the following actions.

- No mechanized clearing in wetlands will be conducted.
- Roots of trees removed will be left in place to avoid ground disturbance.
- Low ground pressure equipment or mats during clearing and construction activities will be used to minimize rutting and reduce soil compaction.
- Hazardous materials, chemicals, fuels, and oils will not be stored in or adjacent to wetlands.
- Equipment will be refueled at least 100 ft from any wetland or drainage.
- Best management practices developed by TVA for work in wetlands will be implemented for all other work within delineated wetland boundaries.

In addition, TVA would compensate for loss of wetland function through the purchase of wetland mitigation credits from the West Kentucky Wetwoods Mitigation Bank 2.

4. ALTERNATIVES

Alternatives to the proposed project included no action, upgrade of existing transmission infrastructure, and a new 161-kV delivery point as described below.

No Action—The no action alternative was considered, but not selected because it would not provide reliable power to support the D&R activities at the PGDP site. The existing infrastructure is nearly 70 years old and is at the end of its useful life.

Upgrade Existing Transmission Infrastructure—Upgrade of the existing transmission infrastructure was considered, but not selected because it is economically infeasible to upgrade the existing infrastructure due to its age and condition.

New 161-kV Delivery Point—Alternative locations for the substation were dismissed because they would be farther from the industrialized area, have greater environmental impacts (including greater impacts to wetlands because other locations), require clearing of undeveloped land, require a greater length of transmission right-of-way to connect with the two existing transmission corridors, and the transmission corridors would require clearing of a greater amount of wetlands than the proposed location. One alternative location for the substation, a 2.5-acre site, is located closer to the industrialized area of PGDP than to the proposed location, but was dismissed because of the lack of space and proximity to a DOE solid waste management unit.

5. CONCLUSIONS

The proposed construction of the TVA substation would have no impacts on wetlands. Construction of transmission lines associated with the TVA substation would have short-term impacts on PEM wetlands from operation of equipment, very minor long-term impacts to 0.007 acres of PEM wetlands from construction of two transmission towers, and long-term impacts on a PFO wetland from conversion of 0.345 acre of PFO wetland into PEM wetland. Following construction, maintenance of the substation would have no impacts on wetlands. Maintenance of the transmission lines would have only minor recurring impacts on wetlands to maintain the desirable emergent wetland conditions within the transmission rights-of-way.

As described in Section 4, the design of the proposed project avoided and minimized impacts to wetlands to the extent practicable. Implementation of the measures to minimize temporary disturbance during construction will further reduce wetland impacts. Compensatory mitigation will be purchased to address loss of wetland function. With implementation of the proposed avoidance and minimization measures and purchase of the proposed compensatory mitigation, no significant wetland impacts would result.

6. REFERENCES

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, Office of Biological Services, USFWS/OBS-79/31, Washington, DC.

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