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FLOODPLAIN/WETLAND ASSESSMENT OF THE EFFECTS OF CONSTRUCTION AND OPERATION OF A DEPLETED URANIUM HEXAFLUORIDE CONVERSION FACILITY AT THE PADUCAH, KENTUCKY, SITE

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NOTATION

The following is a list of the acronyms, initialisms, and abbreviations (including units of measure) used in this document.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

ANL	Argonne National Laboratory
CFR	*Code of Federal Regulations*
CWA	Clean Water Act
DOE	U.S. Department of Energy
DUF_6	depleted uranium hexafluoride
ETTP	East Tennessee Technology Park
GDP	gaseous diffusion plant
HF	hydrofluoric acid
KPDES	Kentucky Pollutant Discharge Elimination System
LMES	Lockheed Martin Energy Systems, Inc.
PEIS	programmatic environmental impact statement
USACE	U.S. Army Corps of Engineers

UNITS OF MEASURE

ft	foot(feet)
ft^2	square foot(feet)
ha	hectare(s)
km	kilometer(s)
m	meter(s)
m^2	square meter(s)
m^3	cubic meter(s)
mi	mile(s)
t	metric ton(s)

FLOODPLAIN/WETLAND ASSESSMENT OF THE EFFECTS OF CONSTRUCTION AND OPERATION OF A DEPLETED URANIUM HEXAFLUORIDE CONVERSION FACILITY AT THE PADUCAH, KENTUCKY, SITE

1 INTRODUCTION

The U.S. Department of Energy (DOE) Depleted Uranium Hexafluoride (DUF_6) Management Program evaluated alternatives for managing its inventory of DUF_6 and issued the *Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DUF_6 PEIS) in April 1999 (DOE 1999). The DUF_6 inventory is stored in cylinders at three DOE sites: Paducah, Kentucky; Portsmouth, Ohio; and East Tennessee Technology Park (ETTP), near Oak Ridge, Tennessee. In the Record of Decision for the DUF_6 PEIS, DOE stated its decision to promptly convert the DUF_6 inventory to a more stable chemical form. Subsequently, the U.S. Congress passed, and the President signed, the *2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States* (Public Law No. 107-206). This law stipulated in part that, within 30 days of enactment, DOE must award a contract for the design, construction, and operation of a DUF_6 conversion plant at the Department's Paducah, Kentucky, and Portsmouth, Ohio, sites, and for the shipment of DUF_6 cylinders stored at ETTP to the Portsmouth site for conversion. This floodplain/wetland assessment has been prepared by DOE, pursuant to Executive Order 11988 (*Floodplain Management*), Executive Order 11990 (*Protection of Wetlands*), and DOE regulations for implementing these Executive Orders as set forth in Title 10, Part 1022, of the *Code of Federal Regulations* (10 CFR Part 1022 [*Compliance with Floodplain and Wetland Environmental Review Requirements*]), to evaluate potential impacts to floodplains and wetlands from the construction and operation of a conversion facility at the DOE Paducah site.

2 PROPOSED ACTION

DOE proposes to construct and operate a conversion facility at the Paducah site for conversion of the DUF_6 inventory stored at the site. Figure 1 shows the Paducah site and vicinity. The conversion facility would convert DUF_6 into a stable chemical form, uranium oxide (U_3O_8), for beneficial use or disposal. The off-gas from the conversion process would yield hydrofluoric acid (HF), which would be processed and marketed or converted to a solid for sale or disposal. To support the conversion operations, the emptied DUF_6 cylinders would be stored, handled, and processed for disposal. The time period considered is a construction period of approximately 2 years, an operational period of 25 years, and the decontamination and decommissioning of the facility. Current plans call for the construction to begin in the summer of 2004.

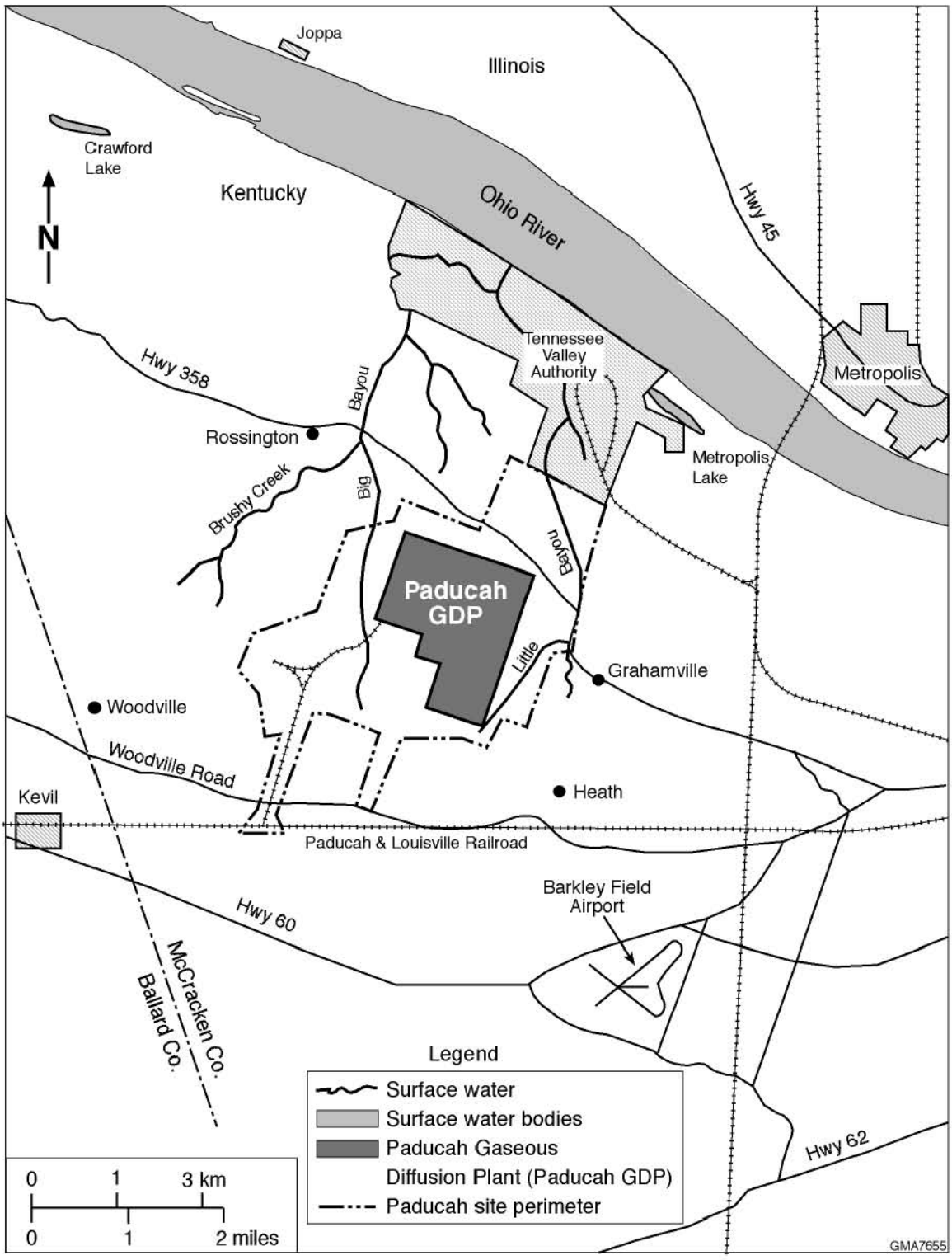


FIGURE 1 Regional Map of the Paducah Site Vicinity (Source: Adapted from Lockheed Martin Energy Systems, Inc. [LMES] 1996)

The Paducah facility is being designed to convert 20,000 tons (18,000 metric tons [t]) of DUF_6 per year, requiring 25 years to convert the Paducah inventory. The conversion facility would occupy a total of approximately 10 acres (4 ha), with up to 45 acres (18 ha) of land disturbed. Some of the disturbed areas would be areas cleared for railroad or utility access, not adjacent to the construction area.

This assessment evaluates the construction and operation of the conversion facility at one primary location within the Paducah site and two alternative locations. The three candidate locations identified at the Paducah site, denoted as Locations A, B, and C, are shown in Figure 2. Location A is the preferred location for the conversion facility and is shown in more detail in Figure 3. This assessment evaluates the proposed action at Location A as the base case analysis. Locations B and C are evaluated as alternative locations for the conversion facility within the Paducah site.

3 DESCRIPTIONS OF THE PADUCAH SITE AND CANDIDATE LOCATIONS

The Paducah site is located in rural McCracken County, Kentucky, approximately 10 mi (16 km) west of the City of Paducah and 3.6 mi (6 km) south of the Ohio River. The Paducah site consists of 3,556 acres (1,439 ha) currently held by DOE (DOE 2001). The site is surrounded by the West Kentucky Wildlife Management Area, which comprises an additional 2,781 acres (1,125 ha) conveyed by DOE to the Commonwealth of Kentucky for use in wildlife conservation and for recreational purposes. The counties surrounding the site are primarily rural, with industrial uses accounting for less than 5% of land use.

The Paducah Gaseous Diffusion Plant (GDP) occupies a 750-acre (303-ha) complex within the Paducah site and is surrounded by a security fence. The Paducah GDP, previously operated by DOE and now operated by the United States Enrichment Corporation, includes about 115 buildings with a combined floor space of approximately 8.2 million ft^2 (0.76 million m^2). The Paducah GDP has operated since 1955.

The Paducah site has 15 yards, 12 of which store cylinders of DOE-managed DUF_6. The yards store a total of 36,191 DUF_6 cylinders. Nine of the Paducah storage yards have gravel bases. One yard is located on a former building foundation; three yards were recently constructed with concrete bases; while two other cylinder yards have been rebuilt with concrete bases.

The highly developed Paducah GDP has few natural vegetation communities. The DOE property between the Paducah GDP and the surrounding West Kentucky Wildlife Management Area consists primarily of open, frequently mowed grassy areas. The DOE property also includes several small upland areas of mature forest, old-field, and transitional habitats. The banks of Bayou Creek and Little Bayou Creek support mature riparian forest with river birch, black willow, and cottonwood (ANL 1991). The West Kentucky Wildlife Management Area contains wooded areas, from early and mid-successional stages to mature forest communities, as well as restored prairie. Nonforested areas are managed by controlled burns, mowing, and planting to promote the development of native prairie species.

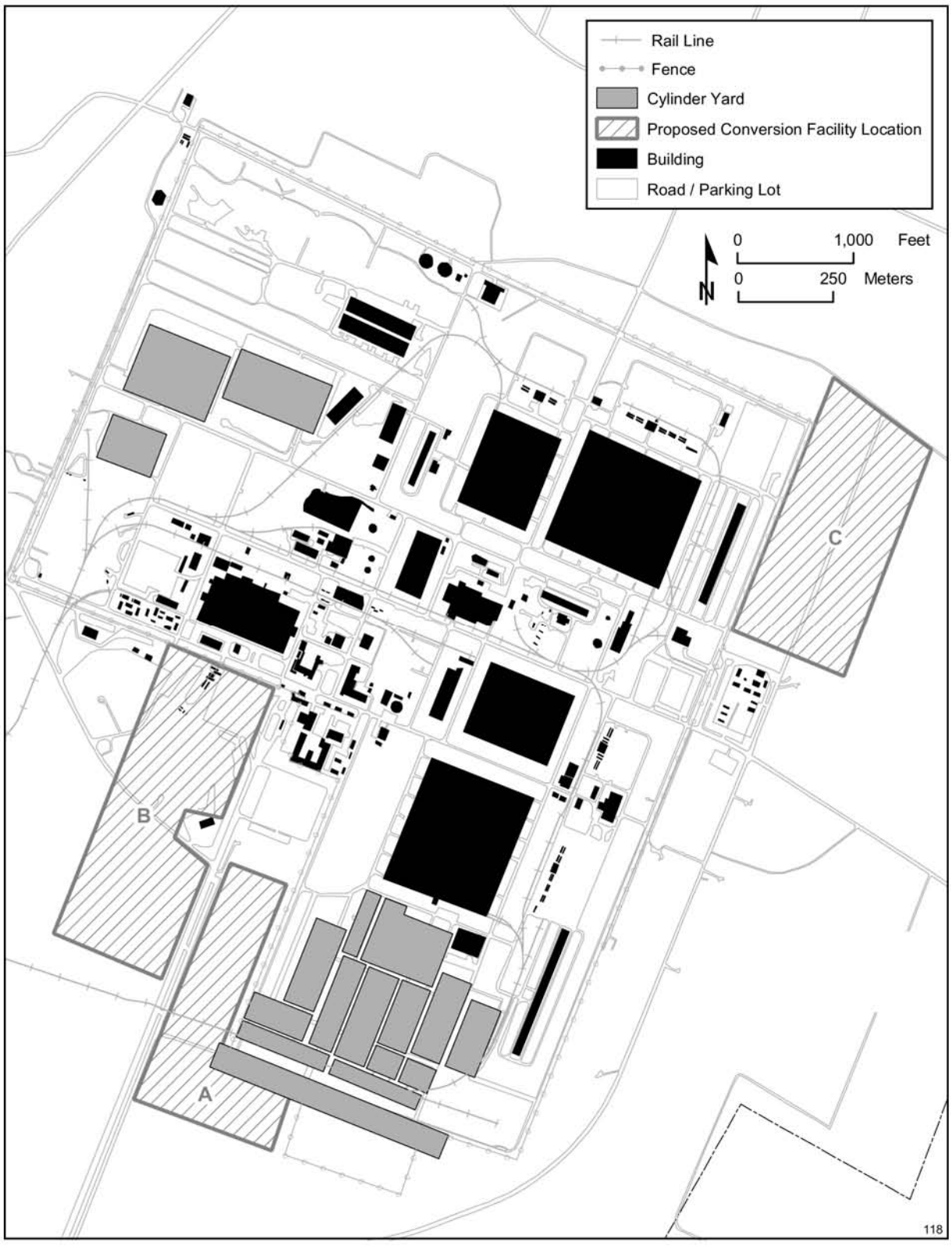


FIGURE 2 Conversion Facility Candidate Locations and Cylinder Yards at the Paducah Site That Are Used to Store DOE-Managed Cylinders (Source: Adapted from DOE 1999)

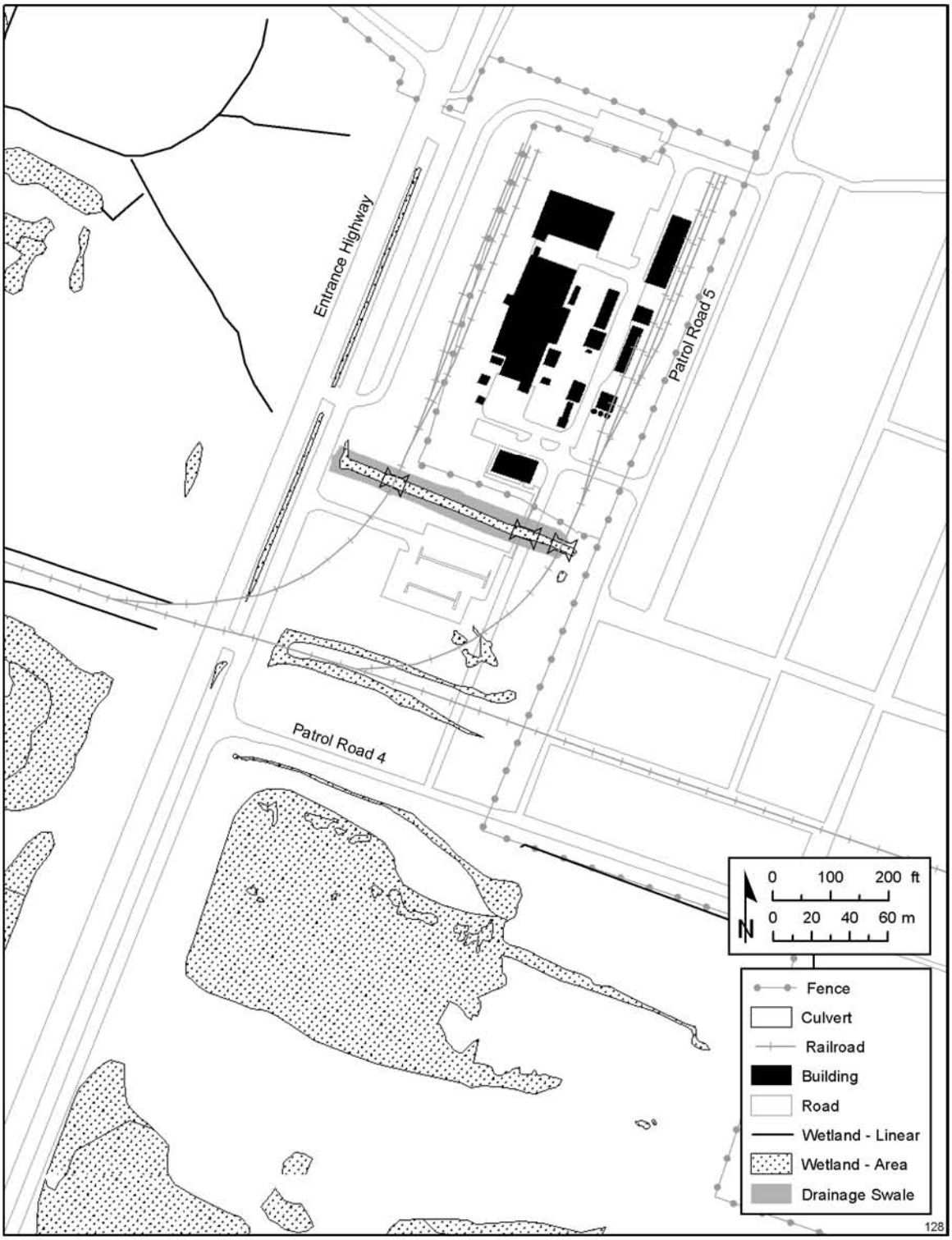


FIGURE 3 Proposed Facility Design at Location A

Location A, one of the three potential facility locations for DUF_6 conversion at the Paducah site, is approximately 35 acres (14 ha) in size and includes previously disturbed and undisturbed areas. The northern portion of Location A is relatively level and previously contained facilities during the initial construction of the Paducah GDP. It now supports an open vegetation cover of grasses maintained as mowed lawn. The southern portion of Location A is relatively undisturbed and primarily supports a mature deciduous hardwood forest community of about 10 acres (4 ha). The dominant species in the forested area are red maple, sweet gum, cherry bark oak, and pin oak; swamp chestnut oak, swamp white oak, and hickories are also present (Pennington 2001). Saplings of red maple, American elm, green ash, white ash, and sweet gum are the primary species of the shrub layer. Vines are primarily Virginia creeper and poison ivy, while the dominant species of the herbaceous layer are stiff marsh bedstraw, blunt broom sedge, narrow-leaved cat tail sedge, Japanese chess, swamp rose, and water parsnip. An open grassland lies immediately south of the forested area within the electric power line right-of-way. A small area of shrubs is located adjacent to the forest and extends into the grassland.

Location B covers about 59 acres (24 ha) and consists of a previously disturbed open area in the northern half and mature deciduous hardwood forest in the southern half of the location. The northern portion of Location B (north of Curlee Road), as well as the northeastern area of the southern portion, is flat to gently sloping and is vegetated primarily with grasses maintained as mowed lawn. Two open woodland groves occur in the northern portion and are also mowed. A number of drainage channels within this portion are bordered by steep banks supporting a mosaic of upland herbaceous and immature woodland communities, which include willows, maples, sycamore, sweet gum, tulip tree, milkweed, dogbane, poison ivy, and fleabane. A large mature deciduous hardwood forest is located south of Curlee Road and extends south and west of Location B. Dominant species in the forested area are oaks and hickories, with sassafras and sweet gum also common. Virginia creeper and honeysuckle are common vines within the forested area.

Location C is approximately 53 acres (21 ha) in size and is relatively level throughout. The western half has been previously disturbed and supports a deciduous hardwood forest that includes many young trees and saplings. The dominant species are oaks and hickories. The western margin of this area is located under the electric power lines and consists of an open grassland area that is periodically mowed. A margin of shrubs and saplings borders the western edge of the forested area. The eastern half of Location C consists primarily of an open old-field community with scattered groves of mature deciduous trees, primarily oaks. The vegetation of the open field is predominantly herbaceous and consists primarily of grasses such as fescue and broom-sedge.

3.1 FLOODPLAINS IN THE CANDIDATE LOCATIONS

The 100-year floodplains in the vicinity of the Paducah site are associated with Bayou Creek and Little Bayou Creek. Both of these floodplains lie outside the Paducah GDP perimeter fence. Executive Order 11988, *Floodplain Management*, requires DOE to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and

preserve the natural and beneficial values served by floodplains. DOE guidelines for implementing Executive Order 11988 are set forth in 10 CFR Part 1022.

3.2 WETLANDS IN THE CANDIDATE LOCATIONS

Although no wetlands are identified on the Paducah GDP by the National Wetlands Inventory, approximately 5 acres (2 ha) of jurisdictional wetlands have been identified in drainage ditches scattered throughout the Paducah GDP (ANL 1991; CDM Federal Programs Corporation 1994; Sadri 1995). Jurisdictional wetlands are waters of the United States that are protected under Section 404 of the Clean Water Act (CWA). They meet the three criteria described in the federal guidelines for wetland delineation (Environmental Laboratory 1987): hydrophytic vegetation, hydric soils, and wetland hydrology. These wetlands are under the jurisdiction of the U.S. Army Corps of Engineers (USACE), which regulates activities affecting jurisdictional wetlands. Executive Order 11990, *Protection of Wetlands*, requires DOE to minimize the destruction, loss, or degradation of wetlands, including jurisdictional, as well as many nonjurisdictional wetlands. DOE guidelines for implementing Executive Order 11990 are set forth in 10 CFR Part 1022.

Outside the Paducah GDP, a large number of wetlands are scattered throughout the Paducah site. These include forested wetlands, ponds, wet meadows, vernal pools, and wetlands converted to agriculture (U.S. Department of the Army 1994). Palustrine forested wetlands occur extensively along the banks of Bayou Creek and Little Bayou Creek. Palustrine wetlands are small nontidal wetlands in shallow still water or variably flooded areas (Cowardin et al. 1979). Wetland functions associated with the forested wetland type along Bayou Creek include groundwater recharge and discharge, nutrient removal/transformation, production export, and wildlife diversity/abundance (U.S. Department of the Army 1994). The National Wetlands Inventory identifies many wetlands on the Paducah site, primarily ponds and forested wetlands. A forested wetland dominated by tupelo trees in the West Kentucky Wildlife Management Area has been designated by the Kentucky Nature Preserves Commission and Kentucky Department of Fish and Wildlife as an area of ecological concern (DOE 1996).

Several jurisdictional wetland areas occur at Location A (Figure 4) and total approximately 7.2 acres (2.9 ha) (Tetra Tech, Inc. 2000). This represents approximately 21% of the area of Location A. The open area in the northern portion of this location has been previously disturbed by construction and grading and is crossed by several drainage ditches and swales that contain wetlands. The northernmost of these drainages conveys storm water from the cylinder storage yard to Kentucky Pollutant Discharge Elimination System (KPDES) Outfall 017, located west of the Paducah GDP entrance road. Two small isolated wetland areas occur about 300 ft (90 m) south of this drainage, and another near the eastern end of the drainage near the Location A boundary. Two additional drainage swales occur north of Patrol Road 4. These areas each support palustrine emergent wetlands, which are characterized by herbaceous vegetation in saturated or shallowly inundated soils. The dominant vegetation species in these wetlands are spikerush, green bulrush, needle-pod rush, fowl manna grass, field paspalum, twig-rush, and

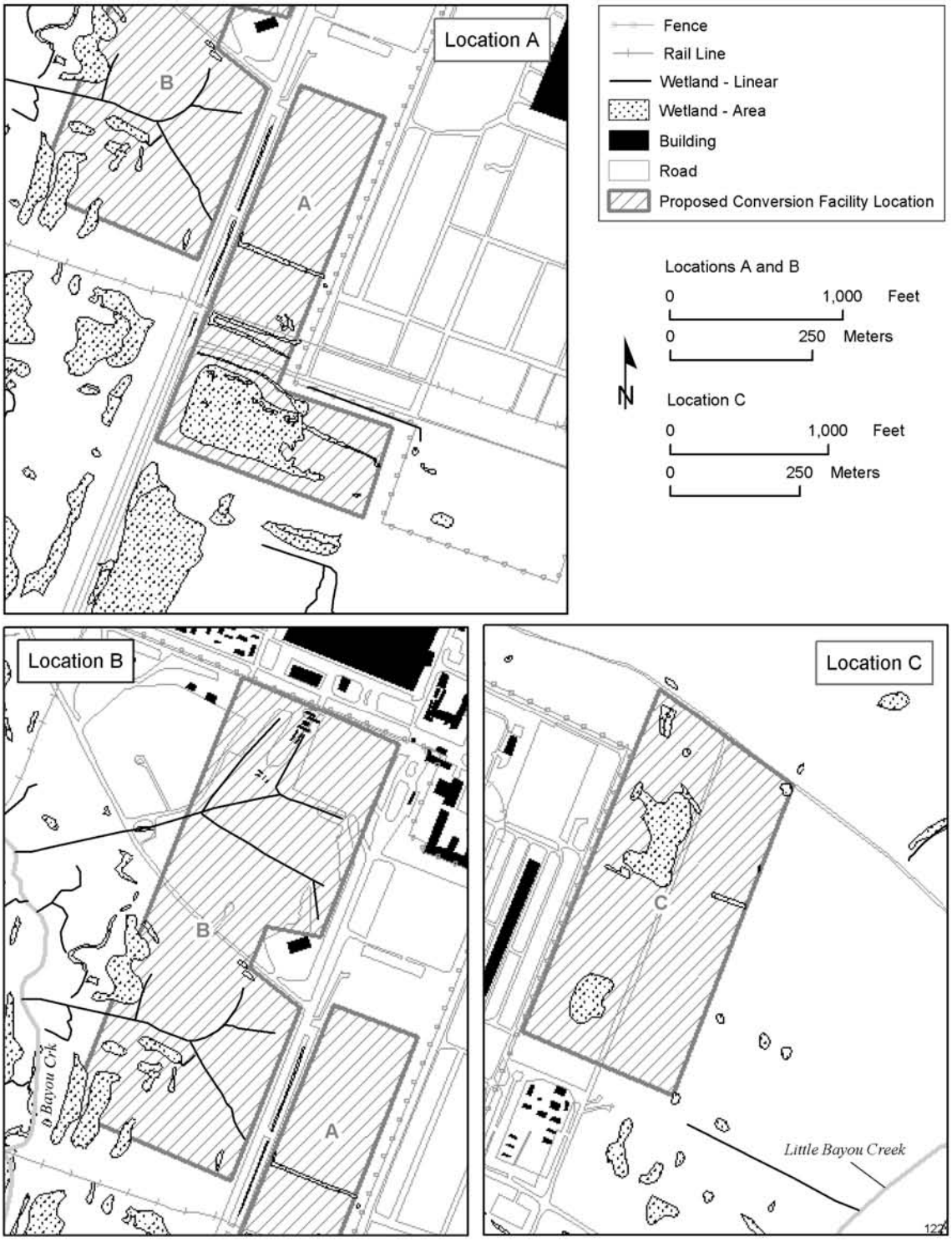


FIGURE 4 Wetlands in the Vicinity of the Three Candidate Locations for the Conversion Facility

blunt broom sedge. These wetlands receive surface water runoff from adjacent upland areas and possibly groundwater discharge. The drainage swales drain through culverts into drainage channels west of the GDP entrance road, while the isolated wetlands lack a surface outflow. All of these wetlands occupy topographic depressions within the landscape and temporarily retain storm water runoff, discharging it vertically to the soil (Tetra Tech, Inc. 2000). Wetland functions associated with these wetlands include wildlife habitat, flood-flow alteration, and groundwater recharge. Wetlands also occur just outside Location A in drainage ditches that border the GDP entrance road and the service road that passes through this area, and drain through culverts into drainage channels to the west.

Two small isolated wetlands, as well as a drainage from the adjacent storage yard, also occur immediately east of the forested area. The drainage flows to the west and provides surface water input to a large wetland within the forested area. This area supports a palustrine forested wetland, which is characterized by woody vegetation (more than 20 ft [60 m] tall) in saturated or shallowly inundated soils. This wetland, approximately 6.3 acres (2.6 ha) in size, lacks a surface outflow and is seasonally flooded. Surface water is present early in the growing season but is absent by mid-summer. The dominant species are similar to those listed above for the forest community. The dominant canopy trees are red maple, sweet gum, cherry bark oak, and pin oak; with swamp chestnut oak and swamp white oak also present. Saplings of red maple, American elm, green ash, white ash, and sweet gum are the primary species of the shrub layer. Vines are primarily Virginia creeper and poison ivy. The dominant species of the herbaceous layer are stiff marsh bedstraw, blunt broom sedge, narrow-leaved cat tail sedge, swamp rose, and water parsnip; sensitive fern and fox sedge are also present.

Location B contains a series of drainage channels that support riverine and palustrine emergent wetlands and flow into Bayou Creek (Figure 4) (DOE 1994). In the forested areas of the southern portion of Location B, trees and shrubs overhang these drainages. Two small palustrine emergent wetlands are also located immediately south of Curlee Road. Functions associated with this wetland type include groundwater recharge and discharge, and floodflow alteration (U.S. Department of the Army 1994). The forested areas support a number of palustrine forested wetlands totaling approximately 1.8 acres [0.7 ha] in area. The dominant canopy species in two of these wetlands are silver maple and cherry bark oak, with green ash present in the shrub layer. Birch is the dominant species in three small forested wetlands; two wetlands are dominated by black willow and buttonbush; and one wetland is dominated by maple. Two wetlands are open water. The predominant forested wetland types are maple/oak, willow/buttonbush, and maple. These wetlands perform the functions listed above as well as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, production export, aquatic diversity/abundance, and wildlife diversity/abundance. The total area of wetlands within Location B is approximately 2.9 acres (1.2 ha).

The western portion of Location C contains several palustrine forested wetlands (Figure 4). Pin oak and cherry bark oak are the dominant canopy species in the largest wetland area (3.3 acres [1.3 ha]); black gum and red maple are also present. Other forested wetlands in this area are also dominated by cherry bark oak. Functions associated with these wetlands include groundwater recharge and discharge, nutrient removal/transformation, production export, and wildlife diversity/abundance (U.S. Department of the Army 1994). Small palustrine

emergent wetlands along an open pathway support bulrush. Drainage ditches along both sides of the road crossing Location C contain wetlands with bulrush, sedge, and willow. These wetlands perform the functions listed above as well as floodflow alteration. The eastern portion of Location C contains four small wetlands. Birch is the dominant species of one forested wetland. A small palustrine emergent wetland is located in the southeast corner, and open water wetlands occur to the north. The wetland functions listed above are also associated with the wetlands in the eastern portion of Location C. The total area of wetlands within Location C is approximately 5.6 acres (2.3 ha), with 5.3 acres (2.2 ha) in the western portion and 0.3 acre (0.1 ha) in the eastern portion.

4 EFFECTS OF THE PROPOSED ACTION ON FLOODPLAINS

None of the construction activities under the proposed action would measurably affect existing 100-year floodplains. Construction of a conversion facility would not take place within a floodplain at any of the candidate locations, and by following good construction and engineering practices, indirect impacts to surface water quality and downstream floodplains would be minimized. A new rail line would be constructed that would connect Location A with an existing rail line west of the Paducah GDP (Figure 5). The new rail line would be constructed on an existing rail bed and the existing railroad bridge crossing Bayou Creek. Reconstruction of

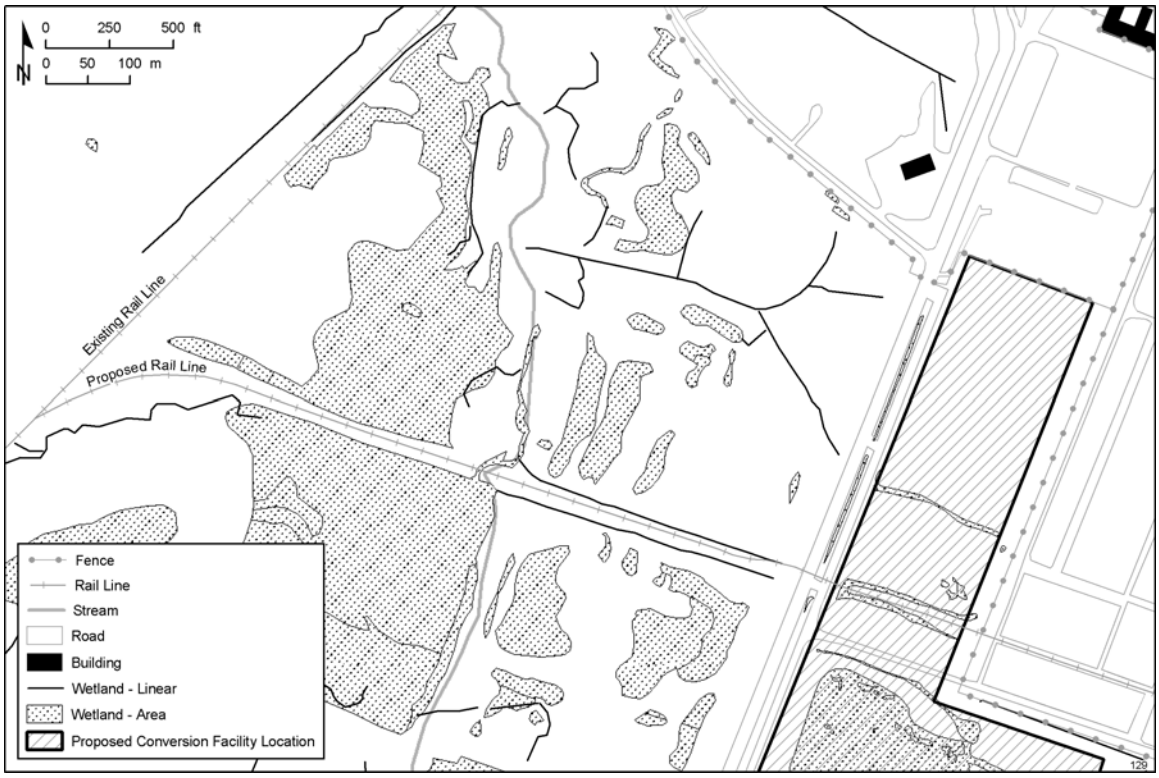


FIGURE 5 Wetlands along the Proposed Rail Line

the bridge crossing Bayou Creek would occur within the Bayou Creek 100-year floodplain. However, replacement of bridge components, including the bridge supports, would not be expected to measurably affect the flood storage capacity of the Bayou Creek 100-year floodplain or result in measurable long-term changes to the floodplain.

Under no action, a DUF_6 conversion facility would not be constructed and ETTP cylinders would not be transported to the Portsmouth site. Impacts to the flood storage capacity of existing 100-year floodplains would not be expected.

5 EFFECTS OF THE PROPOSED ACTION ON WETLANDS

Construction of a conversion facility at Location A would occur in the northern portion of the location, within the facility footprint, and would result in the loss of approximately 10 acres (4 ha) of previously disturbed managed grassland vegetation that is maintained by frequent mowing. The facility would not eliminate undisturbed natural communities. Wetlands could potentially be impacted by filling or draining during construction of the conversion facility. Wetlands could be impacted by alteration of surface water runoff patterns, soil compaction, or groundwater flow if the conversion facility was located immediately adjacent to wetland areas. Impacts to wetlands could be minimized, however, by maintaining a buffer area around them during facility construction. Mitigation for unavoidable impacts may be developed in coordination with the appropriate regulatory agencies.

Water-level changes in the Ohio River because of water withdrawal for construction would be negligible. Regional groundwater changes due to the increase in impermeable surface related to facility construction would also be negligible. Therefore, except for the potential local indirect impacts noted above, impacts to regional wetlands due to changes in groundwater or surface water levels or flow patterns would be expected to be negligible.

The proposed location for the conversion facility within Location A is in the northernmost portion of the location in order to avoid wetland impacts within the facility footprint. However, construction of a conversion facility at Location A could result in impacts to wetlands located in the central and southern portions of this location (Figures 3 and 4). Although the wetlands within the open, previously disturbed area are outside of the facility footprint, construction of an access road and rail lines could eliminate portions of the wetlands in this area. The larger, undisturbed forested wetland in the southern portion of Location A, however, could likely be avoided. Two new rail lines, an access road from Patrol Road 4, and a walkway leading from the south parking area to Building C1100 would cross the wetland within the drainage swale leading to KPDES Outfall 017 and Bayou Creek. Direct impacts to this wetland could occur from the placement of fill material and culverts for the crossings.

Impacts could also occur to the wetlands located in drainage swales to the south, which would be crossed by a new rail line and an access road from Patrol Road 4. In addition, two small isolated wetlands in the open, grassy area could be filled as a result of the construction of the rail line and access road. The drainage swale along the south margin of Patrol Road 4 may be

impacted if widening or other improvements to that road are made, and impacts to wetlands in drainages along the entrance highway could potentially result from improvements to the adjacent roadway to the east. Approximately 0.16 acre (0.064 ha) of palustrine emergent wetland would likely be eliminated by culvert construction or direct placement of fill material within Location A. This represents 18% of the wetlands within the previously disturbed open area of Location A and 2% of all wetlands within the location. Wetland areas that are not filled may be indirectly affected by an altered hydrologic regime, due to the proximity of construction, possibly resulting in a decreased frequency or duration of inundation or soil saturation and potential loss of hydrology necessary to sustain wetland conditions. Indirect impacts could be minimized by maintaining a buffer near adjacent wetlands. In addition, placement of temporary construction areas outside Location A may be necessary to avoid additional direct or indirect impacts to these wetlands. Construction impacts would likely reduce the functioning of the impacted wetlands for wildlife habitat, flood-flow alteration, and groundwater recharge. However, because of the previous disturbance to the open grassy area of Location A and the small area of wetlands affected, the reduction in these functions would not be expected to measurably affect local wildlife populations, flood flows, or groundwater levels, and nearby wetland areas would continue to perform these functions.

The increase in impervious surface and discharge of storm water runoff, due to construction of a conversion facility, could result in alteration of hydrology in the drainage system within Location A or downstream in Bayou Creek, with greater fluctuations in high and low flows, as well as in the other headwater drainages immediately west of the GDP entrance highway. However, because only a small portion of the Bayou Creek watershed would be involved, impacts would likely be small. Downstream wetlands could be affected by sedimentation during construction; however, the implementation of erosion control measures would minimize the likelihood of such impacts. The total area of construction-related disturbance would be up to 45 acres (18 ha), and the forested wetland at this location could be impacted unless temporary construction areas were positioned outside Location A in adjacent, previously disturbed areas.

Wetlands could also be impacted by the construction of infrastructure for facility utility requirements or new rail lines extending outside of Location A. Although the rail lines would primarily be constructed on an existing railroad bed, wetlands in drainages along the margin of the rail bed, forested wetlands adjacent to the south margin east of Bayou Creek, or forested wetlands along each side of the rail bed west of Bayou Creek, could be impacted if rail bed repairs or reconstruction are necessary, or by the operation of heavy equipment within these wetlands while laying track (Figure 5). The drainage along the north side of the rail bed, just west of the Entrance Highway, may potentially be affected by construction of the new rail line serving the western portion of the conversion facility. In addition, impacts to Bayou Creek and the forested wetlands along the creek could result from reconstruction of the rail bridge crossing Bayou Creek. Impacts to these wetlands from the replacement of bridge supports, however, would be expected to be small, and would not be expected to result in a measurable change in wetland functions associated with the forested wetlands along Bayou Creek.

Construction of a conversion facility at Location B could also impact wetlands. Placement of a facility in the northern, disturbed portion of this location would minimize wetland

impacts and avoid impacts to the forested wetlands in the southern portion. However, the drainage channels in the northern area would likely be impacted. The channels could be rerouted to continue to convey flows to Bayou Creek. Wetlands could also be impacted by the construction of infrastructure for facility utility requirements, transportation corridors from cylinder storage yards, or rail lines. In addition, placement of temporary construction areas outside Location B may be necessary to avoid additional direct or indirect impacts to wetlands, including forested wetlands in the southern portion of this location. Indirect impacts to wetlands could also occur. The hydrologic characteristics of wetlands could be indirectly affected by adjacent construction, possibly resulting in a decreased frequency or duration of inundation or soil saturation. Indirect impacts could be minimized by maintaining a buffer near adjacent wetlands. Facility construction could result in alteration of hydrology in the drainage system within Location B, or downstream in Bayou Creek, with greater fluctuations in high and low flows. However, because of the small portion of the watershed involved, impacts would likely be small. Downstream wetlands could be impacted by sedimentation during construction; however, the implementation of erosion control measures would reduce the likelihood of such impacts.

Construction at Location C could potentially result in impacts to wetlands. Facility placement in the western or northeastern portions of this location would likely result in direct impacts to wetlands. Placement of a facility in the southeastern portion of Location C may best avoid direct impacts to wetlands; however, wetlands located in drainage ditches along Dyke Road may be impacted. Indirect impacts, however, could result from construction of a facility immediately adjacent to wetlands in this area. The total area disturbed during construction would be up to 45 acres (18 ha), resulting in direct impacts unless temporary construction areas were located outside of Location C. Facility construction could result in alteration of hydrology in the drainage channel southeast of Location C, or downstream in Little Bayou Creek, with greater fluctuations in high and low flows. However, because of the small portion of the watershed involved, impacts would likely be small. Downstream wetlands could be impacted by sedimentation during construction; the likelihood of such impacts would be reduced, however, with the implementation of erosion control measures.

Liquid process effluents would not be directly discharged to surface waters during the operation of a conversion facility. In addition, water level changes in the Ohio River because of water withdrawal for operations would be negligible. Regional groundwater changes due to the increase in impermeable surface related to the presence of the facility would also be negligible. Therefore, except for potential local indirect impacts near the facility, impacts to regional wetlands due to changes in groundwater or surface water levels or flow patterns would be expected to be negligible. As a result, adverse effects on wetlands or aquatic communities from effluent discharges or water use would not be expected.

Storm water runoff from conversion facility parking areas and other paved surfaces may carry contaminants commonly found on these surfaces to local streams. Biota in receiving streams may be affected by these contaminants, resulting in reduced species diversity or changes in community composition. However, the streams near Locations A, B, and C currently receive runoff and associated contaminants from various roadways and storage yards on the Paducah site, and their biotic communities are likely indicative of developed areas.

During operations, atmospheric emissions from the facility stacks would occur, although emission levels would be extremely low. Facility emissions would include trace amounts of uranium; however, impacts to wildlife in wetlands on or near the Paducah site due to radiation effects are expected to be negligible. Toxic effect levels of chronic inhalation of uranium are many orders of magnitude greater than expected emissions. Therefore, toxic effects on wetland wildlife from uranium compounds would also be expected to be negligible. Toxic effect levels of chronic inhalation of HF are also many orders of magnitude greater than expected emissions from conversion facility operations. Therefore, toxic effects on wetland wildlife from HF emissions are also expected to be negligible.

Under no action, a DUF_6 conversion facility would not be constructed. DUF_6 cylinder storage would continue indefinitely at the Paducah site, along with cylinder surveillance and maintenance activities. Continued cylinder storage would have a negligible impact on wetlands in the vicinity of the Paducah site. Surface water uranium concentrations from hypothetical cylinder breaches would be below levels harmful to biota. Cylinder painting activities at the DOE Paducah site have been associated with increased toxicity in runoff at KPDES Outfall 017. Mitigating actions, such as treating runoff, could be implemented if toxicity limits of the KPDES Permit are exceeded in the future.

6 CONCLUSION

Reconstruction of the bridge crossing Bayou Creek would occur within the Bayou Creek 100-year floodplain. Replacement of bridge components, including the bridge supports, however, would not be expected to result in measurable long-term changes to the floodplain.

Approximately 0.16 acre (0.064 ha) of palustrine emergent wetlands would likely be eliminated by direct placement of fill material within Location A. Some wetlands that are not filled may be indirectly affected by an altered hydrologic regime, due to the proximity of construction, possibly resulting in a decreased frequency or duration of inundation or soil saturation and potential loss of hydrology necessary to sustain wetland conditions. Indirect impacts could be minimized by maintaining a buffer near adjacent wetlands. Wetlands would likely be impacted by construction at Location B; however, placement of a facility in the northern portion of this location would minimize wetland impacts. Construction at Location C could potentially result in impacts to wetlands, however placement of a facility in the southeastern portion of this location may best avoid direct impacts to wetlands. The hydrologic characteristics of nearby wetlands could be indirectly affected by adjacent construction.

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. DOE regulations for implementing Executive Order 11990 as well as Executive Order 11988, *Floodplain Management*, are set forth in 10 CFR Part 1022. Mitigation for unavoidable impacts may be developed in coordination with the appropriate regulatory agencies. Unavoidable impacts to wetlands that are within the jurisdiction of the USACE may require a CWA Section 404 Permit, which would trigger the requirement for a CWA Section 401

Water Quality Certification from the Commonwealth of Kentucky. A mitigation plan may be required prior to the initiation of construction.

Cumulative impacts to floodplains and wetlands are anticipated to be negligible to minor under the proposed action, in conjunction with the effects of existing conditions and other activities. Habitat disturbance would involve settings commonly found in this part of Kentucky, which in many cases involve previously disturbed habitats.

7 REFERENCES

ANL (Argonne National Laboratory), 1991, *Environmental Site Description for a Uranium Atomic Vapor Laser Isotope Separation (U-AVLIS) Production Plant at the Paducah Gaseous Diffusion Plant Site*, ANL/EAIS/TM-59, Argonne, Ill., Sept.

CDM Federal Programs Corporation, 1994, *Investigation of Sensitive Ecological Resources inside the Paducah Gaseous Diffusion Plant*, Document Control Number 7916-003-FR-BBRY, prepared by CDM, Paducah, Ky., for U.S. Department of Energy, Paducah Gaseous Diffusion Plant, and Martin Marietta Energy Systems, Inc., Paducah, Ky., Aug. 19.

Cowardin, L.M., et al., 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.

DOE (U.S. Department of Energy), 1994, *Remedial Investigation Addendum for Waste Area Grouping 23, PCB Sites at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/OR/07-1149 & D2 (KY/ER-32 & D2), Rev. 2, Sept.

DOE, 1996, *Technical Report on Affected Environment for the DOE Sites Considered in the DOE Waste Management Programmatic Environmental Impact Statement (WM PEIS)*, Vols. I and II, META/Berger -SR-01, prepared by META/Berger, Gaithersburg, Md., for DOE, Office of Environmental Management, Dec.

DOE, 1999, *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride*, DOE/EIS-0269, Office of Nuclear Energy, Science and Technology, Germantown, Md., April.

DOE, 2001, *Paducah Site, Annual Site Environmental Report for Calendar Year 2000*, BJC/PAD-237, prepared by CDM, Kevil, Ky., for Bechtel Jacobs Company LLC and U.S. Department of Energy, Paducah, Ky., Oct.

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

LMES (Lockheed Martin Energy Systems, Inc.), 1996, *Paducah Site Annual Environmental Report for 1994*, ES/ESH-60 (KY/EM-79), prepared by Environmental, Safety, and Health Compliance and Environmental Management staffs, Oak Ridge, Tenn., and Environmental Management Division, Paducah Site, Paducah, Ky., for U.S. Department of Energy, Feb.

Pennington, G.G., 2001, *Data Submittal for Preparation of the Site-Specific Environmental Impact Statement (EIS) for the Portsmouth and Paducah Conversion Facility Sites*, letter from Pennington (Bechtel Jacobs Company LLC) to L.D. Boggs (U.S. Department of Energy), Feb. 8.

Sadri, R.J., 1995, letter from R. Sadri (Regulatory Branch, U.S. Army Corps of Engineers, Louisville District, Ky.) to J. Hodges (U.S. Department of Energy, Oak Ridge Operations, Paducah Site Office, Paducah, Ky.), Dec. 12.

Tetra Tech, Inc., 2000, *DUF_6 Conversion Facility Site Characterization Report, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, BJC/PAD-207, prepared by Tetra Tech, Inc., Oak Ridge, Tenn., for U.S. Department of Energy, Office of Environmental Management, Sept. Available at http://www.oakridge.doe.gov/duf6disposition/PADUCAH_REPORT.pdf.

U.S. Department of the Army, 1994, *Environmental Investigations at the Paducah Gaseous Diffusion Plant and Surrounding Area, McCracken County, Kentucky; Volume II, Wetlands Investigation*, Final Report, Volume 2, prepared by Waterways Experiment Station, Corps of Engineers Environmental Laboratory, Vicksburg, Miss., and Engineer District Nashville, Nashville, Tenn., for U.S. Department of Energy, Oak Ridge Operations, Paducah Site Office, Paducah, Ky., May.

U.S. President, 1977a, "Protection of Wetlands," Executive Order 11990, *Federal Register*, 42:26961, May 24.

U.S. President, 1977b, "Floodplain Management," Executive Order 11988, *Federal Register*, 42:26951, May 24.