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ENVIRONMENTAL ASSESSMENT

WACKER CHEMIE POLY 11 REQUEST FOR TENNESSEE VALLEY AUTHORITY LAND USE AND SECTION 26a APPROVALS AND UNITED STATES ARMY CORPS OF ENGINEERS SECTION 404 APPROVAL

Bradley County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

COOPERATING AGENCY:
UNITED STATES ARMY CORPS OF ENGINEERS

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TENNESSEE VALLEY AUTHORITY

SEPTEMBER 2010

The Proposed Decision and Need

The Tennessee Valley Authority (TVA) received a land use request from Wacker Chemie (applicant) and a request for approval for activities that are subject to Section 26a of the TVA Act. The proposed actions would occur adjacent to South Mouse Creek Mile 1.5 (right bank), Hiwassee River Mile (HiRM) 15.6 (left bank), in Bradley County, Charleston, Tennessee (see Attachments A and B). The applicant is planning to construct and operate a facility to manufacture hyperpure polycrystalline (polysilicon), the prime component used to make solar panels and semiconductors. Growth of the photovoltaic solar industry is limited by the supply of polysilicon material. The proposed facility would produce roughly 10 metric tons of pure polysilicon annually.

TVA holds flowage easement rights over project-associated land that lies below elevation 715 feet above mean sea level (msl), and TVA owns the local shoreline below elevation 685.44 feet above msl (see Attachment C). The 100-year floodplain elevation at the project location is 694.1 feet above msl. Section 26a of the TVA Act (16 United States Code [USC] Section [§] 831y-1) stipulates that obstructions affecting navigation, flood control, public lands, or reservations along, or in, the Tennessee River or any tributaries are subject to approval by TVA.

The applicant has requested Section 26a and land use approval for activities along the South Mouse Creek shoreline, including 1.67 acres of TVA fee-owned land. The proposed construction would result in fill placement in wetlands, streams, and floodplains on TVA property. TVA has jurisdiction over the area within its flowage easement and the area within the 100-year floodplain (elevation 715 feet and 694.1 feet above msl). Thus, the decision before TVA is whether to grant the land use and Section 26a requests for the proposed actions or deny them.

The applicant's activities that are associated with the land use request from TVA include the following actions:

- Placement of fill in three areas (0.272 acre) of TVA property at elevation 685.44 feet above msl. Wacker Chemie is requesting a term easement for the fill placement. (Placement of fill also requires Section 26a approval from TVA.)
- Use of 0.01 acre of TVA property for storm water sheet flow. This would require TVA to issue a term easement.

- Placement of structures and 11.25 acres of fill material between elevations 694.1 feet and 685.44 feet above msl. (TVA holds a flowage easement on land from elevation 685.44 feet to elevation 715 feet msl.)
- Performing a cut on TVA fee-owned land (at Wetland Mitigation Area [WMA] #1) for the purpose of creating one hydraulic connectivity point. Performing cuts on TVA fee-owned land (at WMA #2) for the purpose of creating three hydraulic connectivity points. These cuts (0.11 acre) would require TVA to issue a term easement.

Those actions proposed by the applicant that require TVA approval under Section 26a of the TVA Act include the following:

- Placement of 62.2 acres of fill on the applicant's property between elevation 715 feet and 696.8 feet msl.
- Placement of fill on 15.5 acres within the 500-year floodplain on the applicant's property between elevations 696.8 and 694.1 feet msl.
- Encapsulation of a perennial stream.
- Performance off-site stream mitigation activities.
- Construction of four storm water outfalls.
- Restoration or enhancement of stream bank at WMA #2 on South Mouse Creek.

Site preparation for the proposed Wacker Chemie manufacturing facility would result in the modification of 273 acres of the applicant's 564-acre property, including grading and fill activities to level the project site for facility construction. The planned site preparation work would displace approximately 4 million cubic yards of fill material, resulting in unavoidable impacts to 4.1 acres of wetlands, 3,377 linear feet of streams, and 6.8 acres of agricultural ponds. To compensate for these unavoidable adverse effects, the applicant has agreed to undertake the wetland and stream mitigation measures described below.

Wetland Mitigation

Compensatory wetland mitigation for the loss of 4.1 acres of emergent and scrub-shrub wetlands would occur on site in three locations. Wetland mitigation is proposed to occur at a ratio of 4:1 for wetland creation to compensate for 3.0 acres of impacts, and wetland restoration would occur at a ratio of 2:1. Approximately 11.9 acres of floodplain wetlands would be created along South Mouse Creek to form WMA #1 and WMA #2. WMA #1 would be in the northwestern corner of the site, and WMA #2 would be near the southwest corner of the site. Wetland restoration of WMA #3 would occur in the southern portion of the larger 564-acre parcel (see Attachment B).

- WMA #1 would be created through excavation of the site to at least elevation 681.6 feet above msl and/or 1 foot deeper than the adjoining tract of TVA land to the east. Hydric wetland soils would be removed from the wetlands that would be impacted by construction and would be spread about 6 inches deep at the mitigation site. Following the excavation, WMA #1 would be hydrologically connected to the TVA property by removal of a 12-inch berm separating them.
- Creation of WMA #2 would involve grading within the South Mouse Creek floodplain to the reservoir normal pool elevation. An 18-inch berm would be constructed between the wetland and the high water mark of South Mouse Creek. Hydric

wetland soils would be removed from the wetlands that would be impacted and spread about 6 inches deep at the mitigation site. Four water control structures, i.e., risers or weirs, with 1-inch slats would be constructed in the berm to manipulate initial water levels and would later be sealed. A minimum 50-foot vegetative buffer would be established between the south bank of South Mouse Creek and WMA #2.

- Wetland restoration activities at WMA #3 would involve site excavation to elevation 688.5 feet above msl to establish a 2.3-acre herbaceous wetland area. The existing topography would be manipulated, and hydrology to the existing hydric soils would be reestablished. The restored wetland would join with an adjacent wetland.

Wetland vegetation plantings would consist of native herbaceous plants and shrubs, and a listing of these species is included in Attachment D.

Stream Mitigation

Stream mitigation activities would include stream enhancement, replacement, restoration, and in-lieu-fee payments. These activities include the on-site and off-site actions described below.

- On-site stream mitigation would consist of stabilizing and enhancing 1,600 linear feet of stream bank along South Mouse Creek through natural and bioengineered bank stabilization, supplementing protected buffer zones with native trees and enhancing in-stream habitat along South Mouse Creek.
- Off-site stream mitigation would involve a combination of replacement and restoration activities at Fillauer Branch (see Attachment B), a severely altered perennial headwater stream. The stream is located in a flood-prone area and has been degraded over time. The planned development of a properly sized channel with a stable meander pattern would reduce the flow energy that has caused excessive bank erosion and entrainment of sediments.
- Off-site replacement activities would consist of the removal of existing culverts and/or concrete-lined channels. Restoration would involve restoring the culvert areas to a naturalized stream channel and reestablishing a riparian zone, ranging from 30 to 75 feet in width. Other restoration work would involve making a connection to the adjacent floodplain.
- The alignment of the relocated channel would increase the length of the stream from 1,400 feet to 1,527 feet. An additional 127 linear feet of mitigation would result from removing a straight reach of the stream from a culvert and adding sinuosity.
- Another 1,317 linear feet of stream mitigation would be compensated for by the purchase of credits from the state at a 1:1 ratio at \$200 per linear foot.

Signage would be placed around the wetland and stream mitigation areas that clearly indicate that they are "Protected Wetlands and Streams" and that no disturbance is permitted.

Section 301 of the Clean Water Act (CWA) (33 USC § 1311[a]) prohibits the discharge of dredged or fill material into waters of the U.S. unless authorized by the Department of the Army (DA) pursuant to Section 404 of the same act. Under Section 404, the United States

Army Corps of Engineers (USACE) exercises jurisdiction over “waters of the U.S.,” including wetlands, streams, and water bodies that are adjacent to or have significant connection to “traditional navigable water.” Because the applicant’s proposed action is associated with waters of the U.S., a DA Permit under Section 404 is required. The applicant has submitted a Section 404 Permit request for the placement of fill in wetlands and streams (Atwell 2010a). USACE is a cooperating agency in the development of this environmental assessment (EA).

Scope of Environmental Review

The proposal constitutes a federal action subject to the requirements of the National Environmental Policy Act (NEPA) and TVA’s NEPA implementing procedures. Accordingly, TVA has prepared this EA to identify alternatives, to evaluate potential environmental impacts of the alternatives, to describe any mitigation measures or environmental commitments, and to communicate its findings to agency decision-makers and the public.

The study area for this EA includes the applicant’s 273 acres proposed for disturbance, 1.67 acres of TVA fee-owned land in the applicant’s land use request, an on-site WMA just south of the 273-acre boundary, and an off-site stream mitigation area in Cleveland, Tennessee.

Applicant’s Proposed Project

As previously stated, the applicant’s primary actions involve grading and leveling 273 acres of the applicant’s property. The planned construction work would be phased and would involve the following actions: clearing of land as called for on construction plans and removal of debris from the site, installation of erosion-prevention and sediment-control measures (see Attachment E), grading activities and establishment of wetland mitigation areas, phased cut-and-fill placement, stream relocation activities as approved under the applicant’s Aquatic Resources Alteration Permit (ARAP), and completion of remaining cut-and-fill activities (Atwell 2010b).

The manufacturing facility complex would include an administrative office building and several other structures for support processes and warehousing. The administrative office building would be 50,700 square feet in area and would be 25 feet tall. Employees and visitors would utilize a 236-vehicle parking area consisting of asphalt over crushed limestone. The facility complex would include distillation and cooling towers, scrubbers, a maintenance shop, equipment cleaning facility, and two substations, among other features. Conceptual plans of the planned facility are included in Attachment F.

All site work would be completed in accordance with the Erosion Protection and Sediment Control (EPSC) measures as described in the applicant’s Storm Water Pollution Prevention Plan (SWPPP) (Atwell 2010b) and with any other requirements in applicable permits, such as placement of silt control structures prior to any soil-disturbing activities (see Attachment E).

Related Construction Activities

TVA is planning to construct a substation, two parallel 2.3-mile transmission lines and other necessary minor upgrades to transmission lines or facilities that are expected to be in service by the summer of 2013 to provide direct-serve power to the manufacturing facility. The substation site would be situated on about 24 acres at the north end of the applicant’s 273-acre property (see Attachment E). The substation site will be rough-graded by the

applicant during site preparations for the manufacturing facility and the property will be transferred to TVA for operation and maintenance. The new transmission line routes are still under development. TVA will complete an environmental review for the planned transmission lines when final project information is available.

The Olin Chlor Alkali Products Corporation (Olin), a chemical manufacturing facility adjacent to the site, would supply chlorine and other elements necessary for facility operations and production. The operation of the applicant's planned facility would require the withdrawal from the Hiwassee River of approximately 2,000 gallons per minute (gpm) of water for nonconsumptive use. The applicant has proposed upgrading a nearby water intake owned by Olin at HiRM 16.8, left bank, to fulfill its water use needs. The applicant is also proposing to use Olin's process water outfall to the nearby Hiwassee River for discharge of treated process and cooling waters. However, the applicant's final plans for the water intake and outfall, including the acquisition of any easements, are still under development.

Tennessee Department of Transportation (TDOT) would construct a new roadway on 6 acres of the applicant's property to service Wacker, Olin, Arch Chemicals, and other industrial traffic in the vicinity. Preliminary engineering has begun on the planned road from Lauderdale Memorial Highway to Old Lower River Road. Old Lower River Road and a portion of North Mouse Creek Road would remain open until the new road is built that would replace McBryant Road. The roadway would provide direct access for industrial traffic to Interstate 75 and would allow tanker trucks to bypass the town of Charleston. The access road would be straighter, wider, and follow about 30 acres on the eastern boundary of the Wacker site. TDOT has indicated that the planned roadway would not impact any streams or wetlands.

Relevant Regulations and Statutes

The following list shows applicable statutes and executive orders (EOs) relevant to activities assessed in this environmental review. The list is not meant to be exhaustive.

Archaeological and Historic Preservation Act (16 USC Sections [§§] 469-469c)

Archaeological Resources Protection Act (42 USC §§ 470aa-470mm)

Bald and Golden Eagle Protection Act (16 USC §§ 668-668d)

Clean Air Act (42 USC §§ 7401-7671q)

Clean Water Act (33 USC §§ 1251-1387)

Consultation and Coordination With Indian Tribal Governments (EO 13084)

Endangered Species Act (16 USC §§ 1531-1599)

Farmland Protection Policy Act (7 USC §§ 4201-4209)

Floodplain Management (EO 11988)

Invasive Species - National Invasive Species Council (EO 13112)

Migratory Bird Treaty Act (16 USC §§ 703-711)

National Environmental Policy Act (42 USC §§ 4321-4370h)

National Historic Preservation Act (16 USC §§ 470-470x-6)

Protection of Wetlands (EO 11990)

Responsibilities of Federal Agencies to Protect Migratory Birds (EO 13186)

Public Involvement

The applicant's proposed action was the subject of Joint Public Notice (JPN) 10-14 issued by USACE and TVA (see Attachment G) to advertise the proposed activities. The public comment period extended from July 14, 2010, to August 14, 2010. One written comment was received from the United States Fish and Wildlife Service (USFWS) concerning potential impacts to the federally listed as threatened snail darter (*Percina tanasi*) that could result from process wastewater discharged into the Hiwassee River (see Attachment H).

Tennessee Department of Environment and Conservation (TDEC) issued Public Notice NRS 10.110 to inform interested parties of the applicant's request for a Section 401 Water Quality Certification approval (see Attachment G). The public notice was dated June 25, 2010, and the comment period expired July 24, 2010. Two written comments were received during the TDEC public notice comment period. TDEC held a public hearing July 29, 2010, to receive comments or objections regarding the application for Section 401 Water Quality Certification by Wacker. No comments or objections to the permit request were presented at the public hearing.

TVA has consulted with the Tennessee State Historic Preservation Officer (SHPO) under Section 106 of the National Historic Preservation Act (NHPA) regarding properties eligible for listing in the National Register of Historic Places (NRHP). TVA has also consulted with the following federally recognized Indian tribes regarding properties within the proposed project's area of potential effects (APE) that may be of religious and cultural significance to the tribes: Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, The Chickasaw Nation, Muscogee (Creek) Nation of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Kialegee Tribal Town, Thlopthlocco Tribal Town, Seminole Tribe of Florida, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe of Oklahoma (see Attachment H).

Necessary Permits and Approvals

TVA Section 26a approval is being sought by Wacker for activities that could affect streams, wetlands, flood control, and shoreline stabilization in the study area.

Wacker Chemie has requested term easements over certain TVA-managed properties that would provide Wacker the necessary landrights to proceed with construction and operation of the proposed manufacturing facility.

Wacker has requested a Section 404 Permit from USACE for the discharge of dredged or fill materials into waters of the U.S.

TDEC has issued the ARAP that would serve as the Water Quality Certification under Section 401 of the CWA.

Wacker has submitted a Construction SWPPP to TDEC.

TDEC has issued a General Storm Water National Pollutant Discharge Elimination System (NPDES) Permit for construction activities resulting in storm water discharges.

Wacker would need to acquire an Industrial Wastewater NPDES Permit from TDEC for the discharge of process wastewater into the Hiwassee River.

Alternatives and Comparison

TVA is considering two alternatives—the No Action and the proposed Action Alternative. The two alternatives are described below.

No Action Alternative

Under the No Action Alternative, TVA would not grant land use and Section 26a approvals, and USACE would not issue the Section 404 Permit for the applicant's proposed construction activities. Consequently, the applicant would not construct the proposed facility at this time. Environmental conditions in the project area would not change, and anticipated socioeconomic benefits would not occur in the region. Adoption of this alternative would not meet the applicant's project objectives to build the new manufacturing facility in Bradley County, Tennessee.

Action Alternative

Under the Action Alternative, TVA would issue land use and Section 26a approvals, and USACE would issue Section 404 Permit approval for the applicant's proposed actions that would impact 4.1 acres of wetlands, 3,377 linear feet of streams, and 6.8 acres of agricultural ponds.

The TVA land use and Section 26a request actions are described above in the Proposed Decision and Need section. Additional details of the proposed TVA land use, Section 26a actions, and an impact area map are provided as Attachment I.

Impacts to streams, wetlands, and floodplains resulting from construction and operation of the planned manufacturing facility would be mitigated by the applicant through on-site mitigation activities for wetland and stream impacts, along with off-site stream mitigation planned in the city of Cleveland. A draft mitigation plan report (Atwell 2010c) has been prepared on behalf of the applicant. The applicant would be responsible for the design, construction, and vegetation restoration and for all mitigation activities, including monitoring. Monitoring for all the wetland and stream mitigation areas would be conducted by the applicant every six months for at least the first three years, with biannual reports submitted to TDEC and USACE. The planned mitigation activities are included as part of the Action Alternative.

Under the Action Alternative, the applicant would construct and operate the planned industrial facility. Initial site clearing and grading are scheduled to begin by January 2011, and facility completion is scheduled for June 2013. There are no further plans to develop the remaining property on the 564-acre site at this time.

As previously mentioned, the applicant's final plans for addressing water intake and process water outfall needs, including easements, are still under development. Planned facility operations would require approximately 2,000 gpm of nonconsumptive water. The applicant has proposed using Olin's water intake and process water outfall for discharge of the treated process and cooling waters. The applicant estimates process wastewater would be discharged at 500 gpm into the Hiwassee River and would contain negligible amounts of silicate and chloride.

Affected Environment and Evaluation of Impacts

The existing environmental conditions of those environmental resources that could potentially be affected by the proposed actions are described in this section. These

affected environment descriptions are based on field surveys, published and unpublished reports, and personal communications with resource experts.

Site Description

The geographic scope of the environmental review includes the study area consisting of the 273-acre project footprint, including WMAs #1 and #2, and the on-site stream mitigation area, WMA #3, located south of the 273-acre tract, and the off-site stream mitigation area. The scope of the EA analysis also involves 1.67 acres of TVA property associated with the applicant's land use and Section 26a requests. The direct, indirect, and cumulative impacts of the entire Wacker proposal, including necessary permitting requirements and the proposed stream and wetland mitigation areas, are addressed in this section of the EA.

Evaluation of the applicant's proposal has allowed TVA to determine that certain resources would not be affected by the proposed actions. These include recreation, Wild and Scenic Rivers, and prime farmland. Groundwater, air quality, noise, and transportation would experience minor insignificant impacts.

Resources that could be affected by the proposed project have been given further consideration in this environmental review and include the following: surface water quality, aquatic ecology, wetlands, floodplains and navigation, vegetation and wildlife, threatened, endangered, or special status species, historic and archaeological resources, visual resources, socioeconomics and environmental justice.

Surface Water Quality

Affected Environment

Precipitation in the project area averages about 55 inches per year. The wettest month is March with 6.2 inches of precipitation, and the driest month is October with 3.4 inches. The average annual air temperature is 58 degrees Fahrenheit (°F) and ranges from a monthly average of 38°F in January to 78°F in July. Streamflow varies with rainfall and averages about 24 inches of runoff per year or approximately 1.8 cubic feet per second (cfs) per square mile of drainage area.

The project area drains to South Mouse Creek of the Hiwassee River (and the Hiwassee River embayment of Chickamauga Reservoir) in the Tennessee River Basin and discharges into the Hiwassee at HiRM 15.48. South Mouse Creek is on the state 303(d) list (TDEC 2008) as "impaired" (i.e., not fully supporting its designated uses) due to biological integrity loss because of siltation and other undetermined causes, habitat loss due to streamside or littoral vegetative cover, and the presence of *Escherichia coli* (*E. coli*) from discharges from municipal separate storm sewer system area, channelization, stream bank modification/destabilization, and collection system failure. The Hiwassee River embayment of Chickamauga Reservoir is also listed as "impaired" due to mercury and *E. coli* from atmospheric deposition, industrial point source, and collection system failure.

Stream and soil disturbances associated with clearing and grubbing activities, grading and site excavation, stream relocations, access roads, and other construction activities have the potential to result in adverse surface water quality impacts. Other potential effects can be attributed to soil erosion, streambed disturbance, and sedimentation that can clog small streams and threaten aquatic life. Removal of the tree canopy along streams can increase water temperatures, algal growth, dissolved oxygen depletion, and adverse impacts to aquatic biota.

Storm water. Two streams occurring in the study area would be destroyed, and one would be encapsulated. Atwell (2010c) describes planned stream mitigation activities that would improve streams occurring on and off the applicant's property to compensate for these stream losses.

Process wastewater. The applicant estimates process (inorganic wastewater) and utility (cooling tower water treatment) wastewater would be discharged at 1,000 gpm or at approximately 2.2 cfs into the Hiwassee River. The average flow rate of the Hiwassee River is 4,000 cfs, and the 7Q10 is 1,150 cfs (the lowest stream flow for seven consecutive days that would be expected to occur once in 10 years). The constituents in the process wastewater would include approximately 590 parts per million (ppm) silicates and about 1,500 ppm chlorides. Furthermore, once diluted in the Hiwassee River (assuming full mixing), the constituents would be diluted to about 1.1 ppm silicates and 2.9 ppm chlorides. Following rain events, a small portion of the storm water system would be routed through the process discharge sump. This would further dilute silicate and chloride concentrations in the outfall.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to water quality because there would be no physical changes to the project area. Therefore, no environmental effects to current surface water conditions would occur. However, changes to surface water would likely occur over the long term due to other factors such as population growth and land use changes in the area.

Action Alternative

Storm water. Under the Action Alternative, the applicant would obtain a Construction Storm Water General NPDES Permit from TDEC prior to beginning construction. To minimize potential water quality impacts, the EPSC measures (see Attachment E) as described in the SWPPP (Atwell 2010b) would be implemented throughout the duration of all construction activities, including the stream mitigation areas. Measures in the SWPPP include limiting ground disturbance in increments of no more than 50 acres at a time. In addition, prior to earth disturbance, a crew would install erosion-control devices such as silt fences and/or other controls, and these would be inspected and maintained for the duration of construction. All areas disturbed during construction would be seeded to encourage the establishment of a vegetative cover and decrease erosion potential. Both temporary and permanent seeding would be implemented as required under NPDES guidelines until buffer and wetland mitigation vegetation were planted and established.

The SWPPP would be updated as the details for the facility construction phase of the project area are completed. With the implementation of these plans, the proposed facility construction is expected to result in minor, short-term impacts on water quality.

Process wastewater. The applicant would obtain an NPDES Permit from TDEC for process wastewater discharge prior to facility operation. The constituents in the process wastewater are not included in the NPDES list of hazardous chemicals (see Attachment J) and are not considered harmful to water quality. The planned rates of process wastewater discharge and the impacts of the constituents in the process wastewater would be negligible. Potential effects to water quality from the operation of the proposed facility would be insignificant. Therefore, overall impacts to surface water quality would not be significant, and no significant cumulative impacts to surface water are anticipated.

Aquatic Ecology

Affected Environment

This proposed project area lies along the South Mouse Creek embayment of Chickamauga Reservoir near the junction of the Hiwassee River to the north and South Mouse Creek to the west. Three streams totaling 4,856 linear feet and three ponds totaling 6.78 acres were delineated within the study area (see Table 1). Of the 4,856 linear feet of streams, 3,377 linear feet would be impacted, while all 6.78 acres of ponds would be impacted.

Table 1. Streams and Ponds Delineated in the Study Area

Aquatic Feature	Classification	Impact Area	Feature Size
Stream 1	Perennial	2,659 linear feet	3,319 linear feet
Stream 2	Intermittent	70 linear feet	684 linear feet
Stream 4	Intermittent	648 linear feet	853 linear feet
Total Length		3,377 linear feet	4,856 linear feet
Pond 1	Pond Open Water	5.00 acres	5.00 acres
Pond 5	Pond Open Water	1.53 acre	1.53 acre
Pond 6	Pond Open Water	0.25 acre	0.25 acre
Total Area		6.78 acres	6.78 acres

On-site habitat assessment of stream channels proposed to be impacted indicates the impacted streams range from “not impaired” to “severely impaired” (Atwell 2010c). The assessment followed the protocols established by the United States Environmental Protection Agency (1999) and adapted for use by TDEC’s Division of Water Pollution Control. The streams have been affected by farming, ditch manipulation, and livestock grazing.

Stream 1 was sampled in two locations: upstream near the transition from ephemeral to perennial and downstream along a heavily impacted segment. The upstream reach ranked “not impaired” due to its intact buffers, channel stability, in-stream habitat, and macrobenthic community. The downstream reach ranked “severely impaired” due to previous straightening of the channel, minimal riparian buffer, culverted areas to accommodate road crossings, and severe sedimentation. Stream 2 ranked “not impaired,” having similar characteristics as the upstream reach of Stream 1, and Stream 4 ranked “impaired.”

The applicant has prepared a draft mitigation plan report (Atwell 2010c); the mitigation measures are designed to offset the wetland and stream impacts that would result from constructing the manufacturing facility. On-site and off-site mitigation activities, as well as mitigation under the Tennessee Stream Mitigation Program (TSMP), would be implemented to offset wetland and stream impacts. The TSMP is an in-lieu-fee program that provides compensatory mitigation for physical impacts associated with federal and/or state water quality permits. The TSMP has demonstrated results in improving riparian area, in-stream habitat, and aquatic communities through past stream restoration projects.

On-site stream mitigation. The on-site stream mitigation is planned along South Mouse Creek, a portion of the mitigation site being within the 100-year floodplain (see Attachment B). The stream mitigation would involve bank stabilization through native woody plantings and in-stream enhancement. This work would be conducted along a 1,600-linear-foot corridor between the ordinary high water mark of South Mouse Creek and WMA #2. A minimum buffer of 50 feet would be maintained between the creek and the wetland.

Off-site stream mitigation. The off-site mitigation site is planned in a segment of Fillauer Branch that flows through commercial and residential areas of Cleveland (see Attachment B). The stream is a small headwater channel that has been modified through channelization. Inadequate culvert sizing and an eroded urban watershed have contributed to excessive amounts of storm water discharge during heavy rain events, further adding to the channel modifications. The upstream portion of the stream is encapsulated for approximately 400 feet in a concrete box culvert. The stream flows out of the box culvert into an open channel that flows beneath railroad tracks and then flows through a sparsely wooded area and enters two 4-foot culverts beneath Carolina Street. On the downstream side of the culverts, the channel bed drops approximately 5 feet into a plunge pool. The channel then flows north through a densely wooded lot before flowing beneath 12th Street, which is the end of the mitigation site (Atwell 2010c).

The planned stream mitigation activities previously summarized under the Action Alternative (page 7) are discussed in detail in Attachment D.

Environmental Consequences

Because of soil disturbances associated with planned construction activities, there is potential for impacts to aquatic life. Soil erosion and sedimentation from construction water runoff can increase turbidity (water cloudiness) and threaten aquatic life. Section 401 of the CWA requires water quality certification by the state for projects permitted by the federal government. The state's certification typically includes mitigation measures to minimize impacts to water quality and aquatic life.

No Action Alternative

Under the No Action Alternative, the site's environmental conditions would not change, and no direct, indirect, or cumulative impacts to aquatic communities on or adjacent to the project area would occur. However, changes to aquatic life would likely occur over the long term due to factors such as population growth and land use changes within the area. Additionally, long-term benefits to South Mouse Creek and Fillauer Branch would be forfeited.

Action Alternative

Under the Action Alternative, the impacts to 3,377 linear feet of streams and 6.78 acres of ponds would be mitigated as detailed in Atwell (2010c). Compensation for elimination of the streams within the study area would be provided by on-site and off-site mitigation activities and by purchasing credits in the TSMP. The planned off-site mitigation activities would result in disturbance from in-stream work; however, the disturbance would be short term. Restoration of this stream would ultimately benefit aquatic communities in Fillauer Branch, and use of the TSMP would result in a minor net improvement of aquatic resources in the state of Tennessee.

Given the impacts of livestock grazing and the past drainage manipulations to the on-site streams and the degraded quality of the portion of Fillauer Branch that would be redesigned, the project is not expected to result in the loss of quality aquatic resources. No federally or state-listed aquatic species are present in areas that would be affected by on-site stream and wetland mitigation. With the implementation of the planned mitigation, impacts to aquatic resources are expected to be insignificant under the Action Alternative. Direct, indirect, or cumulative impacts to aquatic resources associated with the applicant's proposal would result in long-term benefits to Fillauer Branch and South Mouse Creek.

Wetlands

Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include swamps, marshes, bogs, wet meadows, and lacustrine or palustrine shoreline fringes.

Activities in wetlands are regulated under Section 404 of the CWA and are covered under EO 11990, Protection of Wetlands. As previously stated, under Section 404, the USACE established a permit system to regulate activities that result in the discharge of “dredge or fill material” into the “waters of the U.S.” EO 11990 requires federal agencies to avoid, to the extent practicable, long- and short-term adverse impacts associated with the destruction or modification of wetlands. More specifically, the EO directs federal agencies to avoid new construction in wetlands, unless there is no practicable alternative. Where wetlands cannot be avoided, the proposed action must include all practicable measures to minimize harm to the wetlands.

Affected Environment

Wetland determinations were performed according to USACE standards, which require documentation of hydrophytic (i.e., wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Reed 1997; United States Department of Defense and United States Environmental Protection Agency 2003). Broader definitions of wetlands, such as those used by the USFWS (Cowardin et al. 1979), the State of Tennessee definition (Tennessee Code Annotated § 11-14-401), and the TVA Environmental Review Procedures definition (TVA 1983) were also considered in this review.

A review of a National Wetlands Inventory (NWI) map was conducted initially to determine the likely presence, location, size, and type of wetlands that may be located in the study area. The NWI map showed three recorded wetland areas located within the study area, one within the northern portion of the site, one in the western portion, and one in the southwestern portion of the property along Mouse Creek Road. During on-site investigations, the consultants determined that all three wetlands depicted on the NWI map were no longer functioning as wetlands.

Wetlands were delineated in the study area during September and November 2008 and March 2010 (Atwell 2010c). The information gathered from the review of historical and current documentation, site reconnaissance, and delineation identified nine wetland areas totaling 6.07 acres (see Table 2). The wetland boundaries were verified by the USACE on April 8, 2010. The wetland communities on the property are herbaceous communities dominated by American elm, black willow, boxelder, and green ash.

Table 2. Wetlands Delineated Within the Study Area

Wetland Name	Cowardin Classification¹	Wetland Acres
Wetland A	PEM/PFO	1.57
Wetland B	PSS	0.18
Wetland E	PFO	0.14
Wetland F	PEM	3.33
Wetland G	PEM	0.13
Wetland H	PEM/PSS	0.30
Wetland L	PEM	0.04
Wetland M/N	PEM	0.28
Wetland O	PEM	0.10

¹Classification codes as defined in Cowardin et al. (1979): PEM = Palustrine emergent, persistent vegetation; PFO = Palustrine forested, broadleaf deciduous; PSS = palustrine scrub-shrub

The majority of all wetlands identified on the property were palustrine, emergent (PEM) with a few wetlands having forested (PFO) and/or scrub shrub (PSS) components. Many of the features were linear drainage swales most likely converted during years of farming and site manipulation from stream channels or erosion features. The wetlands identified within the study area are described below (Atwell 2010c).

Wetland A is a linear system associated with Stream 1 (see Table 1). The northern portion of the wetland extends through an old-field/pasture area with scattered shrubs and trees along the watercourse. This section of the wetland possesses wet meadow characteristics. Dominant vegetation includes soft rush, boneset, moneywort, Frank's sedge, silky dogwood, and stiff dogwood. In the areas where adjacent streams flow through forested areas, the wetland vegetation consists of species such as green ash, sycamore, American elm, slippery elm, marsh fern, and shellbark hickory.

Wetland B extends along a small drainageway forming a linear system. The wetland extends northwest beneath a dirt trail and Old Lower River Road. Dominant vegetation includes silky dogwood, stiff dogwood, black willow, dock, and rough goldenrod. The eastern portion of the wetland, located off the property boundary, is dominated by hydrophytic vegetation including green ash, boxelder, black willow, swamp rose, Frank's sedge, and rough goldenrod.

Wetland E is a small forested wetland within an upland oak-hickory forest that connects directly to South Mouse Creek. At the time of site inspection, flowing water was observed draining through the wetland. This wetland contains saturated and inundated muck soils, and herbaceous vegetation appeared to have been disturbed by cattle. A small amount of vegetation was established within the wetland area including green ash, American elm, slippery elm, shellbark hickory, and American hornbeam.

The upland fields surrounding Wetland F are currently cattle pasture. The northern portion of the wetland is a mud flat with emergent vegetation and includes a portion of South Mouse Creek that enters the property via a culvert beneath Old Lower River Road. The southern portion of the wetland separates into progressively smaller and less defined areas where runoff from the field collects and supports wetland vegetation. Portions of the wetland have steep banks and areas of flowing water, but the system is largely vegetated. A greater diversity of hydrophytic vegetation was observed within the northern mud flat portion of the wetland. The southern portions are characterized by an exposed clay layer likely due to erosion and poor vegetation establishment resulting from frequent grazing and

trampling. Dominant hydrophytic vegetation included soft rush, narrow-leaf cattail, dock, blunt spike rush, moneywort, woolgrass, New England aster, and red top.

Wetland G is an emergent wetland associated with Pond 1. Pond 1 is approximately 5.0 acres in size and has been excavated. Two culverts located on the western side of the pond provide an outlet for overflow. These culverts connect to a series of drainage ditches that eventually flow into South Mouse Creek. Drainage from pastureland to the east appears to supply the hydrology for the wetland and pond. Dominant hydrophytic vegetation included soft rush, blunt spike rush, dock, and wetland grasses.

Wetland H is an emergent/scrub-shrub system that extends beyond the banks of the creek at the base of the upland slopes to the east. Dominant wetland vegetation includes soft rush, woolgrass, black willow, sedges, false nettle, nettle, smartweeds, and boxelder.

Drainage patterns and saturated soils were observed within Wetland L. Precipitation and runoff from pastureland supplies the hydrology for the wetland. The hydrologic regime of the wetland appears to be saturated. Dominant hydrophytic vegetation includes whitegrass, swamp smartweed, and Pennsylvania smartweed.

Wetlands M, N, and P are linear emergent systems connected to one another by a series of culvert pipes (approximately 24 inches in diameter). These features are located within a linear drainage depression connected by culverts that flow from north to south, beneath McBryant Road via another culvert into another series of wetland systems, and eventually discharges into South Mouse Creek. Dominant hydrophytic vegetation includes soft rush, yellow nutsedge, swamp smartweed, Pennsylvania smartweed, and nodding beggartick.

Wetland O is an emergent wetland. At the time of site inspection, drainage patterns and saturated soils were observed within the wetland. Dominant hydrophytic vegetation includes soft rush, yellow nutsedge, swamp smartweed, Pennsylvania smartweed, and nodding beggartick.

Wetland mitigation. Compensatory wetland mitigation for impacts to 4.1 acres would occur on site in three locations (WMA #1, #2, and #3) with a combination of wetland creation and restoration (see Attachment B). WMAs #1 and #2 involve about 11.9 acres of wetland creation in an area that is currently an agricultural field with large areas of hydric soils within the floodplain to South Mouse Creek. Wetland creation would involve grading the floodplain of South Mouse Creek to reservoir normal pool level, allowing an almost continuous source of water during the growing season. Hydration would be from rainfall events and infiltration from the creek. Additionally, overland flow from the applicant's project site would be directed to the wetland areas. Vegetation plantings would consist of both native shrubs and herbaceous plants (see Attachment D). About 6 inches of stockpiled hydric soil would be taken from WMA #3 and placed in WMA #1 and WMA #2 during wetland creation activities.

The 2.3-acre wetland restoration area (WMA #3) would occur on the applicant's property just south of the 273-acre tract boundary (see Attachment B). The wetland area would be restored by removing field tiles and culverts and lowering the grade to intercept groundwater flows. In addition, historical streams that have been rerouted, straightened, and encapsulated would have their flow redirected to the restored wetland area (see Attachment B).

Environmental Consequences

No Action Alternative

Under the No Action Alternative, environmental conditions in the project area would remain unchanged. Adoption of this alternative would result in no direct, indirect, or cumulative wetland impacts on TVA property or the applicant's property. However, changes to wetlands would likely occur over the long term due to factors such as population growth and land use changes within the area.

Action Alternative

Under the Action Alternative, construction activities would result in placement of fill material that would directly impact 4.1 acres of the 6.07 wetland acres in the study area. These impacts would be mitigated by the applicant through 14.2 acres of on-site wetland creation at a 4:1 ratio to compensate for 3.0 acres of impacts. The creation of additional wetland acreage would also offset any regional, cumulative impacts to wetlands. An additional 1.1 acres of wetland restoration at a 2:1 ratio would also occur. The applicant would be responsible for the design, construction, vegetation restoration, and monitoring for all wetland mitigation activities. Further details of the wetland mitigation plan are described in Attachment D. The USACE and TDEC will also address wetland impacts via their respective regulatory and permitting programs.

With the proposed mitigation, direct, indirect, or cumulative impacts to wetlands associated with this project would be minor. Wetland effects associated with this project would be beneficial. There would be some slight temporary loss of wetland function between the time that on-site wetlands are filled and the wetland mitigation sites are developed. The wetlands occurring on the applicant's property are relatively low quality and are primarily associated with drainage swales. The increase in species' diversity and habitat complexity associated with the planned wetland mitigation areas would offset this minor loss and would increase the overall wetland acreage and quality within the project region.

Under the Action Alternative, all practicable measures have been taken to minimize harm to wetlands. Furthermore, based on the engineering and environmental evaluations, in accordance with EO 11990, Protection of Wetlands, TVA has determined that there is no practicable alternative to the proposed construction in wetlands. Obligations under EO 11990 have been satisfied.

Floodplains and Navigation

EO 11988, Floodplain Management, directs all federal agencies to take actions to reduce the risk of flood loss, to minimize the impacts of floods on human safety, and to preserve the natural and beneficial values served by floodplains. The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid actions in the 100-year floodplain unless there is no practicable alternative.

Affected Environment

Regulatory floodplains are defined by the elevation of the base flood in relation to the elevation of the ground. The area that would be impacted by construction of the proposed manufacturing facility extends from South Mouse Creek Mile 0.0 to 2.0 on Chickamauga Reservoir. The 100-year flood elevation for South Mouse Creek is 694.1 feet above msl, and the 500-year flood elevation is 696.8 feet above msl. Bradley County participates in

the National Flood Insurance Program, and any development must be consistent with local floodplain regulations.

The proposed development would also involve an off-site mitigation project on Fillauer Branch in Cleveland, Tennessee. Stream improvements to Fillauer Branch would involve removal of existing culverts and concrete-lined channels, and approximately 1,527 feet of stream would be created to restore the channel to a natural, stable condition. The improved area would extend from 12th Street at Fillauer Branch Mile (FBM) 3.0, upstream to 8th Street at about FBM 3.25. The 100-year flood elevation at FBM 3.0 is 854.0 feet above msl. A portion of the off-site stream mitigation area is located within the 100-year floodplain.

The 500-year flood elevations vary from 854.2 feet above msl at FBM 3.0 to 857.7 feet above msl at FBM 3.11. There is a published floodway between FBM 3.0 and FBM 3.11. The floodway adopted by the City of Cleveland involves the portion of the Fillauer Branch channel and floodplain that must remain open and unobstructed to allow passage of floodwaters in order to prevent increases in upstream flood elevations.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains. However, changes to floodplains would likely occur over the long term due to factors such as population growth and land use changes within the area.

Action Alternative

Under the Action Alternative, construction of the planned manufacturing facility and on-site wetland and stream mitigation activities would require placement of fill within the 100-year floodplain. Additionally, storm water and process water outfalls, a water intake, and off-site stream mitigation activities would occur within the 100-year floodplain.

Planned facility construction. Under EO 11988, fill placement for construction of a manufacturing facility is not considered a repetitive action in the floodplain. The applicant has provided documentation concerning the requirement for the manufacturing site to be entirely flat and located adjacent to the planned substation with a similar finished grade. TVA considers this information adequate to support a no practicable alternative determination for the placement of fill in the floodplain.

Because of the need to level the study area, two small streams would be eliminated, and one would be encapsulated. There is no practicable alternative to impacting the streams to achieve this objective because of the physical facility layout and engineering feasibility for the site. Encapsulating a stream within a culvert is considered a repetitive action in the floodplain. Therefore, this portion of the proposed project would be consistent with EO 11988. The proposed storm water outfalls would be consistent with EO 11988 because they are considered repetitive actions in the floodplain that would result in minor impacts.

Under the Action Alternative, the applicant is planning to withdraw water through an existing Olin water intake and use Olin's existing process water outfall. Therefore, the activities associated with the water intake and process water outfall would involve the construction of underground water lines. Consistent with EO 11988, an underground water line is

considered a repetitive action in the floodplain that would result in minor impacts to the floodplain.

Shoreline stabilization. Natural and bioengineering methods would be used to stabilize about 1,600 feet of shoreline within the limits of the 100-year floodplain along South Mouse Creek. Consistent with EO 11988, shoreline stabilization is considered a repetitive action in the floodplain that would result in minor impacts. Furthermore, the planned shoreline stabilization activities would comply with the TVA Flood Control Storage Loss Guideline because there would be less than 1 acre-foot of displaced flood control storage.

On-site wetland creation within the 100-year floodplain. Under EO 11988, creation of a wetland is not considered a repetitive action in the floodplain. The applicant has evaluated alternatives for wetland creation sites and provided documentation to support a no practicable alternative determination for this project. The wetland creation activities in the 100-year floodplain would result in enhanced natural and beneficial floodplain values. Because of these wetland creation areas, there would be an increase of about 71.5 acre-feet of flood control storage, which would comply with the TVA Flood Control Storage Loss Guideline.

Off-site mitigation. Under the Action Alternative, a portion of Fillauer Branch would be modified to offset the impacts associated with the construction of the planned manufacturing facility and associated infrastructure. Due to the limited availability of potential mitigation sites, there is no practicable alternative to this activity at the planned location. However, the stream improvement project would likely result in enhanced natural floodplain values and would be consistent with EO 11988.

Additionally, the City of Cleveland floodplain administrator has indicated that the off-site stream mitigation project must comply with the local floodplain regulations and is requiring the applicant have a "No Rise" Certification for the planned off-site mitigation activities. The "No Rise" Certification would serve to "...ensure that the flood carrying capacity of the altered stream is, at a minimum, maintained and that the project will not cause a rise in flood elevation at any place in the community" (Federal Emergency Management Agency 2010).

To ensure that the proposed development would not adversely impact floodplains and flood control, TVA would include the following standard conditions in the 26a approval and any land transfer agreement(s):

1. For purposes of shoreline bank stabilization, the stabilizing material shall be constructed or placed, on average, no more than 2 feet from the existing shoreline at normal summer pool elevation.
2. The applicant shall grant TVA flowage easement rights along the created wetland areas consistent with those existing along the current shoreline in this area.
3. Any future facilities or equipment subject to flood damage is to be located above elevation 698.6 feet above msl.
4. Any future development proposed within the limits of the 100-year floodplain, elevation 694.1 feet above msl, shall be consistent with the requirements of EO 11988.

5. All future development shall be consistent with the requirements of the TVA Flood Control Storage Loss Guideline.

With the implementation of the proposed mitigation, direct, indirect, or cumulative impacts to floodplains associated with this project would be minor. On the whole, floodplain effects associated with this project would be beneficial because the wetland creation activities in the 100-year floodplain would result in enhanced natural and beneficial floodplain values, and there would be an increase of about 71.5 acre-feet (volume of a surface acre to a depth of 1 foot) of flood control storage as a result of the creation of these wetland areas. Additionally, the off-site stream improvement project would likely result in enhanced natural floodplain values. The proposed project would comply with the TVA Flood Control Storage Loss Guideline and EO 11988.

Vegetation and Wildlife

Affected Environment

The study area occurs within the Southern Shale Valleys ecoregion, a subregion of the Ridge and Valley of Tennessee. The Southern Shale Valley consists of lowlands, rolling valleys and slopes, and hilly areas dominated by shale materials. Small farms and rural residences occur throughout where land is used for grazing or farming tobacco, corn, or hay (Griffith et al. 1998).

Forest, pasture, and cropland are the dominant cover types in this region. Major plant communities in the study area are herbaceous vegetation (85 percent), with deciduous and mixed-deciduous forests/woodlands accounting for approximately 11 percent of the total land cover. These forested areas occupy the edges of the project site and occur along the narrow strips of riparian areas adjacent to South Mouse Creek. The remaining 4 percent of land cover is in the form of wetlands, farm ponds, and stream corridors. No designated critical habitat occurs in or around the study area.

The herbaceous vegetation cover is dominated by tall fescue with scattered crabgrass, foxtail, goose grass, Johnson grass, cocklebur, ironweed, lamb's quarter, pigweed, ragweed, tea-weed, and several clover species. These areas were previously used to graze cattle.

The predominant remnant forested vegetation is second- or third-growth hardwood and pine-dominated forests characterized by American sycamore, bitternut hickory, black walnut, loblolly pine, pignut hickory, southern red oak, sweetgum, and tulip poplar in the overstory, with box elder, Chinese privet, eastern red cedar, Osage orange, pawpaw, and red maple in the understory.

Japanese honeysuckle, oriental bittersweet, poison ivy, and trumpet creeper are common woody vines encountered in the forested areas. Black willow, buttonbush, silky dogwood, and tag alder are common shrubs associated with the wetlands and pond edges. The riparian zone along South Mouse Creek has been heavily impacted by cattle, but portions remain forested with sycamore, box elder, and various hickories. Other areas are dominated by herbaceous vegetation.

Wildlife typically observed in these areas includes white-tailed deer, woodchuck, gray squirrel, eastern cottontail, Canada goose, mallard, great blue heron, red-winged black bird, wild turkey, northern mockingbird, and eastern bluebird. Large numbers of invertebrates

including a variety of sulphur and skipper butterflies and dragonflies were noted on vegetation throughout the pasturelands.

Belted kingfisher, great egret, and great blue heron occur in the riparian corridor and portions of South Mouse Creek that are influenced by Chickamauga Reservoir (Hiwassee River Branch). During winter months, the reservoir-influenced portions of the creek immediately north of the property and an embayment are exposed by reservoir drawdowns, creating excellent habitat for shorebirds, waterfowl, and wading birds. Common species observed in the drawdown zones during a recent water-bird survey (completed within the last five years) include killdeer, least sandpiper, lesser and greater yellowlegs, Wilson's snipe, gadwall, and mallard. Wildlife surveys did not reveal areas potentially critical to migratory birds.

EO 13112 regarding invasive species serves to prevent the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that invasive species potentially cause. According to the Federal Noxious Weed List (USDA 2007), tropical soda apple (*Solanum vivarum*) has been reported in agricultural fields in both Bradley and McMinn counties; however, this plant was not observed during field surveys. Common invasive nonnative species such as Chinese privet, Japanese honeysuckle, and oriental bittersweet occur in the study area. No other plant species listed as federal noxious weeds are known to occur in the vicinity of the project area.

Environmental Consequences

No Action Alternative

Adoption of the No Action Alternative would not result in any project-related direct, indirect, or cumulative impacts to the terrestrial ecology of the region because terrestrial communities would not change. Invasive plant species on site would continue to be present. Terrestrial communities would likely change over time as other factors such as population, land use and development, and recreational patterns change in the area.

Action Alternative

Construction of the planned manufacturing facility would permanently remove vegetation in much of the study area. Most of the site is disturbed herbaceous vegetation, and no uncommon or high-quality terrestrial plant communities occur on the site. Although clearing the forest/woodland areas would increase forest fragmentation in the area, regional impacts would be minor. The nonforested portions of the site are pasture and would be converted to industrial use. Indirect impacts could result from the spread of nonnative plant species if fill materials used during site preparation are not free of noxious weed seeds/plants and areas of disturbance are not replanted with native or nonnative noninvasive plant species. Because the plant communities and plant species are common and representative of the region, there would be no significant impacts to local terrestrial life or to sensitive botanical resources.

Under the Action Alternative, mitigation measures on the project site include the stabilization of a portion of eroded stream bank along South Mouse Creek. These planned shoreline improvements would have positive effects on water quality, benefiting wildlife in the area, especially those foraging in reservoir-influenced portions of the creek.

Although a varied community of terrestrial animals use the mixture of habitats on site, the effects on wildlife from the habitat loss would not be significant, as similar habitats occur in abundance within the surrounding landscape. Animals inhabiting the project site would

move to adjacent habitat during construction activities, while some less mobile animals may perish. Wildlife species observed are common in this region of Tennessee, and no unusual wildlife observations were made. The project is expected to have insignificant impacts to wildlife, and no cumulative impacts to terrestrial ecology and wildlife are anticipated.

No heron colonies were found in the study area, and no habitat features used by sensitive wildlife species, such as caves, occur on site. Therefore, these features would not be affected by the proposed construction and operation of the manufacturing facility or by the planned mitigation measures.

Threatened, Endangered, or Special Status Species

Species listed at the federal level as threatened or endangered are protected under the Endangered Species Act (ESA), which is administered by the USFWS. Section 7 of the ESA requires federal agencies to consult with USFWS in situations where a federal action may adversely affect federally listed species or their habitats.

Affected Environment

Field surveys and reviews of the TVA Natural Heritage database indicated that one candidate for federal listing is known from McMinn County, and two state-listed plant species are documented in Bradley and McMinn counties and/or within 5 miles of the proposed project area (see Table 3). Three state-listed aquatic species and one federally listed as threatened aquatic species are known from the Hiwassee River drainage in Bradley and McMinn counties and/or within a 10-mile radius of the proposed project area (see Table 3). No state-listed or federally listed terrestrial animals occur in the study area or within Bradley and McMinn counties.

Table 3. Federally Listed Species Known From Hiwassee River Drainage in Bradley and McMinn Counties and State-Listed Species Known From the Vicinity of the Proposed Project Area

Common Name	Scientific Name	Federal Status ¹	State Status ¹ (Rank) ²
Plants			
Maryland milkwort	<i>Polygala mariana</i>	-	SPCO (S1)
Spreading false-foxglove	<i>Aureolaria patula</i>	-	SPCO (S3)
White fringeless orchid	<i>Platanthera integrilabia</i>	C	END (S2S3)
Fish			
Flame chub	<i>Hemitemia flammea</i>	-	NMGT (S3)
Lake sturgeon ³	<i>Acipenser fulvescens</i>	-	END (S1)
Snail darter ³	<i>Percina tanasi</i>	THR	THR (S2S3)
Tennessee dace	<i>Phoxinus tennesseensis</i>	-	NMGT (S3)
Bird			
Bald eagle	<i>Haliaeetus leucocephalus</i>	-	NMGT (S3)

Source: TVA Natural Heritage database (accessed August 2010)

¹Status codes: C = Candidate; END = Endangered; THR = Threatened; NMGT = In need of management; SPCO = Special concern

²Rank codes: S1 = Extremely rare and critically imperiled in the state; S2 = Very rare and imperiled within the state; S3 = Rare or uncommon; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

³Lake sturgeon and snail darter have not been collected in the Hiwassee River in Bradley or McMinn counties, but are present in the Hiwassee River upstream and downstream of the reach that runs through Bradley and McMinn counties. Presence in the Hiwassee River near the project area is assumed based on their known distribution and life histories.

No federally listed plant species are known from Bradley County. White fringeless orchid, a candidate for federal listing, is known from McMinn County and is typically found in partially shaded, flat, boggy areas at the head of streams or seepage slopes. The flower is showy, with large, white flowers and conspicuous long spurs. This species is a perennial herb that flowers from late July to early September. Spreading false foxglove and Maryland milkwort are state-listed species of special concern reported from areas near the Hiwassee River west of the Wacker project site. Neither these species nor other federally listed or state-listed plant species or their appropriate habitats occur within the study area.

Both the federally listed snail darter and the state-listed lake sturgeon are reported from the main stem Hiwassee River. Either of these species could be present in the Hiwassee River near the study area. Snail darters could be present in the Hiwassee River main stem and the South Mouse Creek embayment for brief periods during larval drift and subsequent upstream migration. Snail darter larvae undergo a period of larval drift when young fish float downstream from spawning areas and then return upstream after they transform to their juvenile stage. Lake sturgeons prefer larger rivers and streams and may reside in or move through areas of the Hiwassee River and the South Mouse Creek embayment adjacent to the study area.

Snail darter and lake sturgeon have not been collected in the Hiwassee River in Bradley or McMinn counties, but are present in the Hiwassee River upstream and downstream of the reach that runs through Bradley and McMinn counties. Presence in the Hiwassee River near the project area is assumed based on their known distribution and life history. However, none of the state-listed or federally listed species discussed above are known to occur in streams that lie within the study area.

The state-listed flame chub has been reported from northern tributaries to the Hiwassee River in McMinn County. Tennessee dace also primarily inhabit headwater areas. However, these species prefer headwater springs and spring-run habitats, and the stream habitat assessments (Atwell 2010c) indicate that no appropriate habitat for these species is present within the study area. Tennessee dace is reported from the South Mouse Creek drainage and could be present in Fillaer Branch near the off-site mitigation area.

Bald eagles, protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, nest at various sites along the Hiwassee River, but all known and monitored nesting sites are several miles northwest of the study area, well out of range for nearby foraging activities. No bald eagle nests were found on or near the study area during field investigations. Furthermore, no suitable habitat for state-listed terrestrial animal species exists within the study area.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, direct, indirect, or cumulative impacts to endangered and threatened species would not occur. The status and conservation of potentially impacted species would continue to be determined by the actions of others. Changes to endangered and threatened species could occur over time as other factors such as air, water, soil quality, and land use and development change in the area.

Action Alternative

Under the Action Alternative, no impacts are expected to endangered and threatened plant species because none are known to occur within or adjacent to the study area. Although a

federal candidate plant species is reported from the adjacent McMinn County and two state-listed species are known from within 5 miles of the study area, habitat to support these species does not occur within the study area. The proposed project would not result in direct, indirect, or cumulative impacts to any federally or state-listed plant species or their habitats.

In the JPN published on July 14, 2010 (see Attachment G), the USACE and TVA indicated that the project would have no effect on any federally listed as endangered and threatened species or their critical habitat. The USFWS, in a letter dated August 13, 2010 (see Attachment H), informed the federal agencies that the requirements of Section 7 of the ESA had been fulfilled. However, the USFWS expressed concerns regarding the discharge of industrial wastewater and storm water into the Hiwassee River and therefore recommended that the resource agencies be allowed to review any plans for the proposed intakes or outfalls before Section 404 or Section 26a Permit approvals are granted. TVA will coordinate any future requests for intake or outfall structures with USFWS.

The Tennessee dace, which is state-listed as threatened, may occur in Fillauer Branch; however, disturbance from in-stream work would be short term, and the planned stream restoration would ultimately benefit aquatic communities in Fillauer Branch. No federally or state-listed aquatic species are present in areas that would be affected by on-site stream and wetland mitigation. No impacts to listed species or aquatic communities (including Tennessee dace) are anticipated as a result of this off-site mitigation project. No major impacts to aquatic resources are expected to occur from implementation of this project. Therefore, the proposed project is expected to have no significant direct, indirect, or cumulative impacts on federally and state-listed aquatic animal species.

Adoption of the Action Alternative would not result in impacts to endangered and threatened terrestrial animals, as none occur in the vicinity of the study area. Although bald eagles may forage along the nearby Hiwassee River, the proposed project is not anticipated to impact bald eagles because the study area is outside of the range where this species is expected to forage. Wetland mitigation proposed by the applicant would result in indirect benefits (due to erosion control) to species that may occur along the Hiwassee River. The proposed project would not result in direct or cumulative impacts to protected or listed terrestrial animal species or their habitats.

Historic and Archaeological Resources

Affected Environment

Bradley County was organized in May 1836, just before the cession of the Ocoee District by the Indians. At that time, it also encompassed all of Polk County and a portion of James County. The Red Clay Historical Area is associated with the removal of the Cherokee Indians and is considered sacred ground. The town of Charleston is significant because it was the home for the Cherokee Agency and the U.S. Agents of Cherokee Affairs. During the Civil War, soldiers from Bradley County fought on both sides. Today, the county has over 190 industries, including the nearby Olin chemical facility and Bowater, a large paper mill plant.

Archaeological resources. TVA considers the archaeological APE to be the 273-acre project site plus 1.67 acres of TVA fee-owned land and stream mitigation area where ground disturbances would occur. The architectural/visual APE was identified as a 0.5-mile area surrounding the archaeological APE. Because the proposed off-site stream mitigation

would not introduce any aboveground visual changes, TVA finds that it would have no effect on any historic viewsheds.

Phase I cultural resource surveys were conducted within portions of the archaeological APE by Weaver and Associates (Sharp and Weaver 2006; Blazier 2008a; 2008b). The archaeological surveys conducted on April 4-6, 2006, August 13-15, 2008, and November 17-23, 2008, identified two previously recorded sites (BY181 and BY182) and three previously unrecorded archaeological sites (BY183, BY197, and BY202) within the archaeological APE.

During the archaeological surveys, Weaver and Associates also revisited previously recorded sites BY181 and BY182. TVA finds BY181 and BY182 ineligible for the NRHP due to lack of intact deposits/integrity and low research potential.

Site BY183 represents an early/mid-19th century historic artifact scatter. It is TVA's finding that site BY183 is not eligible for the NRHP due to lack of intact deposits and low research potential. Site BY197 represents a small prehistoric lithic scatter that TVA finds ineligible for the NRHP.

Site BY202 represents a historic-period barn site. With estimated occupation as mid-19th and 20th centuries, TVA finds BY202 ineligible for the NRHP due to lack of integrity, an inability to associate the site with a person(s) or event of historical significance, and lack of research potential.

Architectural resources. An architectural survey of the visual APE (Karpynek 2010) resulted in the identification of no previously unrecorded architectural resources within the APE. Two previously recorded architectural resources (BY27 and BY488) are located within the visual APE. A portion of BY166 (Trail of Tears) also is located within the visual APE. The NRHP eligibility assessment of BY27 (Wright/Bryant House) was also addressed by the University of Tennessee's survey results (Guyman 2010). Both consultants recommend structure BY27 (Wright/Bryant House) ineligible for inclusion in the NRHP due to modern exterior and interior alterations that have compromised the architectural integrity of the house.

Environmental Consequences

Historic and cultural resources, including archaeological resources, are protected under various federal laws, including the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the NHPA. Section 106 of the NHPA requires federal agencies to consult with the respective SHPO when proposed federal actions could affect these resources.

No Action Alternative

Under the No Action Alternative, there would be no direct, indirect, or cumulative impacts to historic or archaeological resources because there would be no changes to the study area. Changes to cultural resources would likely occur over time as factors such as population increases, changes in land use, and further industrial development occur in the area.

Action Alternative

SHPO consultation. Pursuant to regulations (36 CFR Part 800) implementing Section 106 of the NHPA, TVA consulted with the Tennessee SHPO to assess potential impacts to

historic properties. In a letter dated August 13, 2010 (see Attachment H), TVA sought concurrence from the SHPO with TVA's findings and recommendations that no archaeological resources would be affected.

In the letter to the SHPO, TVA indicated architectural surveys of the visual APE were completed by TRC and the University of Tennessee Archaeological Research Laboratory. Both consultants recommended the historic structure BY27 (Wright/Bryant House) ineligible for listing in the NRHP due to modern exterior and interior alterations that have compromised the architectural integrity of the house. TVA concurred with these findings and recommended that BY166 (Trail of Tears) would not be adversely affected, while the historic property BY27 was ineligible for listing in the NRHP.

In a response letter dated August 26, 2010 (see Attachment H), the SHPO did not concur with this determination and stated that the historic property BY27 is eligible for listing in the NRHP and that the project as currently proposed may adversely affect this property. TVA reinitiated consultation with the SHPO, and the SHPO recommended conditions that would reduce visual impacts to BY27 (Wright/Bryant House). After further consultation, in a letter dated September 23, 2010 (see Attachment H), the SHPO stated that TVA's proposed undertaking to approve land use and Section 26a requests will not adversely affect any historic property eligible for listing in the NRHP, including the Wright/Bryant House, as long as the following conditions are met:

- The conditions recommended by the SHPO would be included as formal conditions of the Section 26a Permit and would be made a part of that permit.
- TVA is to ensure that the formal permit conditions are met within the timeframe allocated in the conditions.

As recommended by the SHPO, the following formal conditions would be included as part of the Section 26a Permit.

- Condition One:
The applicant shall not alter the exterior of Historic Architectural Property BY27 (Wright/Bryant House) in any manner for five years except as necessary to comply with American Disabilities Act (ADA) and other applicable laws, and to repair damage to the building, and then only with the development of a design plan and in-kind materials. A design plan shall comply with the Secretary of the Interior's Standards for Rehabilitation (see Attachment K) and will be submitted to TVA and the SHPO for approval before beginning any alterations. Alterations to the interior of the structure (other than removal of load bearing walls) may be completed without consultation if the alterations will have no effect to the exterior of the historic property.
- Condition Two:
Within three calendar months of the issuance of the TVA 26a Permit, the applicant shall submit a Vegetative Screening Plan (designed by a landscape architect) to TVA and the SHPO for review and approval. The Plan would screen the southern boundary (see Attachment L) of the planned facility from the view of BY27, and would involve planting (including replanting and maintenance as needed) a visual screen of mature native plant species along the southern boundary of the facility and infrastructure site for approximately 700 feet (a 60 degree viewshed from

BY27). When implemented, the effect of this vegetative screening would be sufficient to obscure the view of the planned manufacturing facility from BY27

- Condition Three:

Within three calendar months of the issuance of the TVA 26a Permit, the applicant shall submit a Vegetative Screening Plan to be implemented along the northern boundary of BY27 to TVA and the SHPO for review and approval. The Plan would be designed by a Historic Landscape Architect to complement the existing landscape setting of BY27 (including replanting and maintenance as needed).

Tribal consultation. Pursuant to 36 CFR §§ 800.2 (c)(2)(ii), 800.3 (f)(2), and 800.4 (a)(4)(b), TVA also consulted with the following federally recognized Indian tribes: Cherokee Nation, Chickasaw Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, Muscogee (Creek) Nation of Oklahoma, Alabama-Quassarte Tribal Town, Kialegee Tribal Town, Thlopthlocco Tribal Town, Seminole Tribe of Florida, Absentee Shawnee Tribe of Oklahoma, and the Eastern Shawnee Tribe of Oklahoma regarding historic properties within the proposed project's APE that may be of religious and cultural significance to them and eligible for listing in the NRHP. TVA received comments from the Seminole Tribe of Florida Tribal Historic Preservation Officer and the United Keetoowah Band of Cherokee Indians that there would be no effect to religious or cultural properties for their respective tribes (see Attachment H). Based on TVA's analysis and tribal concurrence, TVA has concluded that construction and operation of the proposed manufacturing facility and planned mitigation areas would not adversely affect historic properties listed in or eligible for listing in the NRHP.

Visual Resources

Affected Environment

Visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape through the course of human alteration (scenic integrity). Views of a landscape are described in terms of what is seen in foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished in the landscape. In the middleground, normally between 1 mile and 4 miles from the observer, objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used. The general landscape character of the study area is described in this section.

The project site is situated in an area that ranges from industrial development to the south to agricultural lands in all other directions. The area is sparsely populated. The 273-acre parcel is mainly open field interspersed with areas of second- and third-growth hardwoods and evergreen trees throughout the site. The topography of the site is slightly rolling with some flat areas. There are few homes in the area with foreground views of the site, but as previously mentioned, the site would be visible from the Wright/Bryant House. There may be some views of the site from middleground distances along the higher ridgelines to the south and along minor roads to the east and west. Additionally, a portion of the Trail of Tears follows along Lower River Road to the north.

A variety of small agricultural ponds and wetland areas throughout the site offer visual contrast to the surrounding landscape, and wet-weather conveyances are found throughout the site. There are several standing structures on the site including a small block building and a two-story brick residence situated at the approximate center of the site. In this area, scenic attractiveness is common, and scenic integrity is moderate.

As previously mentioned, the proposed facility would include an administrative office building and several other structures for manufacturing, support processes, and warehousing. The administrative office building would be 50,700 square feet with an interior ceiling height of approximately 25 feet. Exterior heights may approach 60 feet. The two tallest structures would be used for purification distillation and separation distillation and would be 160 feet and 150 feet tall, respectively. There would be five other structures that are over 100 feet tall, including a scrubber unit (110 feet tall), and other operational structures ranging from 110 feet in height to 130 feet. The largest structure is a 140,000-square-foot warehouse (400 feet by 350 feet and 50 feet in height).

The off-site stream mitigation area is in the city of Cleveland to the south of the subject project site. The stream mitigation area is located north of Cleveland's historic district near Lee University. The area is predominately residential and can be seen in the foreground by area residents and motorists along local, minor roads. The stream mitigation area has been previously disturbed and is mainly open flat land. Here, scenic attractiveness is minimal, and scenic integrity is low.

Environmental Consequences

Visual consequences were examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the general public, their viewing distances, and the likely visibility of planned changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The foreground, middleground, and background viewing distances were previously described in the Affected Environment section.

No Action Alternative

Under the No Action Alternative, the applicant would not construct the proposed facility at this time, and there would be no direct, indirect, or cumulative impacts to visual resources. Visual resources would not be affected, but the scenic quality of the area would eventually change over time as other factors such as population growth, land use such as other industrial development, and cultural and ecological interests in the area change.

Action Alternative

Under the Action Alternative, there would be a visual change of the project site as a result of development. The landscape character would change from open agriculture land to industrial. The site would be graded, and landforms would change. New buildings and other structures would introduce broadly horizontal elements into the landscape. New roadways, parking facilities, and area lighting would contrast with the natural forms seen in the landscape now. However, these new elements would be visually similar to the nearby and adjacent industrial elements seen in the landscape now. Thus, direct visual impacts would be insignificant.

As previously mentioned, TVA's proposed undertaking to approve land use and Section 26a requests will not adversely affect any historic property eligible for listing in the NRHP, including the Wright/Bryant House, as long as the conditions forth by the SHPO involving restrictions on building modification and the development of vegetative buffers set are met. The portion of the Trail of Tears following along Lower River Road to the north has already been affected by existing industrial development to the south. Additional development for the applicant's project site would add to the number of discordantly contrasting elements seen in the landscape from the Trail of Tears. However, the visual impacts would not be significant because new elements would be similar to the nearby industrial elements currently seen in the landscape.

The visual change in the off-site stream mitigation area would be minor for area residents and motorists along local roads. The mitigation area has been previously disturbed, and the planned stream improvements would result in minor visual benefits to the area.

Construction and operation activities at the project site and the mitigation area would be visually insignificant with the implementation of the planned on-site and off-site mitigation measures. There may be some minor visual discord during the construction and subsequent maintenance periods at each site due to an increase in personnel and equipment and the use of laydown and materials storage areas. These visual obtrusions would be temporary until the mitigation areas have been restored (Atwell 2010c). Therefore, significant direct and indirect visual impacts are not anticipated because of this project, and cumulative impacts are expected to be minor.

Socioeconomics and Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In the course of assessments under NEPA, TVA evaluates the impact of its actions on minority and low-income populations.

Affected Environment

The proposed manufacturing facility site is located in Bradley County, Tennessee, near Interstate 75, and a short distance south of the McMinn County line. Bradley County's population has increased 11.1 percent to 97,710 from April 1, 2000, to July 1, 2009, and is currently projected to continue to increase (United States Census Bureau 2010). The project site is in Census Tract 112.01, Block Group 1. The project area wherein the facility would be located is adjacent to the Hiwassee River Industrial Park and is sparsely populated. As of the 2000 United States Census, total population in this tract was 5,257, and the total population of Block Group 1 was 56 (Table 4). None of the populated areas in Block Group 1 are near the proposed project site.

Table 4. Population in Vicinity of the Proposed Wacker Chemie Facility, 2000

Area	Population, 2000
Bradley County, Tennessee	87,965
Census Tract 112.01	5,257
Block Group 1, Census Tract 112.01	1,409
Block 1016	0
Block 1023	37
Block 1024	10
Block 1025	3
Block 1026	6
Block 1027	0
Block 1028	0
Block 1029	0

Source: U.S. Census of Population 2000 (<http://factfinder.census.gov/home/saff/main.html?lang=en>)

Bradley County's unemployment rate of 9.1 percent in November 2009 was lower than the statewide rate of 10.9 percent (<http://bradleytest.bradleyco.net/default.aspx>). The economy of Bradley County is more dependent on manufacturing than the state and the national economies, as of 2008 (<http://www.bea.gov/regional/reis/>). In Bradley County, 18.9 percent of jobs are in manufacturing; statewide, the average is 10.0 percent, and nationally, 7.8 percent. Farming accounts for 2.1 percent of jobs in the county, similar to the state average of 2.2 percent and higher than the national average of 1.5 percent. Per capita personal income in Bradley County in 2008 was \$30,464. This is 75.8 percent of the national average income of \$40,166 and 87.5 percent of the state average income of \$34,833.

In Block Group 1, minorities make up 18.6 percent of the total population (United States Census Bureau 2000). However, according to the 2000 Census, none of these minorities live in the immediate area of the planned facility site, which is located in or near Blocks 1016, 1023, 1024, 1025, 1026, 1028, and 1029. Poverty levels are relatively low in the area (United States Census Bureau 2000), with only 9.3 percent of the population below the poverty level in Block Group 1 and 6.4 percent in Census Tract 112.01. Poverty data are not available for individual blocks. In comparison, the poverty level in Tennessee and the nation were 13.5 and 12.4 percent, respectively.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed manufacturing facility would not be built, and there would be no improvements in the existing socioeconomic conditions. There would be no potential for economic stimulus from the proposed project, and there would be no project-related change in the existing conditions relative to minority and low-income populations. Furthermore, the socioeconomics of the area would eventually change over time as other factors such as population growth, land use such as other industrial development, and cultural and ecological interests in the area change.

Action Alternative

Adoption of the Action Alternative would result in the construction and operation of the planned manufacturing facility and associated wetland and stream mitigation activities. Wacker's initial investment is expected to bring hundreds of jobs to the region. The creation of 500 construction jobs would result in a minor improvement to the socioeconomics of the area; however, impacts would be temporary and would diminish upon completion of facility construction. The new manufacturing facility would result in

positive direct and indirect effects through the addition of 500 technical jobs in the region. These jobs would, in turn, increase income and spending in the county and the region. Some local business and local government revenues would be generated through purchases and sales tax proceeds from employee spending, and sales tax proceeds from purchases of equipment and services are anticipated. However, effects from these additional revenues are not expected to be significant. The proposed manufacturing facility is not expected to have negative effects on property values in the area because the area is sparsely populated. No significant impacts to socioeconomics in the area are anticipated. There would likely be beneficial cumulative effects in the region due to the creation of jobs and anticipated tax revenues, but the impacts are not expected to be significant to the region.

The proposed development would be located within an area already designated for industrial use. Overall, poverty levels in the vicinity of the proposed manufacturing facility are lower than the surrounding areas, and minority population levels are low compared to state and national levels. No concentrations of minority or low-income populations have been identified near the proposed project area, and population in the area is generally dispersed. No direct, indirect, or cumulative social, economic, or health and safety impacts to persons living in the area are anticipated. Therefore, no disproportionate impacts to disadvantaged populations are expected to occur due to implementation of the Action Alternative.

Cumulative and Indirect Impacts

A cumulative impact includes the total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of Federal, non-Federal, public, and private entities. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Cumulative effects of adopting the Action Alternative would be limited to communities surrounding the study area within Bradley County. As stated above, adoption of the Action Alternative would result in minor adverse effects to vegetation and wildlife, groundwater, and threatened, endangered, or special status species and minor beneficial socioeconomic effects. Some cumulative effects to wetlands, floodplains, navigation, aquatic ecology, and surface water quality would likely occur as a result of the planned mitigation activities.

As Bradley County grows, more industrial development is likely to occur near the Hiwassee River Industrial Park, and slight increases to the socioeconomics of the region would be anticipated. The short-term creation of 500 construction jobs and long-term creation of 500 new industrial jobs would generate additional local business and local government revenues as a result of purchases and sales tax proceeds from new employee spending and sales tax proceeds from purchases of equipment and services. However, the beneficial cumulative impacts from these additional revenues are not expected to be regionally significant.

Cumulative impacts analysis of wetlands took into account wetland loss and conversion at a watershed-level scale, in this case the Hiwassee River watershed. There would be some slight temporary loss of wetland function from the time that wetlands are filled during facility construction and when the wetland mitigation sites are developed. The increase in habitat complexity associated with the planned wetland mitigation areas would offset this minor loss and would result in a minor overall increase in wetland acreage and quality within the watershed. As a result, cumulative impacts to wetlands would be minor and beneficial.

The planned creation of the on-site wetland in the 100-year floodplain would result in ongoing effects on floodplain function benefits due to the increase of about 71.5 acre-feet of flood control storage. However, this additional storage is a negligible amount when compared to available reservoir floodplain flood storage. Therefore, floodplain cumulative impacts would be beneficial but minor. The planned restoration of Fillauer Branch would ultimately result in cumulative beneficial effects to aquatic communities. The ongoing reduction of downstream erosion and siltation combined with the use of the TSMP would result in a minor net improvement of aquatic resources in the state of Tennessee. However, at a watershed-level scale, these beneficial cumulative impacts would not be significant.

There would be minor indirect effects to environmental resources associated with the construction and operation of the proposed transmission lines to serve the Wacker facility. As indicated, the transmission line route is still under development. TVA will conduct an environmental review under NEPA and other applicable statutes when the information regarding the design and location of the transmission line is available. Resources that would be indirectly affected by any future transmission line construction would include vegetation, wildlife, streams, visual resources, and noise. Environmental effects resulting from the construction, operation and maintenance of the proposed transmission line are expected to include the loss of and conversion of forested habitat to early successional and edge habitat and increased fragmentation of remaining adjacent forests within the proposed transmission line project area. This change would benefit early successional species and species that tolerate disturbance well. The loss of forested habitat in the proposed transmission line project area and further fragmentation of adjacent forested areas would impact species favoring forested habitats while benefiting other species.

Streams along the right-of-way would be spanned; transmission line construction and maintenance activities mainly would affect riparian conditions and in-stream habitat. Potential impacts from the removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Other potential construction and maintenance impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams. TVA would employ best management practices to minimize these potential impacts. Further, measures and standards prescribed in any Section 404 and NPDES permits necessary for riparian and aquatic activities would also minimize the impacts.

Short term changes to the visual character would occur within the local area during construction due to equipment and ground-disturbing activities, and later during the periodic removal of vegetation from the right-of-way. Long-term changes to the visual character would include the converted forested areas to right-of-way including the addition of metal structures and conductors. There would also be temporary localized increases in noise during construction and subsequent right-of-way maintenance activities. TVA considers these resources during the planning process and TVA would implement mitigation measures to reduce any adverse effects to affected environmental resources. Indirect effects are expected to be minor and insignificant.

Mitigation and Permit Conditions

TVA is to ensure that the following conditions recommended by the SHPO would be included as formal conditions of the Section 26a Permit within the timeframe allocated in the conditions. If these conditions are not met, the 26a Permit would be revoked.

- Condition One:
The applicant shall not alter Historic Architectural Property BY27 (Wright/Bryant House) in any manner for five years except as necessary to comply with American Disabilities Act (ADA) and other applicable laws, and to repair damage to the building, and then only with the development of a design plan and in-kind materials. A design plan shall comply with the Secretary of the Interior's Standards for Rehabilitation (see Attachment K) and will be submitted to TVA and the SHPO for comments prior to alterations. Alterations to the interior of the structure (other than removal of load bearing walls) may be completed without consultation if the alterations will have no effect to the exterior of the historic property.
- Condition Two:
Within three calendar months of the issuance of the TVA 26a Permit, the applicant shall submit a Vegetative Screening Plan (designed by a landscape architect) to TVA and the SHPO for review and approval. This Plan would serve to screen the southern boundary of the planned Wacker Chemie site and infrastructure from the view of BY27, and would require planting (replanting and maintenance as needed) a visual screen of mature native species along the southern boundary of the facility site for approximately 700 feet (a 60 degree viewshed from BY27). When implemented, the effect of this vegetative screening would be sufficient to obscure the view of the planned facility site and infrastructure from BY27.
- Condition Three:
Within three calendar months of the issuance of the TVA 26a Permit, the applicant shall submit a Vegetative Screening Plan to be implemented along the northern boundary of BY27 to TVA and the SHPO for review and approval. The Plan would be designed by a Historic Landscape Architect, and would complement the existing landscape setting of BY27 (replanting and maintenance as needed).

Implementation of the planned stream and wetland mitigation measures previously described in the EA will adequately minimize other potential environmental effects associated with the construction and operation of the proposed manufacturing facility. No further nonroutine environmental commitments or mitigation measures have been identified by TVA and USACE to reduce potential environmental effects. However, to ensure that the proposed development would not adversely impact floodplains and flood control, TVA would include the following standard conditions in the 26a Permit and any land transfer agreement(s):

- For purposes of shoreline bank stabilization, all stabilization materials shall be constructed or placed, on average, no more than 2 feet from the existing shoreline at normal summer pool elevation.
- The applicant shall grant TVA flowage easement rights along the created wetland areas consistent with those existing along the current shoreline in this area.
- Any future facilities or equipment subject to flood damage is to be located above elevation 698.6 feet above msl.
- Any future development proposed within the limits of the 100-year floodplain, elevation 694.1 feet above msl, shall be consistent with the requirements of EO 11988.

- All future development shall be consistent with the requirements of the TVA Flood Control Storage Loss Guideline.

Preferred Alternative

TVA's preferred alternative is the Action Alternative. Under the Action Alternative, TVA would issue land use and Section 26a approvals, and the USACE would issue Section 404 Permit approval for the applicant's proposed actions. The applicant would construct and operate the planned facility. Potential impacts to wetlands, streams, and floodplains would be mitigated by the applicant through on-site and off-site mitigation and through purchase of credits from the TSMP.

List of Contributors and Preparers

TVA Contributors

John T. Baxter, Aquatic Endangered Species Specialist
Aquatic Ecology and Threatened and Endangered Aquatic Animals

Kelly R. Baxter, NEPA Specialist
NEPA Compliance and Document Preparation

Patricia B. Cox, Botanist Specialist
Vegetation and Threatened and Endangered Plants

James H. Eblen, Contract Economist
Socioeconomics and Environmental Justice

Michaelyn S. Harle, Contract Archaeologist
Historic Properties and Archaeological Resources

T. Hill Henry, Wildlife Biologist Specialist
Wildlife and Threatened and Endangered Terrestrial Animals

John M. Higgins, Water Quality Specialist
Surface Water Quality

Roger A. Milstead, Flood Risk Program Manager
Floodplains

W. Chett Peebles, Landscape Architect
Visual Resources

Kim Pilarski, Senior Wetlands Biologist
Wetlands

Erin E. Pritchard, Archaeological Specialist
Historic Properties and Archaeological Resources

Jan K. Thomas, Contract Natural Areas Specialist
Natural Areas

Richard W. Yarnell, Archaeologist
Historic Properties

Other Contributors

The environmental engineering consulting firm of Atwell LLC is responsible for the preparation of the following documents containing information used in this EA: application for Section 404 and Section 401 of the CWA authorization, draft mitigation plan report, and SWPPP.

Atwell LLC
658 Grassmere Park Drive, Suite 103
Nashville, Tennessee 37211

Agencies and Others Consulted

Absentee Shawnee Tribe of Oklahoma
Alabama-Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Cherokee Nation
Chickasaw Nation
City of Cleveland, Tennessee
Eastern Band of Cherokee Indians, North Carolina
Eastern Shawnee Tribe of Oklahoma
Kialegee Tribal Town, Oklahoma
Muscogee (Creek) Nation of Oklahoma
Seminole Tribe of Florida
Shawnee Tribe, Oklahoma
Tennessee Department of Environment and Conservation
Tennessee State Historic Preservation Officer
Thlopthlocco Tribal Town, Oklahoma
United Keetoowah Band of Cherokee Indians in Oklahoma
United States Army Corps of Engineers
United States Fish and Wildlife Service

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Attachments

- A. Project Vicinity Map
- B. Wetland and Stream Mitigation Areas and Storm Water Outfalls
- C. Drawing of TVA Landrights by Elevation
- D. Details of Planned Mitigation Activities From the Draft Mitigation Plan Report
- E. Planned Elements of Erosion Prevention and Sediment Control Plans From the Applicant's Storm Water Pollution Prevention Plan
- F. Conceptual Plans of the Proposed Manufacturing Facility
- G. Public Notices
- H. Agency Correspondence
- I. Proposed TVA Land Use and Section 26a Actions and Impact Area Map
- J. United States Environmental Protection Agency List of Toxic Pollutants and Hazardous Substances From National Pollutant Discharge Elimination System Permit Application
- K. The Secretary of the Interior's Standards for Rehabilitation
- L. Estimated Wacker Property Boundaries

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