

## **Appendix A – Correspondence**

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STATE OF ALABAMA  
ALABAMA HISTORICAL COMMISSION  
468 SOUTH PERRY STREET  
MONTGOMERY, ALABAMA 36130-0900

COLONEL (RET.) JOHN A. NEUBAUER  
EXECUTIVE DIRECTOR

September 12, 2007

TEL: 334-242-3184  
FAX: 334-240-3477

Thomas O. Maher, Ph.D.  
TVA  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902-1499

Re: AHC 07-1229  
Cultural Resource Assessment  
161 Kv Reese Ferry Transmission Line  
Jackson County, Alabama

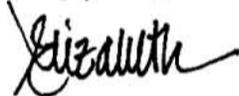
Dear ~~Dr. Maher:~~ **Tom:**

Upon review of the cultural resource assessment conducted by TRC, we have determined that project activities will have no adverse effect on cultural resources eligible for or listed on the National Register of Historic Places. Therefore, we concur with the proposed project activities.

However, should artifacts or archaeological features be encountered during project activities, work shall cease and our office shall be consulted immediately. Artifacts are objects made, used or modified by humans. These include but are not limited to arrowheads, broken pieces of pottery or glass, stone implements, metal fasteners or tools, etc. Archaeological features are stains in the soil that indicate disturbance by human activity. Some examples are postholes, building foundations, trash pits and even human burials. This stipulation shall be placed on the construction plans to insure contractors are aware of it.

We appreciate your efforts on this project. Should you have any questions, my point of contact for this matter is Greg Rhinehart at (334) 230-2662. Please have the AHC tracking number referenced above available and include it with any correspondence.

Truly yours,



Elizabeth Ann Brown  
Deputy State Historic Preservation Officer

EAB/SME/GCR/gcr

Bridgeport, Alabama, Power Supply Upgrade



STATE OF ALABAMA  
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES  
64 NORTH UNION STREET  
MONTGOMERY, AL 36130

BOB RILEY  
GOVERNOR

M. BARNETT LAWLEY  
COMMISSIONER

HOBBIE SEALY  
ASSISTANT COMMISSIONER

JAMES GRIGGS, DIRECTOR  
GREGORY M. LEIN, ASSISTANT DIRECTOR  
STATE LANDS DIVISION

TELEPHONE (334) 242-3484  
FAX NO (334) 242-0989

October 16<sup>th</sup>, 2007

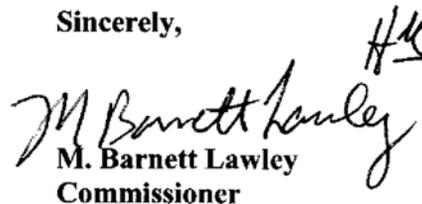
**Todd C. Liskey**  
**Siting and Environmental Design**  
**Transmission Line Projects**  
**Tennessee Valley Authority**  
**MR 4G**  
**1101 Market Street**  
**Chattanooga, Tennessee 37402-2801**

**Re: REESE FERRY 161-KV TRANSMISSION LINE PROJECT**  
**Jackson County, Alabama**

**Dear Mr. Liskey:**

**The Department of Conservation and Natural Resources has reviewed the proposal to construct a new transmission line in Jackson County. We have no objection to the project as proposed, provided that the activity has no adverse impact on state or federally listing species. If the proposed activity impacts protected species, further consultation with the Division of Wildlife and Freshwater Fisheries and with the U.S. Fish and Wildlife Service will be required.**

Sincerely,

  
M. Barnett Lawley  
Commissioner

**cc: Wildlife and Freshwater Fisheries**

The Department of Conservation and Natural Resources does not discriminate on the basis of race, color, religion, age, gender, national origin, or disability in its hiring or employment practices nor in admission to, access to, or operations of its programs, services or activities.





Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

Todd C. Liskey  
Siting and Environmental Design  
Transmission Line Projects  
Tennessee Valley Authority  
1101 Market Street (MR 4G)  
Chattanooga, Tennessee 37402-2801  
Phone 423-751-7631

Dear Mr. Liskey:

REESE FERRY 161-KV TRANSMISSION LINE PROJECT

This is in reference to TVA's request for review that was mailed to me on October 3, 2007.

The project as described by the project summary creates no incompatibility in our area of planning at this time.

Curtis W. Lowe  
Signature

District Manager  
Title

ALDOT  
Agency

3417 AL HWY 71  
Address

DUTTON, AL. 35744



**DEPARTMENT OF THE ARMY**  
**NASHVILLE DISTRICT, CORPS OF ENGINEERS**  
3701 Bell Road  
**NASHVILLE, TENNESSEE 37214**

January 7, 2008

REPLY TO  
ATTENTION OF:

Regulatory Branch

SUBJECT: File No. 200800049; Proposed Utility Line Crossing a Wetland Adjacent to Irondale Branch, Jackson County, Alabama

Mr. Todd Liskey  
Tennessee Valley Authority  
1101 Market Street  
Chattanooga, TN 37402

Dear Mr. Liskey:

This is in regard to the application for a Department of the Army (DA) permit for the proposed utility line crossing. The project has been assigned File No. 200800049.

Based upon the information submitted to this office, to the extent the U.S. Army Corps of Engineers has jurisdiction over discharge of dredged or fill material associated with the work, we have determined that the work has been previously permitted under authority of DA Nationwide Permit (NWP) #12, which became effective March 19, 2007. The proposed work must be constructed in accordance with the enclosed plans and Conditions.

It should be noted that if you fail to comply with any of the conditions, this authorization may be modified, suspended, or revoked and an individual permit may be required pursuant to 33 CFR 330.5(d).

The notification that the work is approved under the Nationwide Permit mentioned above is valid until two years from date of letter unless the NWP is modified, suspended, or revoked. If the work has not been completed by that time, you should contact this office to obtain verification that the permit is still valid.

The State of Alabama Department of Environmental Management (ADEM) issued a conditional 401 water quality certification for the NWP. Consequently, the proposed work must also be constructed in accordance with the enclosed 401 certification dated May 30, 2007.

-2-

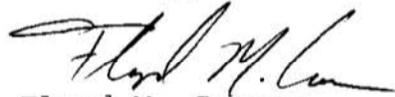
Before you begin construction, you may also need to obtain approval from the Tennessee Valley Authority.

You are also responsible for obtaining any other federal, state, and/or local permits, approvals, or authorizations.

If changes in the location or plans of the work are necessary, revised plans should be submitted promptly to this office. No deviation should be made in the approved plans without first obtaining approval from this office.

If you have any questions, please contact me at the above address or telephone 369-7512.

Sincerely,



Floyd M. Carnes  
Regulatory Specialist  
Operations Division

Enclosures

Copy Furnished:

TVA Guntersville  
3696 Alabama Highway 69  
Guntersville, AL 35976

Alabama Department of  
Environmental Management  
PO Box 301463  
Montgomery, AL 36130



US Army Corps  
of Engineers.

Nashville District

# Nationwide Permit

## No. 12, Utility Line Activities

Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2 acre of waters of the United States.:

(i) **Utility lines:** This NWP authorizes the construction, maintenance, or repair of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for the utility lines, in all waters of the United States, provided there is no change in pre-construction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area. Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

(ii) **Utility line substations:** This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2 acre of waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

(iii) **Foundations for overhead utility line towers, poles, and anchors:** This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

(iv) **Access roads:** This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the United States, provided the total discharge from a single and complete project does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (See 33 CFR Part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP also authorizes temporary structures, fills, and work necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

**Notification:** The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met: (1) the activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (i.e., water of the United States), and it runs parallel to a stream bed that is within that jurisdictional area; (5) discharges that result in the loss of greater than 1/10-acre of waters of the United States; (6) permanent access roads are constructed above grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. (Sections 10 and 404)

**Note 1:** Where the proposed utility line is constructed or installed in navigable waters of the United States (i.e., section 10 waters), copies of the pre-construction notification and NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

**Note 2:** Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, accordance with the requirements for temporary fills.

**Note 3:** Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to Section 9 of the Rivers and Harbors Act of 1899. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).



**US Army Corps  
of Engineers,  
Nashville District**

# Nationwide Permit Conditions

The following General Conditions must be followed in order for any authorization by NWP to be valid:

1. **Navigation.** (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the US Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the US. (c) The permittee understands and agrees that, if future operations by the US require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the US. No claim shall be made against the US on account of any such removal or alteration.
2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.
3. **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
4. **Migratory Bird Breeding Areas.** Activities in waters of the US that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
5. **Shellfish Beds.** No activity may occur in areas of concentrated shellfish populations, unless the activity is related to a shellfish harvesting activity authorized by NWP 4 and 48.
6. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
7. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.
8. **Adverse Effects from Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. **Management of Water Flows.** To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g. stream restoration or relocation activities).
10. **Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.
11. **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
12. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permitttees are encouraged to perform work within waters of the US during periods of low-flow or no-flow.
13. **Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations and revegetated, as appropriate.
14. **Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.
15. **Wild and Scenic Rivers.** No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, US Forest Service, US Fish and Wildlife Service).
16. **Tribal Rights.** No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.
17. **Endangered Species.** (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-

federal permittees shall notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS, the District Engineer may add species-specific regional endangered species conditions to the NWP.

(p) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their World Wide Webpages at <http://www.fws.gov/> and <http://www.noaa.gov/fisheries.htm> respectively.

18. Historic Properties. No activity which may affect historic properties listed or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Prospective permittees should beware that section 110k of the NHPA (15 USC 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur.

19. Designated Critical Resource Waters. Critical resource waters including state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment. (a) Discharges of dredged or fill material into waters of the US are not authorized by NWP 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. (b) For NWP 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

20. Mitigation. The activity must be constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the US to the maximum extent practicable at the project site (i.e. on site). Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

21. Water Quality Certification. The activity must comply with case specific conditions added by the Corps or by the state, Indian Tribe, or USEPA in its section 401 Water Quality Certification. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

22. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal water is constructed under NWP14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1 3-acre.

23. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with NWP verification, the permittee may transfer the NWP verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the NWP verification must be attached to the letter, and the letter must contain the following statement: When the structures or work authorized by this NWP are still in existence at the time the property is transferred, the terms and conditions of this NWP, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below:

Transferee	Date
------------	------

24. Compliance Certification. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification form is included with this verification.

25. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

Further information:

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

# ADEM



## ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

POST OFFICE BOX 301463 36130-1463 • 1400 COLUMBUS BLVD. 36110-2059

MONTGOMERY, ALABAMA

WWW.ADEM.STATE.AL.US

(334) 271-7700

ONIS "TROY" GLENN, III, P.E.  
DIRECTOR

BOB RILEY  
GOVERNOR

Facsimiles: (334)

Administration: 271-7950  
General Counsel: 394-4332  
Communication: 394-4363  
Air: 279-3044  
Land: 279-3050  
Water: 279-3051  
Groundwater: 279-8831  
Field Operations: 272-8131  
Laboratory: 277-6718  
Mining: 394-4326

May 30, 2007

COL. PETER F. TAYLOR, JR.  
DISTRICT ENGINEER  
MOBILE DISTRICT  
US ARMY CORPS OF ENGINEERS  
PO BOX 2288  
MOBILE AL 36628-0001

LT. COL. STEVEN J. ROEMHILDT  
DISTRICT ENGINEER  
NASHVILLE DISTRICT  
US ARMY CORPS OF ENGINEERS  
PO BOX 1070  
NASHVILLE TN 37202-1070

RE: Clean Water Act (CWA) Section 401 Water Quality Certification (WQC)  
March 7, 2007, Federal Register, Vol. 72, No. 47, Pages 11092 – 11198  
US Army Corps of Engineers (COE) Nationwide Permits (NWP) And General Conditions For  
Alabama

Dear Sirs:

This office has completed a review of the above-referenced joint public notice listed, and all associated materials submitted related to the proposed COE NWP for Alabama. Comments made during the public notice period have also been forwarded to us for review. Please be advised that ADEM is providing to the COE additional conditions regarding Coastal Consistency Review by separate correspondence.

Because action pertinent to WQC is required by Section 401(a)(1) of the CWA, 33 U.S.C. Section 1251, et seq., we hereby issue certification, for a period not to exceed **five (5) years** from the date of issuance, that there is reasonable assurance that the discharge resulting from the proposed activities as submitted will not violate applicable water quality standards established under Section 303 of the CWA and Title 22, Section 22-22-9(g), Code of Alabama, 1975, provided the applicant acts in accordance with the following conditions as specified. We further certify that there are no applicable effluent limitations under Section 301 and 302 nor applicable standards under Section 306 and 307 of the CWA in regard to the activities specified.

To minimize adverse impacts to State waters, by copy of this letter we are requesting the COE to incorporate the following as special conditions appropriate to each activity in Alabama authorized by the COE NWP:

1. The applicant shall obtain ADEM concurrence relative to consistency with the State's Coastal Zone Management Program (CZMP) for projects located wholly or partially within the defined coastal area of Alabama, as defined by ADEM Admin. Code R. 335-8-1-.02 (k), prior to commencing activities authorized by the COE NWP. In addition, during project implementation, the applicant shall ensure compliance with applicable requirements of ADEM Admin. Code Div. 335-8 and any CZMP conditions to the COE NWP.

Birmingham Branch  
110 Vulcan Road  
Birmingham, Alabama 35209-1702  
(205) 842-6168  
(207) 941-1003 (Fax)

Decatur Branch  
2715 Sandlin Road, S.W.  
Decatur, Alabama 35603-1333  
(256) 393-1713  
(256) 340-9359 (Fax)

Mobile Branch  
2204 Perimeter Road  
Mobile, Alabama 36615-1131  
(251) 430-3400  
(251) 479-2983 (Fax)

Mobile - Coastal  
4171 Commanders Drive  
Mobile, Alabama 36615-1421  
(251) 432-8539  
(251) 432-8598 (Fax)



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2. During project implementation, the applicant/owner/operator shall ensure compliance with applicable requirements of ADEM. Admin. Code Chapter 335-6-6 (National Pollutant Discharge Elimination System), Chapter 335-6-10 (Water Quality Criteria), and Chapter 335-6-11 (Water Use Classifications for Interstate and Intrastate Waters).
3. Pursuant to EPA rules and ADEM Admin. Code Ch. 335-6-12, the operator/owner or applicant is required to register for and maintain valid National Pollutant Discharge Elimination System (NPDES) coverage for stormwater discharges prior to beginning construction or land disturbance (1) above the Ordinary High Water Mark, (2) for any non-dredge/fill operations below the Ordinary High Water Mark, (3) construction of associated upland dredge disposal sites that will equal or exceed one (1) acre in size, and/or (4) recovery, removal, re-mining, processing, etc. of material from disposal areas or other sites/areas regardless of size. The regulations also require NPDES registration for disturbance activities less than one (1) acre that are part of, adjacent to, or associated with a larger common plan of development or sale, that may eventually equal or exceed one (1) acre, or if less than one (1) acre in size if stormwater discharges have reasonable potential to be a significant contributor of pollutants to a water of the State or have reasonable potential to cause or contribute to a violation of applicable Alabama water quality standards as determined by ADEM. The regulated construction disturbance also includes, but is not limited to, associated areas utilized for support activities such as vehicle parking, equipment or supply storage areas, staging areas, disposal areas, material stockpiles, temporary office areas, and access roads, and pre-construction activities performed in advance or in support of construction such as logging, clearing, and dewatering. Please be advised that a registrant, operator/owner, contractor, or other responsible entity, separately or collectively, must retain NPDES registration coverage for phased developments until all disturbance activity, including phased construction, is complete. Information regarding registration under ADEM Admin. Code Ch. 335-6-12 for discharge of treated stormwater from regulated construction, construction materials management, small non-metallic, noncoal mining, processing and related activity can be viewed/downloaded from the ADEM webpage at [www.adem.state.al.us/FieldOps/Permitting/Construction/Construction.htm](http://www.adem.state.al.us/FieldOps/Permitting/Construction/Construction.htm)
4. All terms, conditions, and requirements of any NPDES permit in effect at the facility must be followed and maintained. Failure to comply with applicable NPDES rules and/or permit coverage may constitute a violation of this certification.
5. Valid NPDES individual or general permit coverage for stormwater discharges resulting from the operation of a service dock, commercial/private marina, transportation/transloading facility, port/docks facility, landfills, or industrial/manufacturing facilities may be required. If you have any questions regarding the requirement for NPDES permit coverage, please contact ADEM's Water Division, Industrial Section at (334) 271-7700.
6. Valid NPDES permit coverage for stormwater discharges is required prior to commencement of operation of a coal, aggregate, crushed stone, chert, dirt, or other ore, mineral, or material mining/borrow, transloading, storage, screening, or barge loading facility. If you have any questions regarding the need for stormwater permit coverage or would like to request application forms/information, please contact ADEM's Mining & Nonpoint Source Section by email at [mnps@adem.state.al.us](mailto:mnps@adem.state.al.us) or by phone at (334) 394-4311.
7. The applicant/owner/operator shall ensure that fill material sources and/or associated borrow/mining sites have obtained appropriate NPDES permit coverage. If you have any

questions regarding the need for the applicant to obtain stormwater permit coverage, to determine if the contractor has obtained stormwater permit coverage, or would like to request application forms/information, please contact ADEM's Mining & Nonpoint Source Section by email at [mnps@adem.state.al.us](mailto:mnps@adem.state.al.us) or by phone at (334) 394-4311.

8. ADEM air permit coverage may be required for certain barge loading/unloading operations. If you have any questions regarding the requirement for air permit coverage, please contact ADEM's Air Division at (334) 271-7700.
9. The applicant/owner/operator shall ensure that activities are in compliance with ADEM Land Division regulations for the permitting/management/removal/remediation or use of any hazardous, toxic, and/or solid waste on the site. Please contact ADEM's Land Division at (334) 271-7730 if you have any questions, or to request additional information.
10. The applicant shall implement the project in accordance with all plans, designs, specifications, descriptions, drawings, schedules, maps, and other information submitted relative to the proposed project.
11. Upon the loss or failure of any treatment facility, best management practice (BMP), or other control, the applicant shall, where necessary to maintain compliance with this certification, suspend, cease, reduce or otherwise control work/activity and all discharges until effective treatment is restored. It shall not be a defense for the applicant in a compliance action that it would have been necessary to halt or reduce work or other activities in order to maintain compliance with the conditions of this certification.
12. The applicant shall retain records adequate to document activities authorized by this certification including but not limited to, inspection reports, monitoring information, copies of any reports and all data used to complete the above reports or the application for this certification, for a period of at least three years after completion of work/activity authorized by the certification. Upon written request, the applicant shall provide ADEM with a copy of any record/information required to be retained by this paragraph.
13. The applicant shall implement and maintain a comprehensive BMP plan for prevention and control of nonpoint sources of pollutants during and after project implementation, including measures that will be taken to ensure permanent revegetation or cover of all disturbed areas during and after project implementation that was submitted as part of the application or required by this certification.
14. The applicant shall implement and maintain appropriate, effective BMPs for prevention and control of nonpoint sources of pollutants during and after project implementation. The applicant, at a minimum, must implement and maintain applicable effective BMPs as provided in the Alabama Handbook For Erosion Control, Sediment Control, And Stormwater Management On Construction Sites And Urban Areas, as amended, Alabama Soil and Water Conservation Committee (ASWCC). A copy of the Handbook can be downloaded or ordered at [http://swcc.state.al.us/erosion\\_handbook.htm](http://swcc.state.al.us/erosion_handbook.htm) Immediately after completion of the project, the applicant is required to implement and maintain effective measures to ensure permanent revegetation or cover of all disturbed areas.
15. The applicant shall implement a Spill Prevention Control and Countermeasures (SPCC) Plan for all temporary and permanent onsite fuel or chemical storage tanks or facilities consistent

with the requirements of ADEM Admin. Code R. 335-6-6-.12(r), Section 311 of the Federal Water Pollution Control Act, and 40 CFR Part 112. The applicant shall maintain onsite or have readily available sufficient oil & grease absorbing material and flotation booms to contain and clean-up fuel or chemical spills and leaks. The applicant shall immediately notify ADEM after becoming aware of a significant visible oil sheen in the vicinity of the proposed activity. In the event of a spill with the potential to impact groundwater or other waters of the State, the applicant should immediately call the National Response Center at 1-800-424-8802 and the Alabama Emergency Management Agency at 1-800-843-0699. The caller should be prepared to report the name, address and telephone number of person reporting spill, the exact location of the spill, the company name and location, the material spilled, the estimated quantity, the source of spill, the cause of the spill, the nearest downstream water with the potential to receive the spill, and the actions taken for containment and cleanup.

16. Until the project is complete, the applicant shall conduct, at a minimum, weekly comprehensive site inspections to ensure that effective BMPs are properly designed, implemented, and regularly maintained (i.e. repair, replace, add to, improve, implement more effective practice, etc.) utilizing good engineering practices to prevent/minimize to the maximum extent practicable discharges of pollutants in order to provide for the protection of water quality. The inspections shall be conducted by a qualified credentialed professional (QCP), qualified personnel under the direct supervision of a QCP, or an ADEM recognized qualified credentialed inspector (QCI), until completion of the proposed activity.
17. Additional, effective BMPs shall be fully implemented and maintained on a daily basis as needed to prevent to the maximum extent possible potential discharges of pollutants from activities authorized by this certification, directly to or to a tributary or other stream segment, that have the potential to be impact a State water currently considered impaired [waterbody is identified on the Alabama 303(d) list, a total maximum daily load (TMDL) has been finalized for the waterbody, and/or the waterbody is otherwise considered a Tier 1 water pursuant to ADEM Admin. Code Ch. 335-6-10]. The applicant shall inspect all BMPs as often as is necessary (daily if needed) for effectiveness, need for maintenance, and the need to implement additional, effective BMPs. Additional effective BMPs shall immediately be implemented as needed and may include but are not limited to sediment retention basins, greater capacity in sediment retention structures, hydroseeding with application of non-toxic tackifiers, grass sodding, non-toxic chemical treatment, erosion control blankets, other effective innovative/alternative technologies, etc. to ensure full compliance with ADEM requirements and the protection of water quality in the impaired waterbody.
18. All construction and worker debris (e.g. trash, garbage, etc.) must be immediately removed and disposed in an approved manner. If acceptable offsite options are unavailable, effective onsite provisions for collection and control of onsite worker toilet wastes or gray waste waters (i.e. port-o-let, shower washdown, etc.) must be implemented and maintained. Soil contaminated by paint or chemical spills, oil spills, etc. must be immediately cleaned up or be removed and disposed in an approved manner. Also, the applicant shall manage and dispose of any trash, debris, and solid waste according to applicable state and federal requirements.
19. Appropriate measures must be taken to prevent the deposition of airborne pollutants such as spray paint, herbicides, excessive road dust, etc. from entering the waterbody.
20. Appropriate measures must be taken to prevent the disposal, minimize to the maximum extent practicable the deposition, and remove as necessary, any material, debris, or liquids resulting

from bridge/culvert, building, or other construction and/or maintenance such as waste concrete/cement, wash water, surfactants, sand blasting particles, paint, etc. from falling into or entering the waterbody.

21. Surface drainage patterns should be designed, constructed, and maintained to the extent practicable with swales or other methods to minimize direct runoff into the waterbody and to prevent/minimize the introduction of pollutants. Diversion structures (berms, ditches, etc.) created in order to re-route upgradient stormwater runoff from the proposed project location shall be constructed, stabilized, and vegetated as necessary, prior to commencement of disturbance activities.
22. All materials used as fill, or materials used for construction of structures in a waterbody, must be non-toxic, non-leaching, non-acid forming, and free of solid waste or other debris.
23. The applicant shall implement appropriate measures to minimize the potential for a decrease of instream dissolved oxygen concentrations as a result of project implementation. In addition, the applicant shall ensure that the activities authorized by this certification do not significantly contribute to or cause a violation of applicable water quality standards for instream dissolved oxygen.
24. Dredged or fill material shall not be sidecast or otherwise placed in adjacent waters or wetlands outside the permitted project area.
25. The applicant shall conduct the proposed operation in a timely manner with all due diligence utilizing good engineering practices in order to reduce potential environmental impacts created by the project to the maximum extent practicable and to reduce the amount of time to the maximum extent practicable in which turbid water is produced.
26. The applicant shall implement appropriate, effective BMPs, including installation of floating turbidity screens as necessary, to minimize downstream turbidity to the maximum extent practicable. The applicant shall visually monitor or measure background turbidity. The applicant shall temporarily suspend operations should turbidity resulting from project implementation exceed background turbidity by more than 50 NTUs. Operations may resume when the turbidity decreases to within acceptable levels.
27. To ensure the protection of water quality, the applicant shall evaluate, characterize, and as necessary, conduct analysis of any material dredged/removed/disturbed in order to ensure that potential pollutants are not present in concentrations that could cause or contribute to a violation of applicable water quality standards. Information regarding the evaluation, characterization, or detailed results of any analyses shall be made available to ADEM upon request.
28. If upland disposal areas are utilized, the applicant shall be responsible for the condition of the spoil disposal area, including the structural integrity of any embankments, for the life of the dredging and disposal activity and until the disposal area is reclaimed or adequately stabilized, and for pumping and discharge rates, to ensure settling of suspended solids within the confines of the spoil disposal area sufficient to ensure that turbidity in the return water will not cause substantial visible contrast with the receiving waters, or result in an increase of 50 NTUs above background turbidity levels in the receiving waters.

29. Unless specifically authorized in writing by ADEM, subsequent recovery, removal, re-mining, processing, trans-loading, etc. of material from upland disposal areas is not authorized by this certification, and appropriate NPDES permit coverage [ADEM Admin. Code Ch. 335-6-12 and/or ADEM Admin. Code Ch. 335-6-9] is required to be obtained from ADEM prior to commencing and/or continuing recovery, removal, re-mining, processing, trans-loading, etc. of material from upland disposal areas or other sites/areas. If you have any questions regarding NPDES permit requirements for material mining, re-mining, recovery, removal, borrow sites, or would like to request application forms/information, please contact ADEM's Mining & Nonpoint Source Section by email at [mnps@adem.state.al.us](mailto:mnps@adem.state.al.us) or by phone at (334) 394-4311.
30. New or updated marinas, multiple boat slips, floating docks, large or multiple piers, etc. that increase the number of berthing areas shall be equipped with all facilities and appurtenances (i.e. trash receptacles, receptacles for fish offal and carcasses, and accepted SPCC plan for fueling facilities, and a sewage pump out system where appropriate) for activities that are allowed or conducted at the new or updated facility as appropriate.
31. Bilge or ballast water pumped from ships or boats (e.g. dredge or construction barges, tugboats, fishing boats, pleasure craft, etc.) shall not be discharged to waters of the State of Alabama without removal of solids, oils, fuel, petroleum by-products and toxic compounds.
32. No rubbish, trash, garbage, or other such materials shall be discharged overboard into waters of the State of Alabama. Litter and refuse from vessels or a marina shall be disposed in a manner consistent with State and local regulations (e.g. trash receptacles, receptacles for fish offal and carcasses).
33. Toilet wastes, domestic wastewater, and other domestic wastes must be pumped out to an approved onsite sewage system or municipal sewer, or must be treated by an approved marine sanitation device prior to discharge to waters of the State of Alabama.
34. Any proposed temporary channel, pipe, conduit, or other management measures implemented to temporarily divert stream flow to accommodate culvert construction, stream crossings, pipelines, or other within-bank stream work shall be constructed and maintained at all times to ensure that water quality is not adversely impacted. The measures to protect water quality during the construction of the temporary diversion channel may include but is not limited to, temporarily blocking/impounding and pumping water around the construction area, construction of a temporary channel lined with plastic or rip-rap, temporary installation of a properly sized pipe, etc.
35. Any proposed new or modified permanent waterbody channel should duplicate the old waterbody channel or a natural waterbody channel in regard to pools, riffle areas, riparian vegetation, depth, gradient, and length to the maximum extent practicable so that the new/modified waterbody channel maintains its dimension, pattern, and profile while neither degrading nor aggrading to ensure that water temperature, pH, turbidity, and dissolved oxygen concentrations are not adversely impacted, and are improved to the extent possible, after the project is completed.
36. Permanent or temporary raised waterbody crossings must be constructed with pipe(s)/culvert(s) to safely pass expected mean water flow of the waterbody for the time of year and length of time that they are installed, unless a properly designed and constructed low-water crossing is installed that provides for unobstructed stream flow over the low-water

structure. The crossing must be inspected on a regular basis and any significant debris or blockage removed and properly disposed to ensure unobstructed flow of water. Placement of raised rock-fill or other fill without pipe(s)/culvert(s) for passage of water is not acceptable. Each raised waterbody crossing must be designed and maintained to ensure structure integrity and stability for safe passage of water flow generated by expected precipitation events while the structure is in place.

37. The bottom of any proposed new or modified, temporary or permanent waterbody channel, culvert, ditch, or pipe should be V-notched, sloped, concave in shape, or otherwise constructed with a base flow channel or configuration, to ensure adequate concentrated and unobstructed flow of water during periods of low flow. Alternatively, the bottom of the culvert/structure can be buried at a sufficient depth considering the hydraulic gradient of the existing channel to provide for a stable sediment streambed through the culvert/structure, or a bottomless culvert can be installed where the stream bottom is bedrock or as otherwise determined suitable by the design engineer.
38. Design features, such as protection of existing waterbody trees or planting of new shade trees or other appropriate measures, should be implemented to the maximum extent practicable in order to minimize temperature extremes in any new or modified permanent waterbody channel.
39. Please be advised that (A) ADEM Admin. Code R. 335-6-6-.03 (aaa) [NPDES Rules] defines "Waters of the state" as all waters of any river, stream, watercourse, pond, lake, coastal, ground or surface water, wholly or partially within the state, natural or artificial. This does not include waters which are entirely confined and retained completely upon the property of a single individual, partnership or corporation unless such waters are used in interstate commerce, (B) ADEM Admin. Code R. 335-6-9-.02(i) [Surface Mining Rules] defines "stream" as any body of water having a drainage area in excess of one square mile [640 acres], (C) Pursuant to ADEM Admin. Code R. 335-6-12-.21(10) [Construction Stormwater Rules], the installation or use of instream or within-bank sediment storage traps or deposition areas, or other sediment storage/detention BMPs, in waters of the State to control/treat stormwater runoff from construction/ activity, is not authorized, and (D) ADEM Admin. Code R. 335-6-12-.21(2)(b)3. [Construction Stormwater Rules], requires proper cleanup/removal or effective stabilization of sediment deposited offsite, in the event of such an occurrence, and effective remediation of sediment or other pollutant instream impacts to the maximum extent practicable.
40. In recognition that projects are site specific in nature and conditions can change during project implementation, ADEM reserves the right to require the submission of additional information or require additional management measures to be implemented, as necessary on a case by case basis, in order to ensure the protection of water quality.
41. Liability and responsibility for compliance with this certification are not delegable by contract or otherwise. The applicant shall ensure that any agent, contractor, subcontractor, or other person employed by, under contract, or paid a salary by the applicant complies with this certification. Any violations resulting from the actions of such person shall be considered violations of this certification and may subject the applicant to enforcement action.
42. ADEM certification decisions are predicated on current regulatory requirements, established engineering standards and technical considerations, best management practices information,

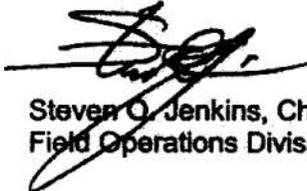
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and formal administrative procedures in conformance with ADEM regulations and applicable Alabama law. Issuance of a certification by ADEM neither precludes nor negates an operator/owner's responsibility or liability to apply for, obtain, or comply with other ADEM, federal, state, or local government permits, certifications, licenses, or other approvals.

43. This certification does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, trespass, or any infringement of Federal, State, or local laws or regulations, and in no way purports to vest in the applicant title to lands now owned by the State of Alabama nor shall it be construed as acquiescence by the State of Alabama of lands owned by the State of Alabama that may be in the applicant's possession.

Should you have any questions on this or related matters, please do not hesitate to contact Richard Hulcher, Mining & Nonpoint Source Section, by email at [mnps@adem.state.al.us](mailto:mnps@adem.state.al.us) or by phone at (334) 394-4311.

Sincerely,



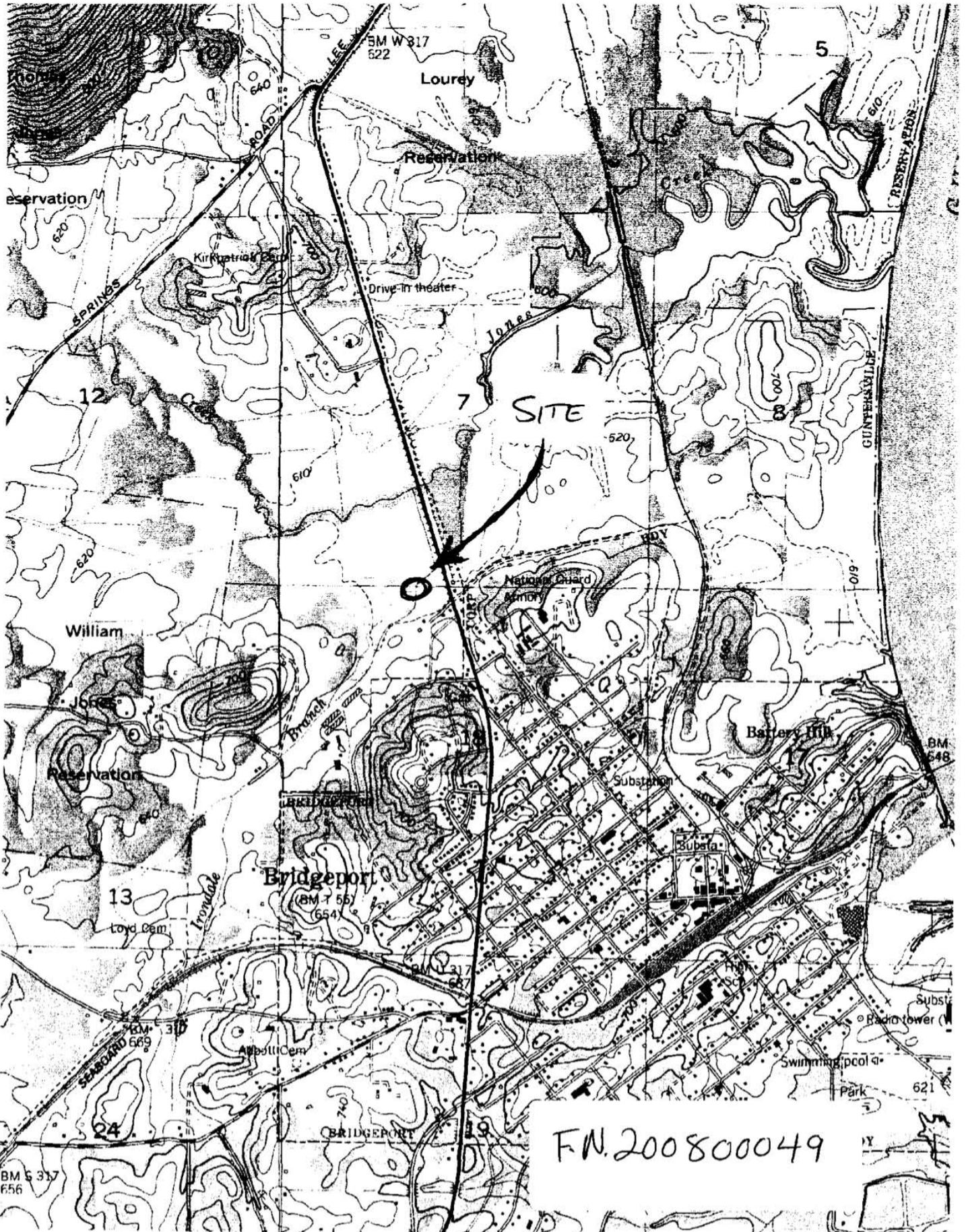
Steven O. Jenkins, Chief  
Field Operations Division

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c: Wetlands Section, EPA Region IV

Bridgeport, Alabama, Power Supply Upgrade



## Appendix B – Tennessee Valley Authority Right-of-Way Clearing Specifications

1. General - The clearing contractor shall review the environmental evaluation documents (categorical exclusion checklist, environmental assessment, or environmental impact statement) for the project or proposed activity, along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and management practices as outlined in TVA's best management practices (BMPs) manual (Muncy 1992, and revisions thereto). The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible.

If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid or prework meeting or present in contract specifications, TVA will order corrective changes and additional work as deemed necessary in TVA's judgment to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances including without limitation all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. The contractor shall secure or ensure that TVA has secured all necessary permits or authorizations to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and any necessary certifications of trained or licensed employees shall be documented with copies submitted to TVA's right-of-way inspector or construction environmental engineer before work begins. The contractor will be responsible for meeting all conditions specified in permits. Permit conditions shall be reviewed in prework discussions.
3. Land and Landscape Preservation - The clearing contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface water or groundwater. In areas outside the clearing, use, and access areas, the natural vegetation shall be protected from damage. The contractor and his employees must not deviate from delineated access routes or use areas and must enter the site at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer

zones shall be observed and the methods of clearing or reclearing modified to protect the buffer and sensitive area. Some areas may require planting native plants or grasses to meet the criteria of regulatory agencies or commitments to special program interests.

4. Streamside Management Zones - The clearing contractor must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZ), tall-growing tree species (trees that would interfere with TVA's National Electrical Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut, and then stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from TVA's Transmission, Operations, and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the right-of-way is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be immediately removed from streams, ditches, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs consistent with permit conditions or regulatory requirements.
5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" understory species and allow them to grow quickly to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.
6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological significance are discovered during clearing or reclearing operations, the activity shall immediately cease within a 100-foot radius, and a TVA right-of-way inspector or construction environmental engineer and the Cultural Resources Program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.
7. Water Quality Control - The contractor's clearing and disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage,

contaminants, debris, and other pollutants or objectionable materials into drainage ways, surface water, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris will be kept away from streams and ditches and shall be incorporated into the soil.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

8. Turbidity and Blocking of Streams - If temporary clearing activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, or right-of-way disturbance in accordance with applicable permit or regulatory requirements.

Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct necessary stream crossings under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed as soon as possible. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream crossings.

9. Air Quality Control - The clearing or reclearing contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land crops, dwellings, highways, or people.
10. Dust and Mud Control - Clearing activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.
11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification, or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind

speed or wind direction change rapidly, the contractor's burning operation may be temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.
13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturers' recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.
14. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way, except in designated sensitive areas. The clearing or reclearing contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.
15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.
16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.
17. Sanitation - A designated representative of TVA or the clearing contractor shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.
18. Refuse Disposal - The clearing or reclearing contractor shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his operations and employees. Facilities that meet applicable regulations

and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used.

19. Brush and Timber Disposal (Reclearing) - The reclearing contractor shall place felled tree boles in neat stacks at the edge of the right-of-way, with crossing breaks at least every 100 feet. Property owner requests shall be reviewed with the project manager or right-of-way specialist before accepting them. Lop and drop activities must be specified in the contract and on plan and profile drawings with verification with the right-of-way specialist before conducting such work. When tree trimming and chipping is necessary, disposal of the chips on the easement or other locations on the property must be with the consent of the property owner and the approval of the right-of-way specialist. No trees, branches, or chips shall remain in a surface water body or be placed at a location where washing into a surface water or groundwater source might occur.
20. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor's contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer, and the open burning permits, notifications, and regulatory requirements must be met. Trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way.
21. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:
  - A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.
  - B. If needed, appropriate soil amendments will be added.
  - C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*. Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.
  - D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

Revision April 2007

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## Appendix C – Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor shall plan, coordinate, and conduct operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting. This specification contains provisions that shall be considered in all TVA and contract construction operations. If the contractor fails to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all structure and conductor pulling sites, protective measures to prevent erosion will be taken immediately upon the end of each step in a construction sequence, and those protective measures will be inspected and maintained throughout the construction and right-of-way rehabilitation period.
2. Regulations - TVA and/or the assigned contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.
3. Use Areas - TVA and/or the assigned contractor's use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).
4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission line. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements.

No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground due to size and function.) Some disking of the right-of-way may occur for proper seedbed preparation.

Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the structure sites except around foundation holes; the water must

be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any structure.

5. Sanitation - A designated TVA or contractor representative shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.
6. Refuse Disposal - Designated TVA and/or contractor personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his operations and by his employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as waste. Contractors must meet similar provisions on any project contracted by TVA.
7. Landscape Preservation - TVA and its contractors shall exercise care to preserve the natural landscape in the entire construction area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.
8. Sensitive Areas Preservation - Certain areas on site and along the right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, water supply watersheds, and public recreational areas such as parks and monuments. Contractors and TVA construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing or construction operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's right-of-way inspector or construction superintendent and Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain best management practices (BMPs) such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the right-of-way, on a construction site, or on access roads.

10. Turbidity and Blocking of Streams - Construction activities in or near SMZs or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. All conditions of a general storm water permit, aquatic resource alteration permit, or a site-specific permit shall be met including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

Appropriate drainage facilities for temporary construction activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*.

Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct crossings or to perform required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained.

Wastewater from construction or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, or pond. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Clearing - No construction activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure sites and conductor setup areas. TVA and the construction contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed that have previously been restabilized after clearing operations. Control measures shall be

implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

12. Restoration of Site - All construction disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:
  - A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.
  - B. If needed, appropriate soil amendments will be added.
  - C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*. Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.
  - D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.
13. Air Quality Control - Construction crews shall take appropriate actions to minimize the amount of air pollution created by their construction operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.
14. Burning - Before conducting any open burning operations, the contractor shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner.
15. Dust and Mud Control - Construction activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access

road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

16. Vehicle Exhaust Emissions - TVA and/or the contractors shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.
17. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way except in designated sensitive areas. The Heavy Equipment Department within TVA or the construction contractor will properly maintain these vehicles with approved spill prevention controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.
18. Smoke and Odors - TVA and/or the contractors shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor shall not burn refuse such as trash, rags, tires, plastics, or other debris.
19. Noise Control - TVA and/or the contractor shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.
20. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction*. TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.
21. Damages - The movement of construction crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor will be responsible for erosion damage caused by his actions and especially for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the contract dealing with damages will apply.

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## **Appendix D – Tennessee Valley Authority Transmission Construction Guidelines Near Streams**

Even the most carefully designed transmission line project eventually will affect one or more creeks, rivers, or other type of water body. These streams and other water areas are protected by state and federal law, generally support some amount of fishing and recreation, and, occasionally, are homes for important and/or endangered species. These habitats occur in the stream and on strips of land along both sides (the streamside management zone [SMZ]) where disturbance of the water, land, or vegetation could have an adverse effect on the water or stream life. The following guidelines have been prepared to help Tennessee Valley Authority (TVA) Transmission Construction staff and their contractors avoid impacts to streams and stream life as they work in and near SMZs. These guidelines expand on information presented in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*.

### **Three Levels of Protection**

During the preconstruction review of a proposed transmission line, TVA Environmental Stewardship and Policy staff will have studied each possible stream impact site and will have identified it as falling into one of three categories: (A) standard stream protection, (B) protection of important permanent streams, or (C) protection of unique habitats. These category designations are based on the variety of species and habitats that exist in the stream as well as state and federal requirements to avoid harming certain species. The category designation for each site will be marked on the plan and profile sheets. Construction crews are required to protect streams and other identified water habitats using the following pertinent set(s) of guidelines:

#### **(A) Standard Stream Protection**

This is the standard (basic) level of protection for streams and the habitats around them. The purpose of the following guidelines is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

#### **Guidelines:**

1. All construction work around streams will be done using pertinent best management practices (BMPs) such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, especially Chapter 6, "Standards and Specifications."
2. All equipment crossings of streams must comply with appropriate state permitting requirements. Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.
3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The

method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Stumps can be cut close to ground level but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as feasible.

## **(B) Protection of Important Permanent Streams**

This category will be used when there is one or more specific reason(s) why a permanent (always-flowing) stream requires protection beyond that provided by standard BMPs. Reasons for requiring this additional protection include the presence of important sports fish (trout, for example) and habitats for federal endangered species. The purpose of the following guidelines is to minimize the disturbance of the banks and water in the flowing stream(s) where this level of protection is required.

### **Guidelines:**

1. Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, especially Chapter 6, "Standards and Specifications."
2. All equipment crossings of streams must comply with appropriate state (and, at times, federal) permitting requirements. Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.
3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Cutting of trees near permanent streams must be limited to those required to meet National Electrical Safety Code and danger tree requirements. Stumps can be cut close to ground level but must not be removed or uprooted.
4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.

**(C) Protection of Unique Habitats**

This category will be used when, for one or more specific reasons, a temporary or permanent aquatic habitat requires special protection. This relatively uncommon level of protection will be appropriate and required when a unique habitat (for example, a particular spring run) or protected species (for example, one that breeds in a wet-weather ditch) is known to occur on or adjacent to the construction corridor. The purpose of the following guidelines is to avoid or minimize any disturbance of the unique aquatic habitat.

**Guidelines:**

1. Except as modified by Guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, especially Chapter 6, "Standards and Specifications."
2. All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat. All crossings of streams also must comply with appropriate state (and, at times, federal) permitting requirements.
3. Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum. Stumps must not be removed, uprooted, or cut shorter than 0.30 meter (1 foot) above the ground line.
4. Other vegetation near the unique habitat must be disturbed as little as possible during construction. The soil must not be disturbed by plowing, disking, blading, or grading. Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.

**Additional Help**

If you have questions about the purpose or application of these guidelines, please contact your supervisor or the environmental coordinator in the local Transmission Service Center.

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**Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 1)**

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
<p><b>1.</b> <b>Reference</b></p>	<ul style="list-style-type: none"> <li>All TVA construction work around streams will be done using pertinent BMPs such as those described in <i>A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities</i>, especially Chapter 6, BMP “Standards and Specifications.”</li> </ul>	<p>Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in <i>A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities</i>, especially Chapter 6, BMP “Standards and Specifications.”</p>	<ul style="list-style-type: none"> <li>Except as modified by guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in <i>A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities</i>, especially Chapter 6, BMP “Standards and Specifications.”</li> </ul>
<p><b>2.</b> <b>Equipment Crossings</b></p>	<ul style="list-style-type: none"> <li>All crossings of streams must comply with appropriate state and federal permitting requirements.</li> <li>Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow.</li> <li>Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.</li> </ul>	<ul style="list-style-type: none"> <li>All crossings of streams must comply with appropriate state and federal permitting requirements.</li> <li>Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow.</li> <li>Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.</li> </ul>	<ul style="list-style-type: none"> <li>All crossings of streams also must comply with appropriate state and federal permitting requirements.</li> <li>All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat.</li> </ul>

**Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 2)**

<b>Guidelines</b>	<b>A: Standard</b>	<b>B: Important Permanent Streams</b>	<b>C: Unique Water Habitats</b>
<b>3. Cutting Trees</b>	<ul style="list-style-type: none"> <li>• Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area.</li> <li>• Stumps can be cut close to ground level but must not be removed or uprooted.</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting of trees with SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area.</li> <li>• Cutting of trees near permanent streams must be limited to those meeting National Electrical Safety Code and danger tree requirements.</li> <li>• Stumps can be cut close to ground level but must not be removed or uprooted.</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum.</li> <li>• Stumps must not be removed, uprooted, or cut shorter than 1 foot above the ground line.</li> </ul>
<b>4. Other Vegetation</b>	<ul style="list-style-type: none"> <li>• Other vegetation near streams must be disturbed as little as possible during construction.</li> <li>• Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations.</li> <li>• Shorelines that have to be disturbed must be stabilized as soon as feasible.</li> </ul>	<ul style="list-style-type: none"> <li>• Other vegetation near streams must be disturbed as little as possible during construction.</li> <li>• Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations.</li> <li>• Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.</li> </ul>	<ul style="list-style-type: none"> <li>• Other vegetation near the unique habitat must be disturbed as little as possible during construction.</li> <li>• The soil must not be disturbed by plowing, disking, blading, or grading.</li> <li>• Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.</li> </ul>

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## **Appendix E – Tennessee Valley Authority Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines**

### **1.0 Overview**

- A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall-growing vegetation and other objects. This requirement applies to vegetation within the right-of-way as well as to trees located off the right-of-way.
- B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, periodic field inspections, aerial photography, and information from TVA personnel, property owners, and the general public. Important information gathered during these assessments includes the coverage by various vegetation types, the mix of plant species, the observed growth, the seasonal growing conditions, and the density of the tall vegetation. TVA also evaluates the proximity, height, and growth rate of trees adjacent to the right-of-way that may be a danger to the line or structures.
- C. TVA right-of-way specialists develop a vegetation reclearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

### **2.0 Right-of-Way Management Options**

- A. TVA uses an integrated vegetation management approach. In farming areas, TVA encourages property owner management of the right-of-way using low-growing crops. In dissected terrain with rolling hills and interspersed woodlands, TVA uses mechanical mowing to a large extent.
- B. When slopes become hazardous to farm tractors and rotary mowers, TVA may use a variety of herbicides specific to the species present with a variety of possible application techniques. When scattered small stands of tall-growing vegetation are present and access along the right-of-way is difficult or the path to such stands is very long, herbicides may be used.
- C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Safety and Health Administration. For that reason, TVA is actively looking at better control methods, including use of low-volume herbicide applications, occasional single tree injections, and tree growth regulators.

- D. TVA does not encourage tree reclearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work. Private property owners may reclear the right-of-way with trained reclearing professionals.
- E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near-surface root crown. The tendency of resistant species is to resprout from the root crown, and shattered stumps can produce a multistem dense stand in the immediate area. Repeated use of mowers on short cycle reclearing with many original stumps regrowing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce regrowth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity and little wildlife food or nesting potential and become a property owner's concern. Selective herbicide application may be used to control monoculture stands.
- F. TVA encourages property owners to sign an agreement to manage rights-of-way on their land for wildlife under the auspices of "Project Habitat," a joint project by TVA, BASF, and wildlife organizations, e.g., National Wild Turkey Federation, Quail Unlimited, and Buckmasters. The property owner maintains the right-of-way in wildlife food and cover with emphasis on quail, turkey, deer, or other wildlife. A variation used in or adjacent to developing suburban areas is to sign agreements with the developer and residents to plant and maintain wildflowers on the right-of-way.
- G. TVA places strong emphasis on managing rights-of-way in the above manner. When the property owners do not agree to these opportunities, TVA must maintain the right-of-way in the most environmentally acceptable, cost-effective, and efficient manner possible.

### **3.0 Herbicide Program**

- A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University, and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low-volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing.
- B. Low-volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection, and more wildlife food plants and cover plants develop. In most situations, there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

- C. Wildlife managers often request the use of herbicides in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground cover year-round with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).
- D. Property owners interested in tree production often request the use of low-volume applications rather than hand- or mechanical clearing because of the insect and fungus problems in damaged vegetation and debris left on the right-of-way. The insect and fungus invasions, such as pine tip moth, oak leaf blight, sycamore and dogwood blight, etc., are becoming widespread across the nation.
- E. Best management practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*, which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, U.S. Environmental Protection Agency (USEPA) guidelines, and respective state regulations and laws.
- F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Aerial and ground applications are either done by TVA or by contractors in accordance with the following guidelines identified in TVA's BMPs manual:
  - 1. The sites to be treated are selected and application directed by the appropriate TVA official.
  - 2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
  - 3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.
  - 4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour or on frozen or water-saturated soils.
  - 5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.
  - 6. Application during unstable, unpredictable, or changing weather patterns is avoided.

7. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
8. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZs) (200 feet minimum width) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
9. Buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
10. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits, (b) off the right-of-way, and (c) during rainy periods or during the 48-hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. Table 1 - Herbicides Currently Used on TVA Rights-of-Way

<u>Trade Name</u>	<u>Active Ingredients</u>	<u>Label Signal Word</u>
Accord	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Transline	Clopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Krenite S	Fosamine Ammonium	Caution
Spike 20P	Tebuthiuron	Caution
Chopper	Imazapyr/RTU	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution

H. Table 2 - Preemergent Herbicides Currently Used for Bare Ground Areas on TVA Rights-of-Way and Substations

<u>Trade Name</u>	<u>Active Ingredients</u>	<u>Label Signal Word</u>
Topsite	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron and Diuron	Caution
Sahara	Diuron/Imazapyr	Caution

## I. Table 3 - Tree Growth Regulators (TGRs) Currently Used on TVA Rights-of-Way

<u>Trade Name</u>	<u>Active Ingredients</u>	<u>Label Signal Word</u>
TGR	Flurprimidol	Caution
Profile 2SC	TGR-paclobutrazol	Caution

TGRs may be used on tall trees that have special circumstances where they must be trimmed on a regular cycle.

- J. TVA currently utilizes Activate Plus, manufactured by Terra, as an adjuvant to herbicides to improve the performance of the spray mixture. Application rates are consistent with the USEPA-approved label. The USFWS has expressed some concern on toxicity effects of surfactants on aquatic species. TVA is working in coordination with Mississippi State University and chemical companies to evaluate efficacy of additional low-toxicity surfactants, including LI700 as manufactured by Loveland Industries, through side-by-side test plots in the SMZs of area transmission lines.
- K. The herbicides and TGRs listed above have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). To access electronic copies of these USFS EISs, see <http://www.fs.fed.us/r8/planning/documents/vegmgmt/>. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.
- L. The rates of application utilized are those listed on the USEPA-approved label and consistent with utility standard practice throughout the Southeast. TVA currently uses primarily low-volume applications of foliar and basal applications of Accord (glyphosate) and Accord- (glyphosate) Arsenal (imazapyr) tank mixes. Glyphosate is one of the most widely used herbicidal active ingredients in the world and has been continuously the subject of numerous exhaustive studies and scrutiny to determine its potential impacts on humans, animals, and the environment.

#### 4.0 Accord

- A. Accord is labeled for vegetation management in forestry and utility right-of-way applications. It has a full aquatics label, and can be applied to emergent weeds in all bodies of fresh and brackish water. There is limited restriction on the use of treated water for irrigation, recreation, or domestic purposes. Accord is applied to the foliage of actively growing plants. The active ingredient is absorbed through the leaves and rapidly moves throughout the plant. Glyphosate prevents the plant from producing amino acids, which are unique to plants and which are building blocks of plant proteins. The plant, unable to make proteins, stops growing and dies.
- B. The favorable environmental fate characteristic of Accord herbicide and its major metabolite (breakdown product) aminomethylphosphonic acid (AMPA) is well known. Continuing research is underway with more than 400 studies conducted to

date in the laboratory and under field use conditions. These studies show rapid breakdown, little soil or plant debris retention, and little vertical movement into soil below the surface.

- C. Glyphosate is naturally degraded by microbes in soil and water under both aerobic (with oxygen) and anaerobic (without oxygen) conditions. AMPA is further degraded in soil and sediments to phosphorus, nitrogen, hydrogen, and carbon dioxide. Glyphosate binds rapidly and completely to a wide range of soils and sediment when introduced into the environment. This essentially eliminates movement in the soil. The average half-life of glyphosate in soils is less than 45 days. Half-life for the dissipation of glyphosate in environmental waters ranges from 1.5 to 14 days.
- D. Glyphosate is nontoxic to birds, mammals, and bees and has been shown not to bioaccumulate, since it acts in plants through an enzyme system that does not exist in animals or humans.

## 5.0 Arsenal

- A. Arsenal (imazapyr) has been similarly tested, and it is found to have low leaching potential in soils. When available on or in the soil, it is broken down rapidly by soil microbes to naturally occurring compounds. When not available, imazapyr is bound tightly to soil colloids and is unavailable for movement. The half-life in soil is 25 to 65 days.
- B. Extensive chronic and acute toxicity studies have made Arsenal a USEPA-classified herbicide as practically nontoxic to humans, mammals, birds, fish, aquatic invertebrates, and insects. The chronic studies demonstrate that Imazapyr is non-teratogenic, non-mutagenic, and not a carcinogen.
- C. The mode of action suppresses amino acids of the plant via an enzyme system containing acetohydroxy acid synthase. This enzyme system does not exist in other forms of life, including humans and animals.

## 6.0 References

- U.S. Forest Service. 1989a. *Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement*, Volumes I and II. Southern Region Management Bulletin R8-MB-23, January 1989. Atlanta, Ga.: USDA Forest Service.
- . 1989b. *Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement*, Volumes I and II. Southern Region Management Bulletin R8-MB-38, July 1989. Atlanta, Ga.: USDA Forest Service.
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Revision January 2008

## Appendix F – Species Narratives

The **blotchside logperch** prefers large to medium-sized rivers and creeks with areas of large gravel and small cobble, low turbidity, and moderate current. It can usually be found in depths of 1.5 feet or more. Spawning occurs from April to May. It is endemic to the Tennessee River and Cumberland River drainages (Etnier and Starnes 1993).

The **flame chub** inhabits springs and small spring-fed streams in the Tennessee, Cumberland, and Coosa river drainages (Mettee et al. 1996).

The **palezone shiner** is very restricted to the Tennessee River drainage in Alabama and Tennessee with disjunct populations to the north in the Cumberland River drainage. It is uncommon and localized throughout its range. It is normally encountered in pools and pool runs below riffles of high-gradient, clear streams flowing over bedrock, cobble, and/or gravel mixed with clean sand. Spawning is thought to occur in late May through July. Little else is known about the life history of this species (Mettee et al. 1996).

The **snail darter** inhabits larger creeks where it frequents sand and gravel shoal areas, as well as deeper portions of rivers and reservoirs where current is present. Spawning occurs from February to mid-April. This particular occurrence of the snail darter is not found in the Tennessee River but is in the Sequatchie River.

**Southern cavefish** occur in the Ozark plateau of Missouri, Arkansas, and Oklahoma and in the Cumberland and interior low plateaus of north Alabama, northwest Georgia, and central Tennessee and Kentucky. It inhabits mostly limestone subterranean waters of the Tennessee and Coosa river systems in clear, mud bottom pools (Mettee et al. 1996).

The **Alabama lampmussel** is restricted to the Tennessee River drainage, northern Alabama, and east Tennessee. Very little is known about this species. They inhabit small to medium-sized rivers and is believed to live in sand and gravel shoals (Parmalee and Bogan 1998).

The **Cumberland moccasinshell** is endemic to the Cumberland and Tennessee river drainages. It inhabits sand and gravel substrates and can often be found in cracks in the bedrock or under flat rocks. It can usually be found at depths less than 3 feet in moderate to strong current (Parmalee and Bogan 1998).

The **deertoe** mussel is a generalist in substrate choice and river size. It is more common in medium-sized rivers (Parmalee and Bogan 1998).

The **fine-rayed pigtoe** mussel occurs in the Tennessee River drainage from Clinch and Powell rivers in southwestern Virginia to Muscle Shoals, Alabama. It usually inhabits ford and shoal areas of rivers with moderate gradient (Parmalee and Bogan 1998).

The **kidneyshell** mussel occurs in small to medium-sized rivers of the Ohio, Tennessee, and Cumberland river systems; lower peninsula of Michigan, Kansas, Arkansas, Oklahoma, and Louisiana; Pennsylvania west to Illinois, south to Tennessee. It appears to be tolerant of a variety of habitat but prefers coarse gravel and sand substrate between 1 to 24 feet of water (Parmalee and Bogan 1998).

The **monkeyface** mussel occurs in the Upper Mississippi River drainage south to the Tennessee and Arkansas rivers. It is typically found in medium-sized rivers in swift, preferably clear, water on gravel bottoms. The species has adapted well to impoundments in Tennessee (Parmalee and Bogan 1998).

The **Ohio pigtoe** mussel occurs in the Upper Mississippi River drainage to the St. Lawrence River drainage. It reaches greatest abundance and size in large rivers with solid substrate consisting of sand and gravel with strong current. Although it can be found at depths of 18 to 24 feet, it has not adapted well to impoundments (Parmalee and Bogan 1998).

The **orangefoot pimpleback** mussel occurs in the Ohio, Cumberland, and Tennessee river systems. It has been extirpated from most of its original range. The orangefoot pimpleback inhabits sand or coarse gravel substrate at depths of 12 to 18 feet (Parmalee and Bogan 1998).

The **painted creekshell** mussel is restricted to the Tennessee and Cumberland river drainages. It prefers substrate of mixed sand and gravel in good current at depths of 3 feet or less (Parmalee and Bogan 1998).

The **pale lilliput**, a mussel, normally occurs in the tributaries of the Tennessee River. However, records have been reported from the Mobile River system. It only occurs in small tributary rivers and streams. The pale lilliput prefers gravel and sand substrate in slow to moderate current at depths less than 3 feet. No other life history is known (Parmalee and Bogan 1998).

The **pink mucket**, a mussel, is typically a big river species, but occasionally individuals become established in small to medium-sized tributaries of large rivers. It inhabits rocky bottoms with swift current usually in less than 3 feet of water (Parmalee and Bogan 1998).

The **purple lilliput** mussel has a wide distribution. It prefers mud, sand, and gravel substrate of small to medium-sized rivers. However, it can be found on shallow, rocky gravel points or sandbars in impoundments (Parmalee and Bogan 1998).

The **rabbitsfoot** mussel is closely related to the rough rabbitsfoot (*Quadrula cylindrical strigillata*). It is typically found in the Tennessee River drainage below Pickwick Dam. The rabbitsfoot inhabits shoals and riffles in the current at depths of 9 to 12 feet. Spawning occurs between May and July (Parmalee and Bogan 1998).

The **rainbow** mussel prefers riffles along the edges of emerging vegetation in gravel and sand in moderate to strong current. It becomes most numerous in clean, well-oxygenated stretches at depths of less than 3 feet (Parmalee and Bogan 1998). It has a wide distribution and inhabits medium to big rivers with moderate to high gradients (NatureServe 2007).

The **round hickorynut** mussel occurs in the Tennessee and Cumberland river systems and in the Ohio River system. It prefers medium to large rivers with sand and gravel substrate and moderate flow. Typically, it is found at depths less than 3 feet.

The **sheepnose** mussel can be found in the Ohio, Cumberland, and Tennessee river systems, and upper Mississippi River north to Minnesota. The species prefers substrate of mixed coarse sand and gravel (Parmalee and Bogan 1998).

The **shiny pigtoe**, a mussel, is found in the Tennessee River drainage above Muscle Shoals, Alabama. It typically inhabits shoals and riffles of clear streams with moderate to swift current. Spawning occurs between May and June (Parmalee and Bogan 1998).

The **snuffbox** mussel can be found living deeply buried in sand and gravel substrate of shallow riffles with fast current (Parmalee and Bogan 1998).

The **slabside pearlymussel** can be found in shoal areas of the Tennessee River as well as in small to medium-sized streams and rivers. A moderately strong current and a substrate composed of sand, fine gravel, and cobbles appear to provide the most suitable habitat for this species (Parmalee and Bogan, 1998).

The **slippershell** mussel occurs in the upper Mississippi River drainage; Ohio, Cumberland, and Tennessee rivers; and lower and middle sections of the St. Lawrence River systems. Post impoundments, the slippershell mussel can be found in small creeks and shallow streams. It prefers substrate of sand and fine gravel but can thrive in mud and sand bottoms among vegetation roots in stretches of continuous current (Parmalee and Bogan 1998).

The **spike** mussel has a wide distribution range. It is a generalist in regards to river size and depth. Most suitable habitat seems to be firm substrate of coarse sand and gravel in moderately strong current. Reproductive activity occurs from mid-May to August (Parmalee and Bogan 1998).

The **Tennessee clubshell** occurs in the Tennessee and Cumberland river drainages. It prefers substrate of coarse gravel and sand in small shallow creeks and rivers with good current (Parmalee and Bogan 1998).

Little is currently known about the **Tennessee heelsplitter**, a mussel. It is typically found in small shallow streams in substrate primarily composed of sand and mud. The reproductive period is unknown (Parmalee and Bogan 1998).

The **Tennessee pigtoe** mussel occurs in the Cumberland and Tennessee river systems. Several subspecies range from headwater to big river habitat (Parmalee and Bogan 1998).

The **wavy-rayed lampmussel** is a species typical of small to medium-sized rivers, usually occurring at depths of three feet or less. This mussel appears tolerant of habitat conditions unfavorable to many species and, under favorable circumstances, including moderate current and a stable substrate composed of mud, sand, and gravel (Parmalee and Bogan, 1998).

**Anthony's riversnail** prefers large rivers with cobble/boulder substrate near riffles (NatureServe 2007).

The **corpulent hornsail** can be found only in the Tennessee River between Bridgeport and Florence, Alabama, and Battle Creek at Ketchall, Marion County, Tennessee. Only five

occurrences have been documented to date. Thus, little is known about the life history of this species (NatureServe 2007).

The **spiny riversnail** prefers medium rivers with shallow shoals that are well oxygenated by rapid water (NatureServe 2007).

The **varicose rocksnail** inhabits large to medium rivers with rocky shoals and riffles. It can be found in moderate current at depths of up to approximately 3 feet (NatureServe 2007).