

Appendix B – Tennessee Valley Authority Substation Lighting Guidelines

For Greenfield Sites

Permanent substation lighting should be a two-stage design. Stage 1 is operated dusk to dawn for fixtures at higher mounting heights, more than 12 feet above the ground, and Stage 2 is switch-controlled for low mounting heights at 12 feet and below.

Stage 1 will be continuous nighttime lighting turned on with a photocell and designed to meet minimum requirements for safety and security. The general purpose of Stage 1 lighting is to light the ground and general area to the fence. Designing Stage 1 continuous lighting should follow Illuminating Engineering Society of North America (IESNA) RP-33-99 recommended practices for maximum lighting at the fence and past the fence, except where National Electrical Safety Code (NESC) requirements supersede these guidelines for safety reasons or *Federal Register* requirements supersede these guidelines for spill-containment facilities. Stage 1 lighting fixtures mounted at an elevation above 12 feet should be the cutoff or full-cutoff type to reduce off-site glare.

The Stage 2 lighting will be provided for temporary operational needs and will only be turned on when required. Stage 2 lighting is intended to provide visibility of substation structures and devices, to operate switches, and to perform tasks. Design of Stage 2 lighting should follow NESC and IESNA RP-7-01 recommended practices for task lighting.

Substation structures should be utilized for mounting Stage 1 and Stage 2 lighting fixtures wherever feasible. Lighting fixtures should be mounted at the minimum elevation required to provide coverage dictated by the required vertical and horizontal light levels and uniformity. Lights may be mounted above an elevation of 40 feet when required for security reasons, such as cameras, or lighting of objects taller than 40 feet.

For Minor Modifications to Existing Facilities

Additional lighting required for substation modifications will follow the basic existing lighting design. To the degree possible, substation structures should be utilized to mount light fixtures. Lighting fixtures may be mounted at an elevation above 40 feet when required for site coverage, security reasons, such as cameras, or lighting of objects taller than 40 feet. All substation lights mounted at an elevation above 12 feet should be cutoff or full-cutoff type, such that no light is emitted from the fixture at lateral angles above 90 degrees (above the horizontal plane) to reduce off-site glare, unless the light is required for operational needs, such as the operation of a disconnect switch mounted at a higher elevation. To the extent possible, lighting additions should follow *Federal Register*, NESC, IESNA RP-7-01, and IESNA RP-33-99 recommended practices for lighting.

The Stage 1 and Stage 2 lighting approach will not be considered for minor modifications because of the difficulty in rearranging wiring circuits for lighting power supply and control. These changes are more appropriately addressed when major modifications are made.

(For major modifications to existing substations, consideration should be given to implement lighting policies for greenfield sites. This can be determined during site visits and project scoping.)

General Design Issues and Design Principle Definitions

- A Good Neighbor. Most of the design constraints are summed up by this principle. Thoughtful consideration of the neighbors is critical to the success of the design.
- Luminaire Optical Properties. Four designations are used for the light control of outdoor lighting fixtures: Full Cutoff (0 percent, <10 percent), Cutoff (<2.5 percent, <10 percent), Semicutoff (<5 percent, < 20 percent), and Noncutoff. These are in terms of a percentage of the lamp's intensity lateral to the fixture and at an angle 10 degrees below the horizontal plane.
- Light Levels. Light levels are determined for both horizontal and vertical surfaces by the appropriate standards. Principally American National Standards Institute (ANSI)/IESNA RP-7-01, IESNA RP-33-99, IESNA *Lighting Handbook*, 9th Edition, 2000, blue pages Safety/Security-1, IESNA G-1-03, and the NESC, Section 111.A, should be considered.
- Neighboring Property Uses. The lighting design shall consider ways to reduce light trespass in directions where neighbors are known to exist through light fixture placement and control of the fixture light output.
- Design Standards. Design standards are general engineering guides to proper application of lighting equipment to achieve lighting levels consistent with their recommended standards. Primary design standards are listed under the "Light Levels" definition.
- Physical Security Survey. If warranted, specific lighting needs can be determined through the process outlined in IESNA G-1-03, Annex B, with measurements according to Annex C.
- Television Surveillance. If required, television surveillance provides lighting compatible with the needs of camera visibility, which may or may not enhance human visibility.
- Mounting Heights. Mounting height is a key factor in determining the uniformity or evenness of the light level. For substations, mounting heights are defined as Stage 1 or Stage 2 for high and low under "Mounting Locations." Generally, mounting heights provide good uniformity on the ground or structure when lights are spaced a distance two times the mounting height or lateral distance. Aboveground structures will have decreased uniformity by the same ratio unless this design geometry is considered. For example, lights at a 12-foot mounting height typically provide uniform coverage on the ground 24 feet wide. Spacing between fixtures of 48 feet would provide good uniformity on the ground. When lighting vertical structures, the distance to the light affects the uniformity in the same way.
- Mounting Locations. Low mounting heights are defined as 12 feet and below and high mounting heights are above 12 feet.
- Terrain. Nuisance glare and light trespass are also a function of the substation height above or below the average local terrain, including land contours and vegetation height. Terrain can shield fixtures and reduce lighting control requirements.

- Temporary Lighting Systems. Systems designed for outages and limited to portable systems should have no restrictions due to their temporary nature.
- Permanent Lighting Systems. These systems require the most care due to their persistent effect on the neighbors.
- New Construction Greenfield Sites. These sites have a higher level of care due to the clean slate available to accommodate good lighting design.
- Minor Substation Modifications. Small modifications include substation component replacement and expansions of less than 50 percent of the substation capacity. Following the existing lighting design pattern in these cases is acceptable practice to expand the lighting system coverage.
- Extensive Substation Modifications. Extensive modifications involve site voltages or expansions of more than 50 percent capacity. Lighting should be evaluated by design engineers to determine feasibility of using the design approaches of new construction greenfield sites.
- Safety. Wherever unsafe conditions are present, in the judgment of design engineers, additional lighting is warranted.

References

IESNA G-1-03, *Guideline on Security Lighting for People, Property, and Public Spaces*

IESNA *Lighting Handbook*, 9th Edition, 2000, blue pages Safety/Security-1

IESNA RP-7-01, *Recommended Practice for Lighting Industrial Facilities*

IESNA RP-33-99, *Recommended Practice for Lighting for Exterior Environments*

NESC, Institute of Electrical and Electronic Engineers (IEEE), *ANSI/IEEE C2-2007*, 2007 Edition May 2008 Revision

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Appendix C – Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Substation or Communications Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor and subcontractors shall plan, coordinate, and conduct his or her operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting (including clearing and grading or reclearing and removal or dismantling). This specification contains provisions that shall be considered in all TVA and contract construction, dismantling, or forensic operations. If the contractor and his or her subcontractors fail 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 site perimeters, structure, foundation, conduit, grounding, fence, drainage ways, etc., appropriate protective measures to prevent erosion or release of contaminants will be taken immediately upon the end of each step in a construction, dismantling, or forensic sequence, and those protective measures will be inspected and maintained throughout the construction and site stabilization and rehabilitation period.
2. Regulations - TVA and/or the assigned contractor and subcontractor(s) 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 and/or subcontractor(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 and subcontractor(s) 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, site, 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 or communication facility. 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 and best management practices (BMPs).

No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual site, 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, access, and site(s) 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 site or around structures 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 anchor, foundation, or its structure.

5. Sanitation - A designated TVA or contractor and/or subcontractor(s) representative shall contract 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 and subcontractor(s) personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his or her operations and by his or her 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 wastes. Records of the amounts generated shall be provided to the site's or project's designated environmental specialist. Contractor(s) and subcontractor(s) must meet similar provisions on any project contracted by TVA. Final debris, refuse, product, and material removal is the responsibility of the contractor unless special written agreement is made with the ultimate TVA owner of the site.
7. Landscape Preservation - TVA and its contractor(s) and subcontractor(s) shall exercise care to preserve the natural landscape in the entire construction, dismantling, or forensic 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 access and/or 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,

endangered species' habitat, water supply watersheds, and public recreational areas such as parks and monuments. Contractors, their subcontractor(s), 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, grading, borrow, fill, construction, dismantling, or forensic operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's construction superintendent, project manager, or area environmental program administrator and TVA 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, dismantling, or forensic 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 erected erosion and/or sedimentation control shall be maintained and (when TVA or contract construction personnel are unable) the construction crew(s) shall maintain 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 and at sequential steps of construction at the same location on site. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor and/or subcontractor(s) personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections and any required sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling results will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA project manager or supporting environmental specialist.

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

10. Turbidity and Blocking of Streams - Construction, dismantling, or forensic activities in or near streamside management zones 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, dismantling, or forensic 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*.

On rights-of-way, mechanized equipment shall not be operated in flowing or standing water bodies 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, their adjacent wetlands, 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.

Mechanized equipment shall not be operated in flowing or standing water on substation, switching station, or telecommunication sites.

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

11. Floodplain Evaluation - During the planning and design phase of the substation or communications facility, floodplain information should be obtained to avoid locating flood-damageable facilities in the 100-year floodplain. If the preferred site is located within a floodplain area, alternative sites must be evaluated and documentation prepared to support a determination of "no practicable alternative" to siting in the floodplain. In addition, steps taken to minimize adverse floodplain impacts should also be documented.
12. Clearing - No construction, dismantling, or forensic activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure, substation, or communication site or access thereto. TVA and the construction, dismantling, or forensic contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed after each disturbance 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.
13. Restoration of Site - All construction, dismantling, or forensic-related 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. Rehabilitation species shall use species designated by federal guidance that are low-maintenance, native species appropriate for the site conditions that prevail at that location.
 - E. 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.
 - F. The site must be protected from species designated by the federal Invasive Species Council and must not be the source of species that can be transported to other locations via equipment contaminated with viable materials; thus, the equipment must be inspected, and any such species' material found must be removed and destroyed prior to transport to another location.
14. Air Quality Control - Construction, dismantling, and/or forensic crews shall take appropriate actions to minimize the amount of air pollution created by their operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.
15. Burning - Before conducting any open burning operations, the contractor and subcontractor(s) 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 on rights-of-way or project manager for TVA sites.
16. RENOVATION OR DEMOLITION DEBRIS MAY NOT BE BURNED.
17. Dust and Mud Control - Construction, dismantling, or forensic 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.
18. Vehicle Exhaust Emissions - TVA and/or the contractor(s) and subcontractor(s) 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.

19. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way or access route to the site. 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 site except adjacent to or in designated sensitive areas. The Heavy Equipment Department within TVA or the construction, dismantling, or forensic 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. Records of amounts generated shall be provided to TVA. Equipment shall not be temporarily stored in stream floodplains whether overnight or on weekends or holidays.
20. Smoke and Odors - TVA and/or the contractor(s) and subcontractor(s) shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor and subcontractor(s) shall not burn refuse such as trash, rags, tires, plastics, or other debris.
21. Noise Control - TVA and/or the contractor and subcontractor(s) 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, dismantling, or forensic 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.
22. 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.
23. Damages - The movement of construction, dismantling, or forensic 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 and subcontractor(s) will be responsible for erosion damage caused by his or her actions and employees 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 project to be handled shall be documented with an implementation schedule and a property owner signature obtained.
24. Final Site Cleanup and Inspection - The contractor's designated person shall ensure that all construction, dismantling, or forensic-related debris, products, materials, and wastes are properly handled, labeled as required, and removed from the site. Upon completion of those activities, that person and a TVA-designated person shall walk down the site and complete an approval inspection.

Revision April 2007

**Appendix D – Tennessee Valley Authority
Categorical Exclusion Checklist 23534**

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Categorical Exclusion Checklist for Proposed TVA Actions

Categorical Exclusion Number Claimed 20	Organization ID Number 102350 - W.O.s 43E4D and 44N49	Tracking Number (NEPA Administration Use Only) 23534
Form Preparer Todd C. Liskey	Project Initiator/Manager Thomas Cureton Jr.	Business Unit PSO - Electric System Projects
Project Title Right-of-Way Abandonments for Future Volunteer-East Knox 181-kV Transmission Line - Project 102350,		Hydrologic Unit Code
Description of Proposed Action (Include Anticipated Dates of Implementation) <input checked="" type="checkbox"/> Continued on Page 3 (if more than one line) For Proposed Action See Attachments and References		
Initiating TVA Facility or Office	TVA Business Units Involved in Project	
Location (City, County, State) Knox County, TN, See project description and attached map.		

Parts 1 through 4 verify that there are no extraordinary circumstances associated with this action:

Part 1. Project Characteristics

Is there evidence that the proposed action---	No	Yes	Information Source
1. Is major in scope?	X		Liskey T. C. 12/09/2010
2. Is part of a larger project proposal involving other TVA actions or other federal agencies?		X	For comments see attachments
*3. Involves non-routine mitigation to avoid adverse impacts?	X		Liskey T. C. 12/09/2010
4. Is opposed by another federal, state, or local government agency?	X		Liskey T. C. 12/09/2010
*5. Has environmental effects which are controversial?	X		Liskey T. C. 12/09/2010
*6. Is one of many actions that will affect the same resources?	X		Liskey T. C. 12/09/2010
7. Involves more than minor amount of land?	X		Liskey T. C. 12/09/2010

* If "yes" is marked for any of the above boxes, consult with NEPA Administration on the suitability of this project for a categorical exclusion.

Part 2. Natural and Cultural Features Affected

Would the proposed action---	No	Yes	Permit	Commitment	Information Source for Insignificance
1. Potentially affect endangered, threatened, or special status species?	X		No	No	Liskey T. C. 12/09/2010
2. Potentially affect historic structures, historic sites, Native American religious or cultural properties, or archaeological sites?	X		No	No	Liskey T. C. 12/09/2010
3. Potentially take prime or unique farmland out of production?	X		No	No	Liskey T. C. 12/09/2010
4. Potentially affect Wild and Scenic Rivers or their tributaries?	X		No	No	Liskey T. C. 12/09/2010
5. Potentially affect a stream on the Nationwide Rivers Inventory?	X		No	No	Liskey T. C. 12/09/2010
6. Potentially affect wetlands, water flow, or stream channels?	X		No	No	Liskey T. C. 12/09/2010
7. Potentially affect the 100-year floodplain?	X		No	No	Liskey T. C. 12/09/2010
8. Potentially affect ecologically critical areas, federal, state, or local park lands, national or state forests, wilderness areas, scenic areas, wildlife management areas, recreational areas, greenways, or trails?	X		No	No	Liskey T. C. 12/09/2010
9. Contribute to the spread of exotic or invasive species?	X		No	No	Liskey T. C. 12/09/2010
10. Potentially affect migratory bird populations?	X		No	No	Liskey T. C. 12/09/2010
11. Involve water withdrawal of a magnitude that may affect aquatic life or involve interbasin transfer of water?	X		No	No	Liskey T. C. 12/09/2010
12. Potentially affect surface water?	X		No	No	Liskey T. C. 12/09/2010
13. Potentially affect drinking water supply?	X		No	No	Liskey T. C. 12/09/2010
14. Potentially affect groundwater?	X		No	No	Liskey T. C. 12/09/2010
15. Potentially affect unique or important terrestrial habitat?	X		No	No	Liskey T. C. 12/09/2010
16. Potentially affect unique or important aquatic habitat?	X		No	No	Liskey T. C. 12/09/2010

Volunteer-East Knox Bulk Transmission Project

Part 3. Potential Pollutant Generation

Would the proposed action potentially (including accidental or unplanned)---	No	Yes	Permit	Commitment	Information Source for Insignificance
1. Release air pollutants?	X		No	No	Liskey T. C. 12/09/2010
2. Generate water pollutants?	X		No	No	Liskey T. C. 12/09/2010
3. Generate wastewater streams?	X		No	No	Liskey T. C. 12/09/2010
4. Cause soil erosion?	X		No	No	Liskey T. C. 12/09/2010
5. Discharge dredged or fill materials?	X		No	No	Liskey T. C. 12/09/2010
6. Generate large amounts of solid waste or waste not ordinarily generated?	X		No	No	Liskey T. C. 12/09/2010
7. Generate or release hazardous waste (RCRA)?	X		No	No	Liskey T. C. 12/09/2010
8. Generate or release universal or special waste, or used oil?	X		No	No	Liskey T. C. 12/09/2010
9. Generate or release toxic substances (CERCLA, TSCA)?	X		No	No	Liskey T. C. 12/09/2010
10. Involve materials such as PCBs, solvents, asbestos, sandblasting material, mercury, lead, or paints?	X		No	No	Liskey T. C. 12/09/2010
11. Involve disturbance of pre-existing contamination?	X		No	No	Liskey T. C. 12/09/2010
12. Generate noise levels with off-site impacts?	X		No	No	Liskey T. C. 12/09/2010
13. Generate odor with off-site impacts?	X		No	No	Liskey T. C. 12/09/2010
14. Produce light which causes disturbance?	X		No	No	Liskey T. C. 12/09/2010
15. Release of radioactive materials?	X		No	No	Liskey T. C. 12/09/2010
16. Involve underground or above-ground storage tanks or bulk storage?	X		No	No	Liskey T. C. 12/09/2010
17. Involve materials that require special handling?	X		No	No	Liskey T. C. 12/09/2010

Part 4. Social and Economic Effects

Would the proposed action---	No	Yes	Commitment	Information Source for Insignificance
1. Potentially cause public health effects?	X		No	Liskey T. C. 12/09/2010
2. Increase the potential for accidents affecting the public?	X		No	Liskey T. C. 12/09/2010
3. Cause the displacement or relocation of businesses, residences, cemeteries, or farms?	X		No	Liskey T. C. 12/09/2010
4. Contrast with existing land use, or potentially affect resources described as unique or significant in a federal, state, or local plan?	X		No	Liskey T. C. 12/09/2010
5. Disproportionately affect minority or low-income populations?	X		No	Liskey T. C. 12/09/2010
6. Involve genetically engineered organisms or materials?	X		No	Liskey T. C. 12/09/2010
7. Produce visual contrast or visual discord?	X		No	Liskey T. C. 12/09/2010
8. Potentially interfere with recreational or educational uses?	X		No	Liskey T. C. 12/09/2010
9. Potentially interfere with river or other navigation?	X		No	Liskey T. C. 12/09/2010
10. Potentially generate highway or railroad traffic problems?	X		No	Liskey T. C. 12/09/2010

Part 5. Other Environmental Compliance/Reporting Issues

Would the proposed action---	No	Yes	Commitment	Information Source for Insignificance
1. Release or otherwise use substances on the Toxic Release Inventory list?	X		No	Liskey T. C. 12/09/2010
2. Involve a structure taller than 200 feet above ground level?	X		No	Liskey T. C. 12/09/2010
3. Involve site-specific chemical traffic control?	X		No	Liskey T. C. 12/09/2010
4. Require a site-specific emergency notification process?	X		No	Liskey T. C. 12/09/2010
5. Cause a modification to equipment with an environmental permit?	X		No	Liskey T. C. 12/09/2010
6. Potentially impact operation of the river system or require special water elevations or flow conditions??	X		No	Liskey T. C. 12/09/2010
7. Involve construction of a new building or renovation of existing building (i.e., major changes to lighting, HVAC, and/or structural elements of building of 2000 sq. ft or more) on which TVA will pay/pays the utilities??	X		No	Liskey T. C. 12/09/2010

Volunteer-East Knox Bulk Transmission Project

DCKC will provide additional rights on about 5.89 acres of the Waterville-Arlington ROW. There are no structures on any of this ROW, so no further action is required by TVA.

CEC General Comment Listing

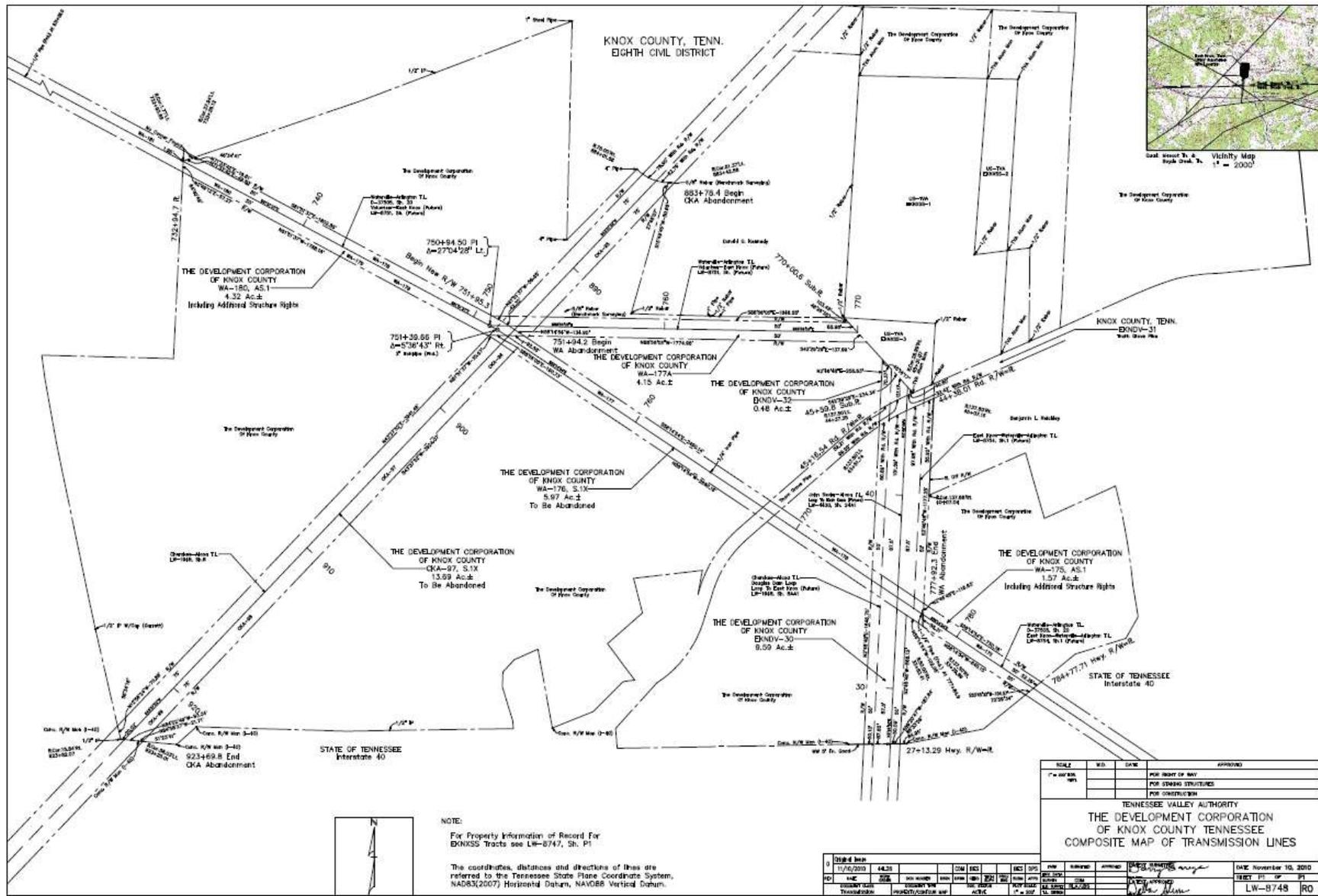
1. The attached map shows location of ROW abandonments and areas where DCKC will provide additional rights to TVA.
By: Todd C. Liskey 12/14/2010
Files: Vol-EKnox_ROW_Abandonment_Map.pdf 12/14/2010 1,111,399 Bytes
2. The attached drawing shows the surveyed locations of the transmission lines on DCKC property.
By: Todd C. Liskey 12/14/2010
Files: LW-8748sP1.pdf 12/14/2010 237,336 Bytes

CEC Comment Listing

Part 1 Comments

2. This action is required in order to facilitate development by DCKC and a TVA power supply project in Knox County to provide additional load. The EA is expected to be completed in December 2012.
By: Todd C. Liskey 12/14/2010

Volunteer-East Knox Bulk Transmission Project



Appendix E – 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.

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Appendix F – 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 G – 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.

Revision April 2007

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>1. Reference</p>	<ul style="list-style-type: none"> 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.” 	<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"> 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.”
<p>2. Equipment Crossings</p>	<ul style="list-style-type: none"> All crossings of streams must comply with appropriate state and federal 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. 	<ul style="list-style-type: none"> All crossings of streams must comply with appropriate state and 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. 	<ul style="list-style-type: none"> All crossings of streams also must comply with appropriate state and federal permitting requirements. 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.

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

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
<p align="center">3.</p> <p align="center">Cutting Trees</p>	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. • Cutting of trees near permanent streams must be limited to those meeting National Electrical Safety Code and danger tree requirements. • Stumps can be cut close to ground level but must not be removed or uprooted. 	<ul style="list-style-type: none"> • 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 1 foot above the ground line.
<p align="center">4.</p> <p align="center">Other Vegetation</p>	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.

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Appendix H – 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 Methods

- 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 (TGRs).

- 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. Table 1 below identifies herbicides currently used on TVA rights-of-way. Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental Protection Agency (USEPA)-approved label and consistent with utility standard practice throughout the Southeast.

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
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron/Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammonium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Streamline	Aminocyclopyrachlor/Metsulfuron/Liquid	Caution
Transline	Clopyralid/Liquid	Caution

Table 2 - Pre-emergent 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>
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

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>
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

- B. The herbicides listed in Tables 1 and 2 and TGRs listed in Table 3 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). Electronic copies can be accessed at <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.

- C. 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.
- D. 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).
- E. 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.
- F. 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* (Muncy 1999), 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, USEPA guidelines, and respective state regulations and laws.
- G. 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 (Muncy 1999):
 - 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) 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.
- I. TVA currently uses primarily low-volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr / Metsulfuron Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.0 References

- Muncy, J. A. 1999. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*, revised edition. Edited by C. Austin, C. Brewster, A. Lewis, K. Smithson, T. Broyles, and T. Wojtalik. Norris: Tennessee Valley Authority, Technical Note TVA/LR/NRM 92/1.
- 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.
- . 2002a. *Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement Supplement*. Southern Region Management Bulletin R8-MB-97A, October 2002. Atlanta, Ga.: USDA Forest Service.
- . 2002b. *Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement Supplement*. Southern Region Management Bulletin R8-MB-98A, October 2002. Atlanta, Ga.: USDA Forest Service.

**Appendix I – Stream Crossings Along the Proposed Volunteer–
East Knox Transmission Line Route and Substation Site Located
in Knox County, Tennessee**

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Table I. Stream Crossings Along the Proposed Volunteer–East Knox 161-kV Transmission Line Route, Dumplin Valley-Nixon Road 161-kV Loop Line and East Knox 161-kV Substation Site Located in Knox County, Tennessee

Stream Identification	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
001	Perennial	Category A (50 feet)	Roseberry Creek	15-foot -wide channel. High water prevented substrate observations at time of survey.
002	Perennial	Category A (50 feet)	Unnamed tributary to Roseberry Creek	2-foot-wide x 1-foot-deep channel with clay/gravel substrate.
003	Intermittent	Category A (50 feet)	Unnamed tributary to Strong Creek	4-foot-wide x 3-foot-deep channel with gravel/bedrock substrate. Livestock have access to stream.
004	Perennial	Category A (50 feet)	Strong Creek	7-foot-wide x 5-foot-deep channel with bedrock/cobble substrate.
005	Perennial	Category A (50 feet)	Unnamed tributary to Strong Creek	Spring run. Water flowing at time of survey.
006	Perennial	Category A (50 feet)	Strong Creek	5-foot-wide x 5-foot-deep channel with cobble/gravel substrate. Corbicula shells observed.
007	Other	Category A (50 feet)	Pond	Pond.
008	Perennial	Category A (50 feet)	Legg Creek	30-foot-wide x 3-foot-deep channel with bedrock/cobble substrate. Fish and snails observed.
009	Other	Category A (50 feet)	Pond	Pond.
010	Perennial	Category A (50 feet)	Holston River	Holston River at river mile 9.5.
011	Perennial	Category A (50 feet)	Sinking Creek	15-foot-wide x 6-foot-deep channel with gravel substrate.
012	Perennial	Category A (50 feet)	Sinking Creek	15-foot-wide x 6-foot-deep channel with back channel present.
013	Intermittent	Category A (50 feet)	Unnamed tributary to Cash Branch	Scored 19 on TDEC Hydrologic Determination Field Data Sheet ¹ .
014	Other	Category A (50 feet)	Pond	Pond.
015	Intermittent	Category A (50 feet)	Unnamed tributary to Cash Branch	Scored 26 on TDEC Hydrologic Determination Field Data Sheet ¹ .
016	Intermittent	Category A (50 feet)	Unnamed tributary to Cash Branch	Scored 26 on TDEC Hydrologic Determination Field Data Sheet ¹ .

Volunteer-East Knox Bulk Transmission Project

Stream Identification	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes
017	Perennial	Category A (50 feet)	Unnamed tributary to Cash Branch	Scored 32 on TDEC Hydrologic Determination Field Data Sheet ¹ .
018	Intermittent	Category A (50 feet)	Unnamed tributary to Cash Branch	Scored 27.5 on TDEC Hydrologic Determination Field Data Sheet ¹ .
019	Perennial	Category A (50 feet)	Unnamed tributary to Lyon Creek.	Forested riparian zone.
020	Perennial	Category A (50 feet)	Lyon Creek	Partially forested.

¹Under normal conditions, the watercourse is a wet-weather conveyance if the secondary indicator score on the Hydrologic Determination Field Data Sheet is less than 19.

Appendix J – Results of the June 2012 Indiana Bat Acoustic Survey for TVA’s Volunteer-East Knox Bulk Transmission Project in Knox County, Tennessee

As a result of recent draft Indiana bat survey guidance released by the U.S. Fish and Wildlife Service (USFWS), habitat assessments were conducted within the proposed project area to identify dead trees greater than 5 inches in diameter with exfoliating bark (USFWS 2012). Trees meeting this criteria were then examined for suitable roost characteristics. Potentially suitable summer roosting habitat for Indiana bat was identified within a few isolated forested pockets along McNally Ridge where the proposed new right-of-way (ROW) would begin, between Carter Mill Drive and Copper Road, and on either side of Interstate (I)-40 (Figure J-1). The combined total area of potentially suitable habitat is approximately 5 to 6 acres.

Because the time frame for the initial clearing of the proposed ROW would include summer months, acoustic surveys for bats were conducted at each of these three areas. Two bat acoustic detectors (Anabat SD2 Compact Flash Bat Detector, Titley Scientific, Manual Version 1.5, August 2010) were set up at each of the three locations and programmed to record bat calls for 2 consecutive nights. Each pair of detectors was at least 200 meters apart and was placed in openings located in close proximity to areas identified as potentially suitable (USFWS 2012, USFWS and Kentucky Department of Fish and Wildlife Resources 2010).

Bat acoustic surveys were conducted at the sites along McAnnally Ridge June 4-5, between Carter Mill Drive and Copper Road June 6-7, on the north side of I-40 June 13-14, and on the south side of I-40 June 19-20. Call files collected by the acoustic equipment during these survey dates were uploaded into Analook W.exe (Titley Scientific, www.hoarybat.com, Version 0.3.8.17) and then analyzed using a call filter designed by the Kentucky Field Office of the USFWS and approved for use by the Tennessee Field Office of the USFWS. This call filter was built based on documented call characteristics of Indiana bat observed when foraging in open spaces. Results from analysis of the calls with respect to detection of Indiana bat are listed in Table J-1. One call file that was collected June 20 at the survey site located on the southside of I-40 was identified by the analysis as containing calls from an individual Indiana bat. This site was in the proximity of an existing transmission line ROW and the proposed Dumplin Valley-Nixon Road Loop line.

Volunteer-East Knox Bulk Transmission Project

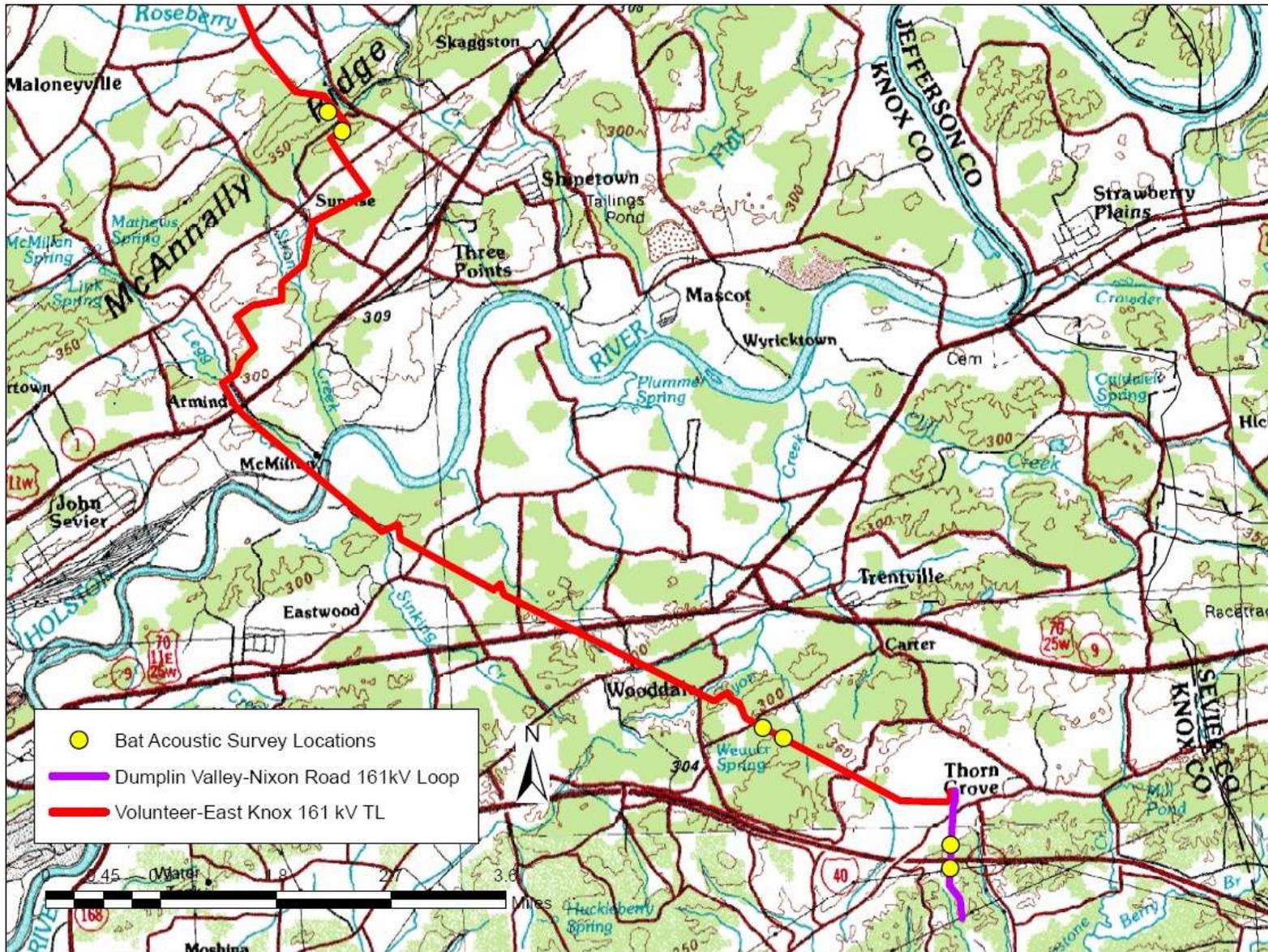


Figure J-1. 2012 Indiana Bat Acoustic Survey Locations along Proposed Right-of-Way for the Volunteer-East Knox Bulk Transmission Project in Knox County, Tennessee

Table J-1. Results of Bat Acoustic Surveys Conducted Near Habitat Identified as Potentially Suitable for Summer Roosting Indiana Bat.

Site	Property - Landmark	Date	Anabat Serial Number	Total Number of Files	Number of Files with Bat Calls	Number of Files with Indiana Bat Calls
McAnnally Ridge	North of Sunrise Road	06/04/2012	81704	350	33	0
McAnnally Ridge	North of Sunrise Road	06/05/2012	81704	157	21	0
McAnnally Ridge	South of Sunrise Road	06/04/2012	81703	383	19	0
McAnnally Ridge	South of Sunrise Road	06/05/2012	81703	74	64	0
Carter Mill	South of Carter Mill Road	06/06/2012	81704	94	85	0
Carter Mill	South of Carter Mill Road	06/07/2012	81704	216	195	0
Copper Road	North of Copper Road	06/06/2012	81703	164	14	0
Copper Road	North of Copper Road	06/07/2012	81703	26	12	0
I-40	Northside	06/13/2012	81704	109	104	0
I-40	Northside	06/14/2012	81704	127	119	0
I-40	Southside	06/19/2012	81703	51	44	0
I-40	Southside	06/20/2012	81703	59	55	1

United States Fish and Wildlife Service and Kentucky Department of Fish and Wildlife Resources. 2010. *Indiana Bat Survey Guidance for Kentucky*. Frankfort, Kentucky, 38 pages.

_____. 2012. *Rangewide Indiana Bat Summer Survey Guidance, Draft, February 3, 2012*. United States Fish and Wildlife Service, <<http://www.fws.gov/midwest/Endangered/mammals/inba/index.html>> (n.d.).

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**Appendix K – Farmland Classification of the Proposed East Knox
161-kV Substation Site Located in Knox County, Tennessee**

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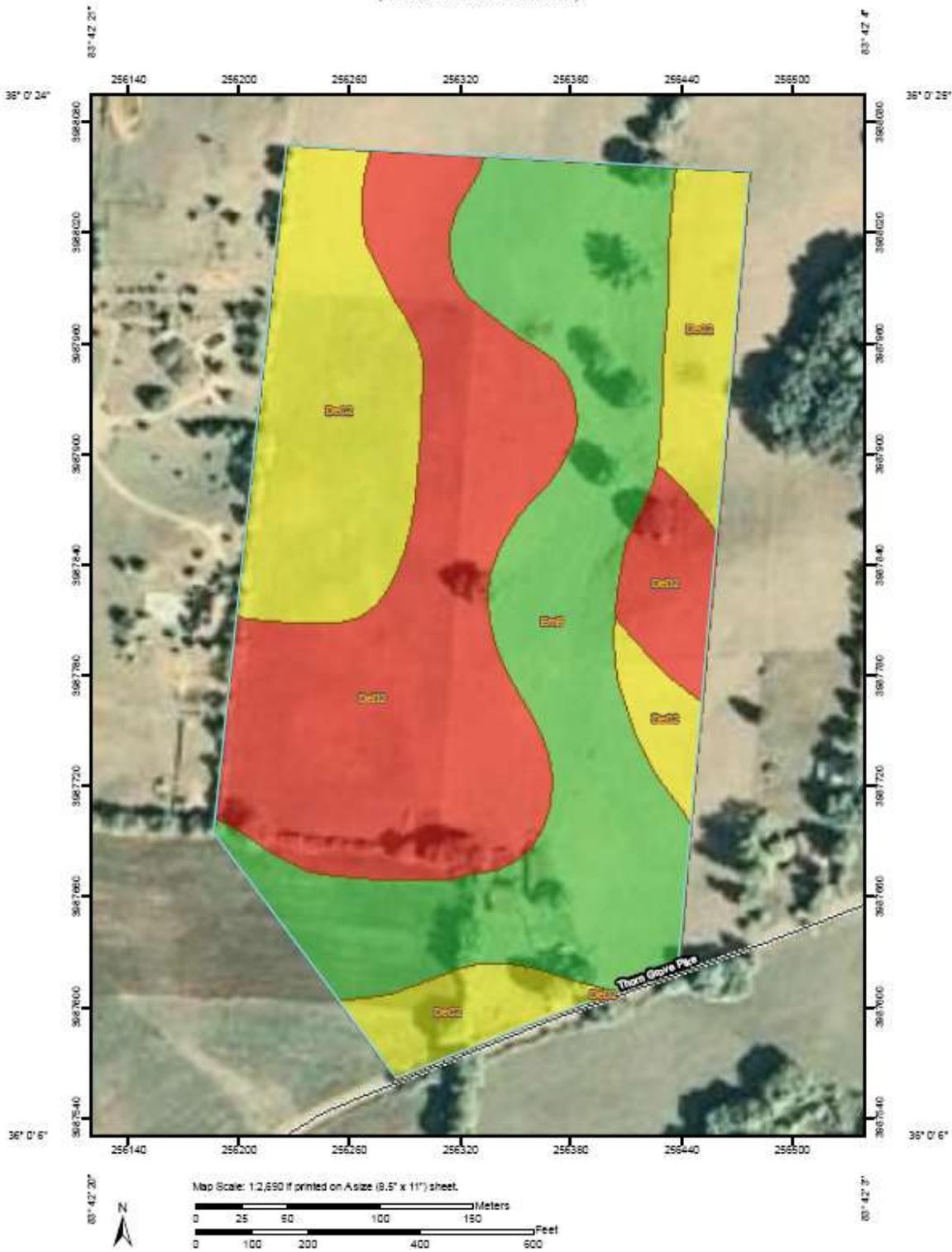
U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 2/17/12			
Name Of Project Volunteer-E. Knox Transmission System Project		Federal Agency Involved TVA			
Proposed Land Use Sub-Station		County And State Knoxville, TN			
PART II (To be completed by NRCS)		Date Request Received By NRCS 2/17/12			
Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply -- do not complete additional parts of this form).		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Acres Irrigated None	Average Farm Size 66 acres
Major Crop(s) Corn (indication crop)	Farmable Land In Govt. Jurisdiction Acres: 177,300	% 53	Amount Of Farmland As Defined in FPPA Acres: 62,900 % 19		
Name Of Land Evaluation System Used LESA	Name Of Local Site Assessment System NA	Date Land Evaluation Returned By NRCS 2/27/12			
PART III (To be completed by Federal Agency)		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly		28.5			
B. Total Acres To Be Converted Indirectly					
C. Total Acres In Site		28.5	0.0	0.0	0.0
PART IV (To be completed by NRCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		10.5			
B. Total Acres Statewide And Local Important Farmland		6.7			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0.0			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		39.0			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)		73	0	0	0
PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))		Maximum Points			
1. Area In Nonurban Use		15			
2. Perimeter In Nonurban Use		9			
3. Percent Of Site Being Farmed		20			
4. Protection Provided By State And Local Government		0			
5. Distance From Urban Builtup Area		15			
6. Distance To Urban Support Services		5			
7. Size Of Present Farm Unit Compared To Average		5			
8. Creation Of Nonfarmable Farmland		0			
9. Availability Of Farm Support Services		5			
10. On-Farm Investments		5			
11. Effects Of Conversion On Farm Support Services		0			
12. Compatibility With Existing Agricultural Use		0			
TOTAL SITE ASSESSMENT POINTS		180	79	0	0
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	73	0	0
Total Site Assessment (From Part VI above or a local site assessment)		180	79	0	0
TOTAL POINTS (Total of above 2 lines)		280	152	0	0
Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Reason For Selection:					

Volunteer-East Knox Bulk Transmission Project

Farmland Classification—Knox County, Tennessee (Volunteer-E. Knox Sub-Station)

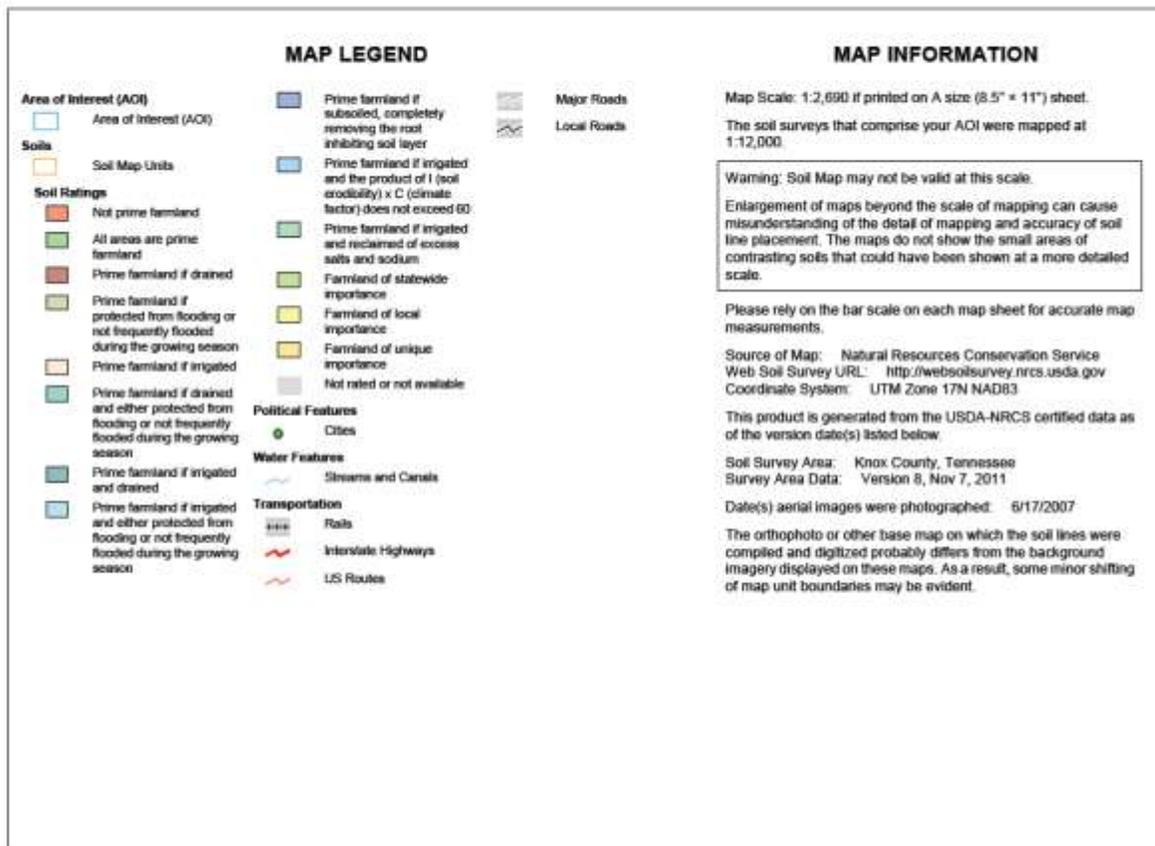


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Farmland Classification-Knox County, Tennessee
(Volunteer-E. Knox Sub-Station)



Farmland Classification

Farmland Classification— Summary by Map Unit — Knox County, Tennessee (TN093)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DeC2	Dewey silt loam, 5 to 12 percent slopes, eroded	Farmland of local importance	8.1	28.2%
DeD2	Dewey silt loam, 12 to 25 percent slopes, eroded	Not prime farmland	10.3	36.1%
EmB	Emory silt loam, 2 to 5 percent slopes	All areas are prime farmland	10.2	35.7%
Totals for Area of Interest			28.6	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower