

FINDING OF NO SIGNIFICANT IMPACT TENNESSEE VALLEY AUTHORITY

PICKWICK LANDING DAM SOUTH EMBANKMENT SEISMIC UPGRADE

The Tennessee Valley Authority (TVA) proposes to make upgrades to the south embankment of Pickwick Landing Dam to improve performance of the dam during and following a large earthquake, should one occur. Upgrades would be made to both the upstream and downstream sides of the embankment, and would include the construction of berms and placement of fill. The Pickwick Landing Dam is a multi-purpose concrete and earthen embankment dam located on the Tennessee River (Mile 206.7) in Hardin County, Tennessee, near Tennessee's border with Mississippi and Alabama.

Completed in the 1930s, the dam consists of a 3,300-foot-long concrete dam which extends to the north and two large navigation locks, as well as an earthen embankment which extends to the south approximately 4,380 feet. The south embankment was constructed using hydraulic fill methods and has a maximum height of about 65 feet.

The Pickwick Landing Dam is approximately 100 miles from southern portions of New Madrid Seismic Zone along the Mississippi River. According to the U.S. Geological Survey, the New Madrid is the most active seismic zone in the United States east of the Rocky Mountains, and there is a 7 to 10 percent chance or probability that a quake of magnitude 7 to 8 will occur in the New Madrid region within the next 50 years. A seismic stability evaluation of the dam's south embankment completed in 2014 indicates that under a "design earthquake" scenario, the loss of strength is likely to occur in some soil layers of the embankment, leading to slope instability. The analysis indicates that the mean annual probability of an earthquake-induced breach is between 1 in 2,500 and 1 in 1,250 for reservoir elevations between 408 (winter pool) and 414 (summer pool) feet, respectively. TVA considers these probabilities high enough that upgrades to the south embankment are warranted. Even if a breach were not to occur, a slope stability failure (especially one in the upstream direction) would likely require lowering the reservoir well below winter pool to ensure safety and make repairs. Making scheduled upgrades to the embankment would allow TVA to safeguard residents' health and safety and also avoid the significant economic impacts that would result from having to lower the reservoir below winter pool levels for an extended period following an emergency.

After extensive investigation, TVA developed a proposal to strengthen the dam's earthen embankment and prepared an environmental assessment (EA) to consider its potential environmental impacts. The EA is incorporated by reference herein.

Proposed Action

As described in detail in the EA, TVA proposes to strengthen the embankment by making upgrades along both the upstream and downstream side of the embankment. On the upstream and downstream sides of the embankment, TVA would place fill for an upstream berm along the embankment and in extended fill areas in select locations. To support construction activities, approximately 7.5 acres below the dam (on TVA land west of North Carolina Land Road) would

be used for laydown activities, including material and equipment storage, for the duration of the project. More information about these activities is included below:

Proposed Upstream Activities

Similar to the proposed downstream activities, a berm and fill would be built on the upstream side of the dam. The proposed impact area for this portion of the project is approximately 32 acres. Construction of the berm on the upstream side would involve placing fill consisting of crushed stone, sand and/or gravel or riprap into the reservoir adjacent to the embankment. If sand and gravel are used for the upstream berm, vibratory densification techniques would be used to compact the berm. The berm would have a riprap face and would be constructed either with a barge-mounted crane or placed from land starting at the south abutment. TVA would not alter normal reservoir operations at Pickwick Landing Dam during the construction period.

Extended fill would also be placed in an area of the embankment adjacent to the Pickwick Lock. Because the extended fill would extend far beyond the upstream slope, the crushed stone would be placed using barge-mounted equipment.

Proposed Downstream Activities

The proposed berm along the downstream side would be located adjacent to the dam and would stabilize potential shallow downstream failures through the embankment. The proposed impact area for this portion of the project is approximately 35 acres. The extended fill would be placed only in select locations downstream and would reach a distance downstream of the toe to stabilize potential failures through the foundation's silty sand. The area to receive the most extended fill would be to the north, close to the dam's navigational lock. The fill areas would not need to be as high as the berm.

Prior to construction, vegetation, trees and stumps in the project area would be removed and disposed of off-site, topsoil and riprap would be removed to a storage area for reuse, and erosion and sedimentation controls would be installed. The downstream berm would consist of sand and gravel imported from an off-site location, placed with bulldozers, and compacted with vibratory drum rollers. The existing riprap on the downstream slope would be stripped and stockpiled and the flat portion of the berm would be covered with topsoil and seeded.

Because the weight of the proposed berm could cause the existing clay tile toe drain pipes to collapse, the toe drain pipes would be replaced prior to construction, and new manholes passing through the berm would be constructed. At one location along the embankment, the existing drainage swale that collects flow would be filled as part of the fill area so it would be replaced with a buried pipe extending past the fill area.

Proposed Laydown Area

The proposed location for material and equipment storage is on the downstream (west) side of the embankment, across from TVA's existing maintenance facility. This site is approximately 7.5 acres and is an open, unmaintained field of grasses, small scrub bushes and small pine trees. Vegetation on the site would be cleared and equipment would be used to scrape the topsoil (approximately 3 to 4 inches) and to lay a nonwoven, fiber fabric on which crushed stone would be placed. The laydown area would be used for parking, equipment and material storage and staging, placement of a temporary office trailer(s), and other project management activities. Utilities currently serving the shooting range would be extended to serve the laydown area as well. After completion of the project, TVA would remove the stone and fabric, revegetate, and restore the area to its current condition.

Proposed Access

Construction activities would not necessitate closure of or restrictions to travel on Highway 128 crossing the dam. In the EA, TVA evaluated several options for accessing the embankment and fill areas for construction activities. To access the upstream side of the embankment, three options were evaluated, including using barges on the reservoir, constructing and using an access road along the embankment, and using a combination of barges and the access road. On the downstream side of the embankment, North Carolina Landing Road would provide access to the construction and laydown areas.

Proposed Schedule of Activities

TVA proposes to initiate some site preparation activities, including vegetation clearing, in late 2016. TVA proposes to initiate construction in 2017 and conclude in late 2021 (dates are subject to change). Work would be conducted year round during the construction period and occur primarily during daylight hours of the work week. Occasionally, activities may occur on weekend days. TVA does not anticipate the need for nighttime work activities or continuous, around-the-clock activities at any point during the project.

TVA analyzed two alternatives in the EA: the Proposed Action as summarized above and the No Action alternative, under which TVA would not strengthen the dam's earthen embankment. Because of the continuing risk and potential impact to the public of taking no action, the No Action alternative is not considered reasonable. In the EA, TVA also listed and summarized 6 other seismic upgrade alternatives that were considered by TVA engineers and external experts but ultimately dismissed from further consideration.

Environmental Assessment

In the EA, TVA analyzed potential impacts to the following environmental and socioeconomic resource areas:

- Floodplains
- Water supply
- Groundwater
- Wildlife
- Vegetation
- Aquatic ecology
- Threatened and endangered species
- Natural areas, parks and recreation
- Transportation
- Surface water
- Wetlands
- Air quality
- Utilities
- Socioeconomics and environmental justice
- Cultural resources
- Noise
- Navigation
- Solid waste

Generally, TVA's analysis found that most environmental resources would be minimally affected by the proposed upgrades. Many actions associated with the proposed upgrades would occur on the dam's earthen embankment, which is a previously disturbed area; therefore, impacts to most resources are anticipated to be minimal. The clearing and fill of areas on the downstream side of the embankment would impact approximately 22.5 acres of suitable summer habitat for the Indiana and northern long-eared bats, approximately 2.5 acres of wetland, and approximately 370 linear feet of stream (see proposed mitigation below). Minor and temporary impacts from construction traffic, including importing new fill material via road or barge, and noise from construction activities are also anticipated. Project activities would not affect the navigation of the Tennessee River or use of the navigation locks at the dam, and normal

operations of Pickwick Dam would continue during construction, in accordance with the 2004 Reservoir Operations Study Environmental Impact Statement. In addition, the proposed action was found to be consistent with Executive Order 11988 on floodplain management and Executive Order 11990 on wetlands.

Public Involvement and Intergovernmental Review

On August 12, 2016, TVA issued a draft of the EA for a 30-day review and comment period. Comments were received from four individuals, the U.S. Fish and Wildlife Service, the State of Tennessee Department of Environment and Conservation (TDEC), and the Packaging Corporation of America, which operates a manufacturing facility near the project area. TVA responded to these comments in the final EA.

As required under Section 106 of the National Historic Preservation Act, TVA consulted appropriate recognized Native American tribes and the State of Tennessee Historic Preservation Office (SHPO) concerning potential impacts to the project area and the dam, which is eligible for inclusion on the National Register of Historic Places. The Tennessee SHPO concurred with TVA's determination that the project would have no adverse effect on historic or archaeological properties. TVA received no objection from any of the tribes.

In September 2016, TVA began consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act (ESA) regarding the potential impacts to bat species within the project area. TVA biologists have determined that 6.0 acres of the proposed action area could present suitable summer roosting habitat for Indiana and northern long-eared bats. An additional 16.5 acres of forested habitat to be removed could be used as suitable foraging habitat for these two bat species. Included in this consultation, TVA proposed to mitigate indirect impacts to Indiana bat by contributing funds to support activities to conserve and/or promote the recovery of the species. In addition, TVA proposed to limit its clearing of trees in the project area to October 15 to March 31 of any year, when Indiana bats are unlikely to be present in the area. Prior to the commencement of construction, consultation with the USFWS under Section 7 of the ESA will be completed. TVA will mitigate for impacts to the Indiana bat following compensatory mitigation guidance outlined in the USFWS Cookeville Ecological Services' Conservation Strategy for Forest-dwelling Bats in Tennessee.

Prior to implementing the proposal, TVA must also coordinate and secure permits from TDEC and the U.S. Department of Army, Corps of Engineers to address potential impacts to water resources, including streams, floodplains and wetlands, under the Clean Water Act.

Mitigation

TVA will implement the following mitigation measures to avoid, minimize, or mitigate adverse impacts on the environment. In addition, all applicable permits would be acquired and permit-related mitigation measures and best management practices would be implemented to further minimize impacts and restore areas disturbed during construction and operations.

- Erosion controls to reduce stormwater runoff would be implemented in accordance with a Stormwater Pollution Prevention Plan. Erosion and sediment controls will be installed, placed, implemented, or constructed in accordance with the provisions of the Tennessee Erosion and Sediment Control Handbook.
- TVA will mitigate for impacts to the Indiana bat following compensatory mitigation guidance outlined in the USFWS Cookeville Ecological Services' Conservation Strategy

for Forest-dwelling Bats in Tennessee. In addition, a tree clearing moratorium will be in effect from April 1 to October 14 of any year. No ground-disturbing activities will occur until TVA has completed consultation and fulfilled its obligations under Section 7.

- TVA will mitigate impacts to wetlands in the project area via compensatory mitigation as determined by U.S. Army Corps of Engineers permitting requirements.
- TVA will mitigate impacts to streams by purchasing an appropriate number of credits from the Tennessee In-Lieu-Fee Stream Mitigation Program, as determined during the permitting process.
- To address impacts to reservoir surface waters, floating silt barriers/turbidity curtains will be placed in reservoir waters adjacent to the project area to contain turbidity during construction activities. TVA or contract personnel will conduct regular sampling of adjacent waters and continual visual inspections of waters to monitor for turbidity. Additional measures will be considered if necessary to control turbidity, including the use of flocculants (after coordination and approval from TDEC).
- Prior to mobilization, TVA will develop an evacuation plan to relocate flood-damageable, loose, or valuable equipment out of the floodplain during a flood.
- The design of the seismic upgrade project will be modeled in the current Hardin County Flood Insurance Study hydraulic model. If needed, compensatory adjustments will be included in the cross section of the river where the project would take place, to prevent any increase in modeled upstream flood elevations. If compensatory adjustments are insufficient to prevent an increase in modeled upstream flood elevations, consultation with Hardin County floodplain officials will be initiated to determine the next steps in order to comply with the National Flood Insurance Program.
- Navigation notices concerning construction activities adjacent to the dam's navigational lock will be issued; navigation markers will be placed in the area of extended fill in the reservoir to denote boating hazards.
- To avoid altering the floodway, topsoil and riprap temporarily removed during construction will be stored on-site, by regrading it into the embankment.
- To comply with EO 13112 (Invasive Species), disturbed areas will be revegetated with native or non-native, non-invasive plant species to avoid the introduction or spread of invasive species.
- Prior to creating and using an access road from the southern end of the embankment, TVA will evaluate whether an existing underground waterline of Packaging Corporation of America would be affected by heavy traffic; improvements or minor changes to the route (within the Study Area) would be made to ensure this waterline is not adversely affected.
- During site preparation activities on the downstream side of the embankment, the burning of any vegetation removed and piled on site will occur under proper conditions to minimize or avoid smoke affecting nearby areas. TVA will comply with all local or state requirements for burning.
- Flaggers and signage will be utilized along State Highway 128 and North Carolina Landing Road to improve the safety of those traveling through the project area.

Conclusion and Findings

Based on the findings of the EA, TVA concludes that the proposed seismic upgrades to the south embankment of Pickwick Landing Dam would not be a major federal action significantly affecting the environment. Accordingly, an environmental impact statement is not required.



9/30/2016

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Date Signed