



101 Constitution Avenue, NW, Suite 375 East
Washington, DC 20001-2179
(800) 548.ASCE(2723) *toll free* (202) 789.7850
(202) 789.7859 *fax* ■ www.ASCE.org

September 6, 2017

Tennessee Valley Authority
400 W. Summit Hill Drive #WT-11D
Knoxville, TN 37902

Re: ASCE Comments for Proposed Changes to the TVA's National Environmental Policy Act (NEPA) Procedures 18 CFR Part 1318

Introduction and Background

The American Society of Civil Engineers (ASCE) is pleased to submit the following comments to the Tennessee Valley Authority on its proposed rule re: "Procedures for Implementing the National Environmental Policy Act."

The ASCE was founded in 1852 and is the oldest engineering organization in the nation. The Society represents more than 150,000 civil engineers in private practice, government, industry, and academia who are dedicated to protecting the public safety and welfare of people in the U.S. and worldwide through the advancement of the science and practice of civil engineering. The members of the ASCE are dedicated professionals who design, build, construct, operate, and maintain infrastructure in and around floodplains, and the Society also sets standards related to flood resilient design and construction. For decades, the ASCE has advocated public policies that reduce risk and hold paramount public safety and welfare. Given the ethical responsibility of our members to ensure the public remains safe and that infrastructure is designed to maximize the public interest, including minimizing cost sustainably, the ASCE provides the following comments on the proposed amendments to the TVA National Environmental Policy Act (NEPA) procedures. These ASCE comments necessarily include implementing the Federal Floodplain Risk Management Standard (FFRMS) that was repealed by President Trump's Executive Order on August 15, 2017.

The ASCE supports the federal mitigation of risk, especially pre-disaster mitigation. Between 1980 and 2013, the nation experienced flood-related damages exceeding a total of \$260 billion, and with more than half of the nation's population living within 50 miles of a coast, the risk-management approach taken by the FFRMS is important now more than ever. The FFRMS takes a fiscally responsible, common sense approach of considering and mitigating flood disaster risks

for federally funded development in flood prone areas that should be part of any sustainable agency and organizational planning.

Having considered the role of the professional engineer, reviewed the history of disaster response, and analyzed the proposed actions of the TVA, the ASCE supports the TVA implementation of the sustainable essence of the FFRMS as good resource management. The analysis of the ASCE further finds parts of the proposed rule that could be clarified.

ASCE Policy

The ASCE has two Board approved policies relating to flood risk. The following ASCE policies related to floodplain management indicate that the Society has been actively considering public policies to protect the life and welfare of the citizens of the United States.

The ASCE's Floodplain Management policy states: "The American Society of Civil Engineers (ASCE) urges governments at all levels to adopt proactive floodplain management policies that:

- Hold paramount the public's safety, health, and welfare;
- Protect and restore natural floodplains in situations where the benefit is greater than the costs;
- Enact and enforce land use policies, ordinances and building codes that consider life safety and account for increased risk due to development or major redevelopment of communities in floodplains;
- Inform residents and community planners of the risk associated development in the floodplain;
- Develop flood disaster mitigation and relief plans commensurate with residual risk;
- Develop and exercise flood disaster preparedness and evacuation plans commensurate with residual risk;
- Support creative partnering between federal, state and local governments to adopt floodplain management policies;
- Fund the design and implementation of floodplain management policies and flood mitigation projects;
- Incorporate the concept of building disaster resistant communities consistent with sustainable development;
- Encourage risk appropriate, multiple-uses of flood prone areas;
- Pursue nonstructural flood mitigation facilities, including river restoration and wetland restoration that include improvements in habitat, ecosystems, recreation and open space use; and
- Incorporate floodplains into comprehensive watershed management programs."

The ASCE's Flood Risk Management policy states: "The American Society of Civil Engineers (ASCE) urges all federal, state and local government agencies, in collaboration with the private sector, to adopt flood risk management policies that provide for:

- A consistent definition of flood risk and an accepted framework for how risk should be estimated;

- Effective and sustainable management of risks posed by floods to life safety, human health, economic activity, cultural heritage and the environment;
- Collaborative risk sharing and risk management at all levels of government and by all stakeholders;
- Risk informed communication, policies and funding priorities; and
- The use of natural processes to mitigate the consequences of flooding.”

Comments

Based on the ASCE support of the FFRMS climate science approach to establishing flood elevations, the Society finds that the TVA’s “Determination of Project Specific FFRMS Elevations and Their Applicability” to be unclear in how the Authority factors in the creditable projections of climate change and the effects of weather and watershed changes on floodplain delineations. This document states:

“The most recent National Climate Assessment (NCA; 2014) indicates that there is either no change to current conditions in the Southeast United States, or the trend data is inconclusive; therefore, TVA considers the water surface elevations computed for 100- and 500-year floods to be informed by climate science.”

Other agencies have found actionable trends, and the TVA has made recent revisions of the probable maximum rainfall (PMR) and probable maximum flooding (PMF) parameters used to design and manage the important dams, reservoirs, and vital coal and nuclear power plants along the Tennessee River. Jawdy (2015)¹ used recent extreme events occurring in and around the Tennessee Valley. These events used by the TVA included at least some data from the 2009 unprecedented flood in northern Georgia, a flood that was very clearly due to a change in climate. Shepherd et al. (2011)² established that, for the first time, this extreme event channeled enormous amounts of moisture into the southeast U.S. from the Pacific Ocean. Prior to 2009, southeastern floods were all due to tropical storms that channeled substantial amounts of moisture from the Gulf of Mexico and other parts of the Atlantic Ocean.

Unfortunately, the TVA did not allow sufficient time for the ASCE to look further into specific TVA procedures and methods of analysis to determine if the Authority is misinterpreting the most recent National Climate Assessment (NCA 2014), usually based on global scale analysis. By contrast, floodplain delineation is a semi-empirical art based on hydrologic records at rain gages and stream gages. Rainfall and streamflow records in and around the Tennessee Valley are available at much greater resolution than the information normally used in climate assessments like the NCA (2014). The definitive determination of climate effects on floodplain determination is to test for stationarity in precipitation and runoff records that includes recent extreme events

¹ Jawdy, C. 2015. TVA’s Flood Hydrology Strategy and Potential for Federal Collaboration. Briefing to Subcommittee on Hydrology. 10/22/2015.

² Shepherd, M., T. Mote, P. Knox, S. McCutcheon, J. Dowd, and M. Roden. 2011. Unique perspectives on how synoptic forcing and urban land cover contributed to the disastrous Atlanta flood of 2009. *Bulletin of the American Meteorological Society* July: 861-870, DOI:10.1175/2010BAMS3003.1 (online 6/2010). [<http://journals.ametsoc.org/doi/pdf/10.1175/2010BAMS3003.1>]

using the methods described by Weaver (2016)³, who evaluated the statistical methods of Bulletin 17b⁴ and the anticipated methods in the draft Bulletin 17c⁵. The brief review of Jawdy (2015) did not indicate evidence of the TVA testing of stationarity. Thus, the ASCE is concerned that the TVA assertion that the Authority floodplain management is “informed by climate science” is at best misleading and misinformed as floodplain management is best informed by the hydrologic science on which floodplain delineation is based.

As a result, the Society is extremely concerned about the public health and safety of the people of the Tennessee Valley. Furthermore, the unprecedented rainfall depths from Hurricane Harvey in just the last few days indicates to the ASCE that the procedures to estimate PMR and PMF in the southeastern U.S. may need to be revised. Updated estimates of these critical parameters may be necessary to better evaluate the risks of TVA dam failures and the ultimate threat to public health and safety.

In addition, the ASCE has concerns about the large number of categorical exclusions proposed in this rule; seemingly innocuous, these categorical exclusions take on a new importance when taken into consideration that the TVA also owns and operates three nuclear power plants. The Society requests that the TVA extend the comment period to give our members and other experts the time necessary to fully review each categorical exclusion. Furthermore, the ASCE strongly recommends that the TVA engage an expert panel of the National Research Council or an independent Blue-Ribbon Panel of experts to evaluate the scientific basis of both the categorical exclusions and the implementation of risk-based floodplain management in the nationally important Tennessee Valley.

In conclusion, the ASCE commends the TVA proposed implementation of the principles of the FFRMS, the use of a risk-management approach that ensures protection of life and welfare, and the wise, efficient, and thoughtful expenditure of taxpayer dollars. However, the Society is concerned about the engineering methods and scientific procedures necessary to manage risks economically and to continue to protect the people of the Tennessee Valley as more and more extreme events put our citizens at risk.

³ Weaver, A. 2016. "Reanalysis of a Flood of Record Using HEC-2, HEC-RAS, and USGS Gage Data." *Journal of Hydrologic Engineering*, DOI: 10.1061/(ASCE)HE.1943-5584.0001354.

⁴ Subcommittee on Hydrology of the Advisory Committee on Water Information. 1982. *Guidelines for Determining Flood Flow Frequency*. Bulletin 17B.

⁵ Subcommittee on Hydrology of the Advisory Committee on Water Information. 2017. *Guidelines for Determining Flood Flow Frequency*. Bulletin 17C, draft.