



# TVA Clinch River SMR Project Early Site Permit Application

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August 14, 2019

NRC Commission Hearing

# TVA Created to Make Life Better

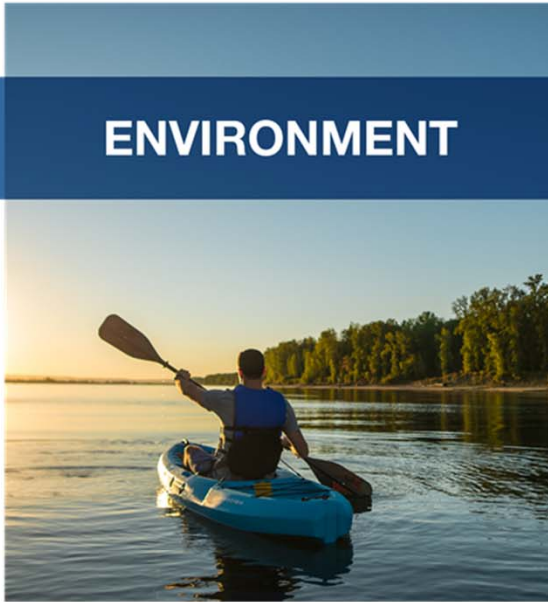


**"...a Corporation clothed with the power of government, but possessed of the flexibility and initiative of a private enterprise."  
- Franklin D. Roosevelt**

# TVA's Mission of Service



Provide *affordable, reliable* power.

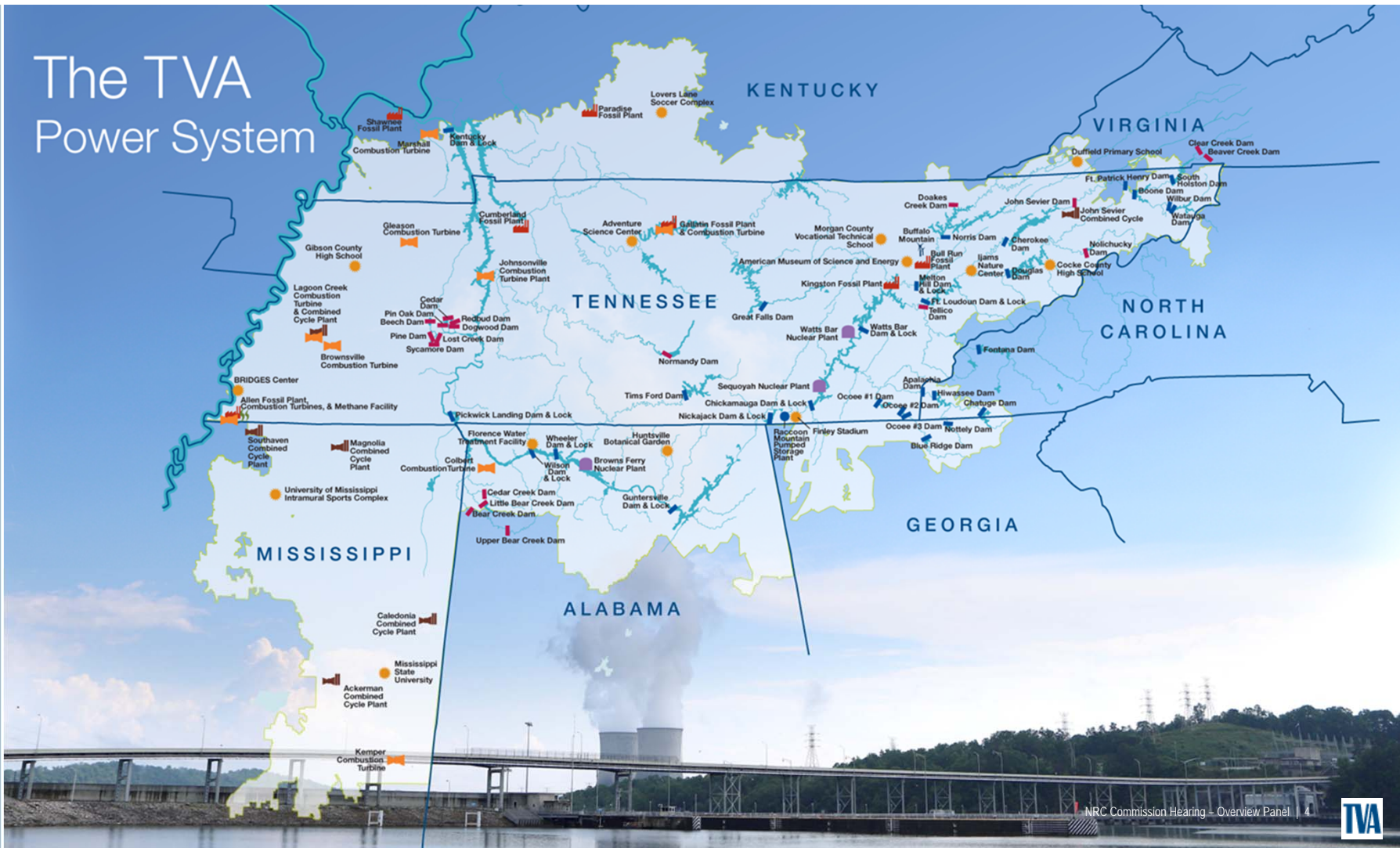


Steward the Valley's *natural resources*.



Partner for *economic growth*.

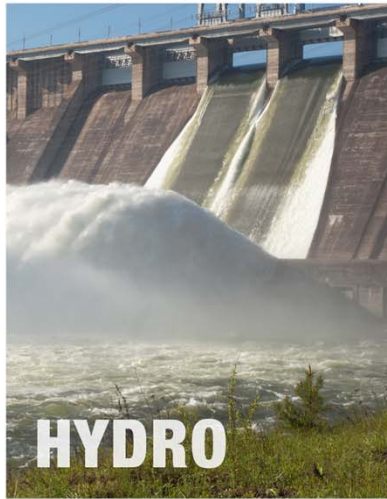
# The TVA Power System



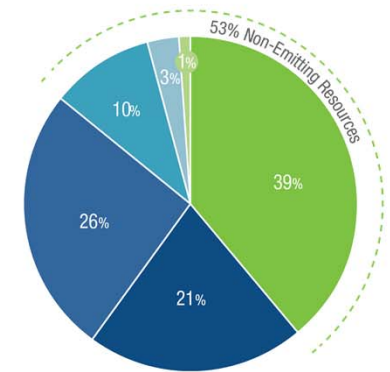
# Caring About Our Resources



# Investing in Cleaner Energy



FY18 Actual Power System Mix



Generating Sources

- Coal
- Gas
- Nuclear
- Hydro
- Wind and Solar
- TVA Energy Efficiency



# Bringing Businesses & Jobs to the Valley



**13<sup>th</sup>** TOP **10** UTILITY  
YEAR

**LAST YEAR**  
ATTRACTED | RETAINED **JOB**  
**65,000**  
**\$11.3** **BILLION**  
INVESTED



# Small Modular Reactors (SMRs)

SMRs are a next-generation nuclear technology with potential for improved safety and increased operational flexibility. SMRs,

- Support TVA's technology innovation mission
- Are consistent with TVA's vision to be one of the nation's leaders in cleaner, low-cost energy.
- Are defined as nuclear reactors 300MWe or less, enabling factory fabrication
- Could safely shut down and self-cool, with no operator action, no electrical power, and no additional water
- Have smaller reactor cores and radiological source terms
- Have the potential for reduced emergency planning zones



# TVA's SMR Program Background

An Early Site Permit Application (ESPA) assesses site suitability for potential construction and operation of a nuclear power plant.

- 2009 - TVA began exploring potential SMR Project
- 2010 - Site Characterization began
- 2014 - TVA shifts to technology neutral ESPA

**The main objectives of the Clinch River SMR Project are to demonstrate:**

- Power generated by SMRs could be used for addressing critical energy security issues.
- SMR technology can assist federal facilities with meeting carbon reduction objectives.
- SMR design features include underground containment and inherent safe-shutdown features, longer station blackout coping time without external intervention, and core and spent fuel pool cooling without the need for active heat removal.
- SMR power generating facilities are designed to be deployed in an incremental fashion to meet the power generation needs of a service area.

# Clinch River Site Overview

- TVA owned/controlled
- Neighbor to DOE, an interested customer
- Access to 500 KV and 161 KV transmission
- Basic Infrastructure
- Strong community support
- Abundant and skilled workforce



NRC Commission Hearing – Overview Panel | 10



# Early Site Permit Application

## Application includes:

- Site Safety Analysis Report (SSAR)
- Environmental Report (ER)
- Emergency Plans (EP) (Part 5A, "Site Boundary" and Part 5B, "Two-Mile")
- Exemptions and Departures (Part 6)

## ESPA based on a "plant parameter envelope" (PPE)

- Composite of reactor and engineered parameters based on the four U.S. light-water SMR designs under development when the application was prepared
- Developed based on NEI 10-01 guidance with margin added to specific parameters
- Up to 800MWt for a single unit with a combined nuclear generating capacity not exceeding 2420 MWt (800 MWe)
- Assumes two or more SMR units

# ESPA Development

## Regulatory bases for the SSAR:

- NRC Regulations—10 CFR 20, 10 CFR 50, 10 CFR 52, and 10 CFR 100
- NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition
- NRC Regulatory Guide 1.206, Combined License Applications for Nuclear Power Plants (LWR Edition)
- RS-002, Processing Applications for Early Site Permits

## Regulatory bases for the ER:

- National Environmental Policy Act,
- NRC Regulations—10 CFR 51 and 10 CFR 52,
- NRC Regulatory Guide 4.2, Preparation of Environmental Reports for Nuclear Power Stations,
- NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations,
- NUREG-1555, Federal, regional, state and local environmental statutes, as applicable, and
- RS-002, Processing Applications for Early Site Permits.



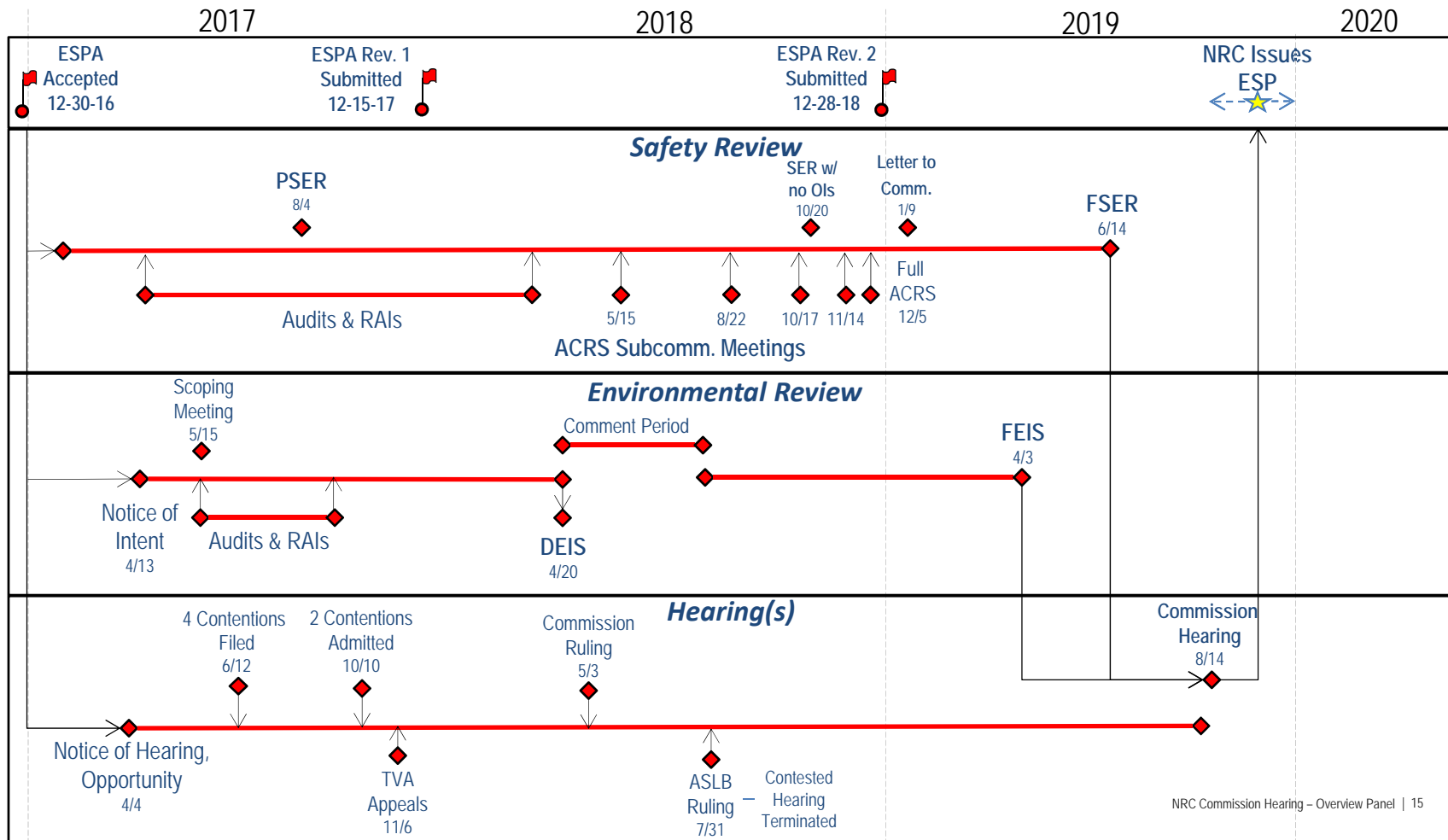
# ESPA Review Summary

- NRC Commenced Review in FY 2017
- Contains more than 8,000 Pages
- Supported by over 80,000 pages in referenced documents
- Efficient Use of Audits
- Minimal Requests for Additional Information (RAIs)
- Frequent, Clear, and Candid Communication

# ESPA NRC Interactions

- Pre-Environmental Report Visit March 2013
- PPE Development September 2014
- Pre-application Site Visit October 2014
- Alternative Sites Visit June 2015
- ESPA Readiness Review August 2015
- Hydrology and Health Physics Audit April 2017
- Seismic/Geotechnical Audit May 2017
- Environmental and Meteorology Audit May 2017
- EP Audit November 2017 – February 2018
- QA Inspection April 2018
- EP Audit April 2018
- Meteorology and Health Physics Audit May 2018

# NRC Review Schedule



# Conclusion

SMRs have desirable attributes that can benefit TVA and the nuclear industry.

An early site permit (ESP) would establish suitability of the Clinch River Site for potential future construction and operation of an SMR facility, and TVA believes:

- The Clinch River Site is suitable for future construction and operation of an SMR facility.
- Applicable standards and requirements of the Atomic Energy Act and commissions regulations have been met.
- TVA's staff is technically qualified to engage in any authorized activities at the Clinch River Site.
- Issuance of the permit will not be inimical to the common defense and security or the health and safety of the public.