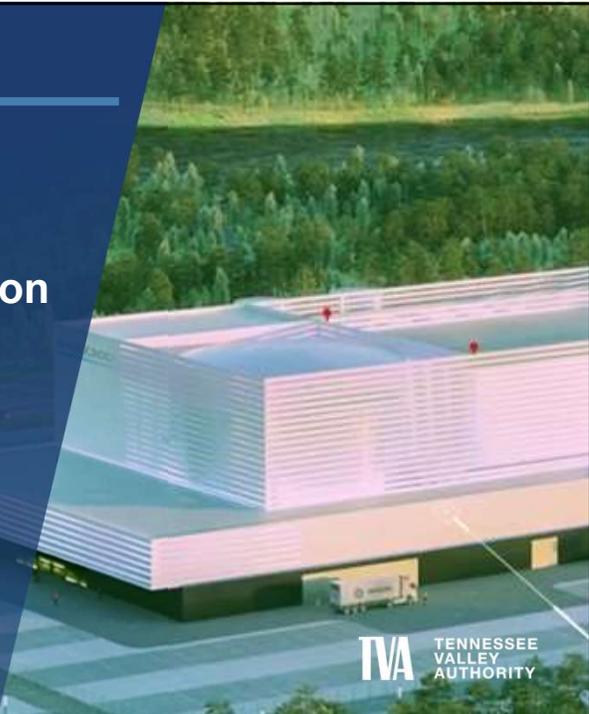


# NRC Public Meeting

## TVA Clinch River Project

### CRN-1 Reactor Building Excavation

September 13, 2023



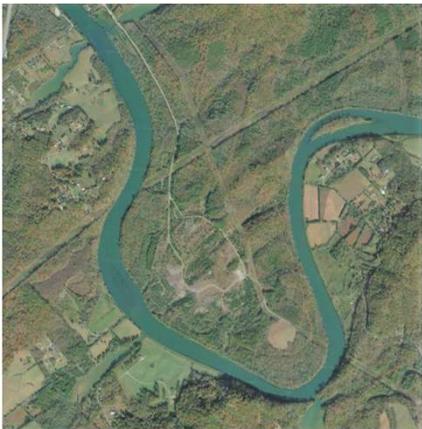
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## Agenda

- Introductions
- Background
- Expected Activities/Benefits
- Exemption Request
- Schedule
- Conclusion
- Questions/Comments

Clinch River Nuclear (CRN) Site



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## Background

- In preparing the CRN-1 site for nuclear construction, TVA intends to excavate for the BWRX-300 Reactor Building in advance of receiving the Construction Permit (CP).
- Per 10 CFR 50.10(a)(2)(v), excavation on its own is not considered to fall into the definition of “construction”.
- To ensure worker safety during excavation and facilitate construction activities, an initial ground support system is expected to be installed for erosion control prior to and during excavation.
- Initial ground support system serves no function in the completed construction.
- Proposed initial ground support features are infeasible to remove and are planned to be abandoned in place.
- TVA has not yet authorized the deployment of an SMR. Nonetheless, these discussions and efforts regarding excavation activities will enable TVA to move forward in a timely manner, if and when a decision is made to build an SMR.

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## Initial Ground Support System

The following items may be installed as part of the initial ground support system:

- secant piles or steel piles through the soil overburden and weathered rock, if required,
- rock bolts to secure unstable rock blocks and create a safe and stable excavation, as required,
- wire mesh and a thin, non-structural sprayed-gunite lining to stabilize and protect exposed rock walls,
- horizontal gravity drains to manage groundwater, as required,
- pressurized grout to seal any notable areas of water entry.

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## Benefits of Excavation prior to CP Issuance

Reduces risk and improves schedule by completing excavation prior to CP issuance and commencement of “construction” activities:

- Additional subsurface information can be provided to the NRC to consider before the CP is issued.
- Allows the extensive geotechnical mapping and surveys to be performed on a more controlled schedule when it is separated from the primary construction schedule.
- Identification of any critical features like discontinuities, shear zones, faults, karst features, or potentially unstable blocks will help improve the design of the permanent ground support system prior to construction.
- Optimizing the schedule for demonstration of new nuclear plants is imperative to enabling TVA to consider SMRs throughout the TVA Power Service Areas to support TVA’s carbon emission reduction aspirations (e.g. net-zero by 2050).

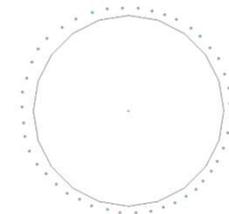
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## Expected Excavation Activities

1. Site preparation activities
2. Installation of field instrumentation
3. Excavation through the soil overburden and weathered rock.
  - 1) sloped excavation using conventional earthmoving equipment,
  - 2) **secant piles or steel piles installed and keyed into the bedrock<sup>1</sup>.**
4. Construction of temporary crane pads.
5. Line drilling around the perimeter of the shaft excavation.



<sup>1</sup> If installed will be abandoned in place.

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## Expected Excavation Activities

6. Excavating through the bedrock will be completed in 8'-12' deep lifts.
- 1) Controlled drilling and blasting,
  - 2) Expanding chemical grouting, and
  - 3) Rock Hammer
7. Temporary de-watering systems, such as pumps and sumps and temporary wells or well points, will be employed during shaft excavation. **Areas of notable water entry will be sealed via an engineered pressure grouting process or localized water collection system<sup>1</sup>.**



<sup>1</sup> If installed will be abandoned in place.

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## Expected Excavation Activities

8. Geological mapping of the rock walls will be completed during the excavation meeting the requirements of NRC Inspection Manual 88131. The inspection of the shaft walls will be performed as the shaft progresses in lifts.
9. **Natural voids or poor quality rock identified during the excavation process or exposed in the walls of lifts will be evaluated and, when required, stabilized. This stabilization may include rock reinforcement (i.e. rock bolts) or treatment with grout<sup>1</sup>.**



<sup>1</sup> If installed will be abandoned in place.

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## Expected Excavation Activities

**10. Wire mesh reinforcement, in combination with a non-structural sprayed-gunite lining will be installed on the rock face<sup>1</sup>. In cases where seepage is noted in the bedrock, horizontal gravity drains<sup>1</sup> and/or weep holes will be installed so that the water does not deteriorate the sprayed-gunite lining.**



**11. The final foundation level at the base of the excavation will be cleaned and mapped in addition to the walls of the final lift. If any anomalous issues are discovered, additional geotechnical investigations will be performed in accordance with RG 1.132.**



<sup>1</sup> If installed will be abandoned in place.

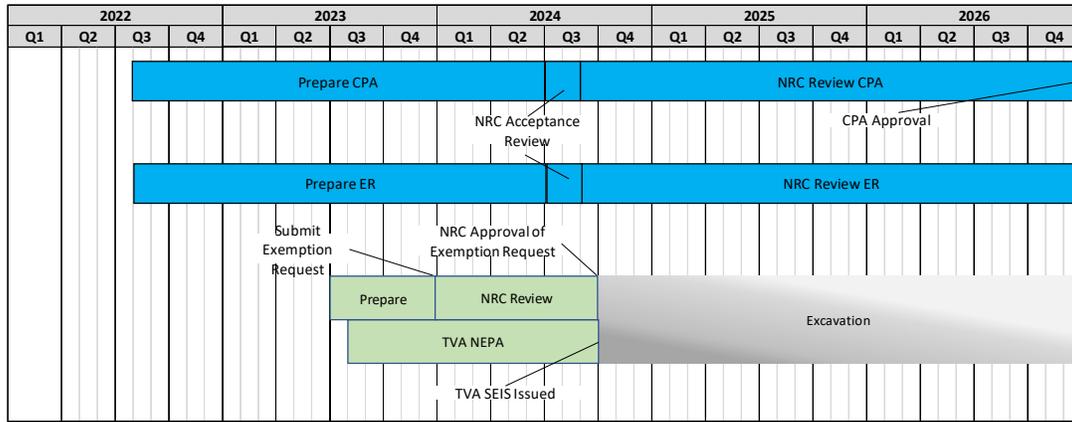
## Exemption Request

TVA is considering submitting an exemption request to provide regulatory certainty in moving forward with excavation prior to CP Issuance.

- 10 CFR 50.12 (a)
- 10 CFR 50.12 (b)

It is not expected that an NRC environmental impact statement or environmental assessment will be required for approval of an exemption request as it would meet the criteria of 10 CFR 51.22(c)(25).

## Construction Permit Issuance



- As communicated previously, TVA has not yet authorized the deployment of an SMR. Nonetheless, receiving an exemption from 10 CFR 50.10(c) will provide regulatory certainty from NRC moving forward for excavation activities which would enable TVA to move forward in a timely manner, if and when a decision is made to build an SMR.

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## Conclusion

- The RB excavation is of critical importance to the CRN-1 construction schedule and cannot be conducted without installation of the initial ground support system.
- If excavation for CRN-1 is delayed until issuance of the CP, it is anticipated the demonstration of constructing and licensing an SMR would be delayed over one year, hence delaying the availability of carbon-free electricity generation.
- An exemption request would satisfy the necessary elements of 10 CFR 50.12(a) and 10 CFR 50.12(b), as well as satisfy the requirements for a categorical exclusion in accordance with 10 CFR 51.22(c)(25).

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