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January 21, 2026
XO1-26-004

ATTN: Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Presentation Slides - Acceptability of Historical Information - Volcanic (Project #99902130)

This letter transmits Energy Northwest New Nuclear LLC's (ENNN) presentation slides relating to the acceptability of historical volcanic hazard information for the Cascade Advanced Energy Facility (Enclosure 1). These slides are provided in preparation for a public meeting on January 27, 2026.

ENNN intends to submit a Construction Permit Application (CPA) for up to twelve Xe-100 small modular reactors at a site adjacent to Columbia Generating Station (Columbia). The project will be known as the Cascade Advanced Energy Facility or Cascade. ENNN assessed the acceptability of historical volcanic hazard information applicable to Cascade to satisfy the requirements for establishing volcanic hazards for the CPA. This presentation outlines the key historical evaluations applicable to Cascade, including volcanic hazard evaluations for Columbia and the Hanford Site.

This letter contains no commitments. If you have any questions or need any additional information, please contact Nathan Clark at ndclark@energy-northwest.com or 509-377-6069.

Sincerely,

DocuSigned by:

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Lisa Williams
Operations, Licensing, Environmental Manager, New Nuclear Development

XO1-26-004

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Enclosures

1. Presentation Slides - "Acceptability of Historical Information - Volcanic", ENNN, January 2026.

cc:

Greg Cullen

Ken Langdon

EN Legal Services

Ms. Denise McGovern, NRR/DANU/UAL2

Ms. Madelyn Nagel, NMSS/REFS/EPMB3

Acceptability of Historical Information - Volcanic

White Paper Review

January 27, 2026
Rockville, MD

Energy Northwest
New Nuclear (ENNN)

Outline

- Purpose of Meeting and Introduction
- Cascade Project Background and Plans
- Columbia and Hanford Volcanic Evaluations
- ENNN Evaluation Process
- Volcanic Acceptability Evaluation
- Summary and Conclusions
- Questions and Comments

Purpose of Meeting and Introduction

An aerial photograph of an industrial facility, possibly a water treatment plant, featuring several large rectangular buildings with grey roofs and concrete walls. A large, dark, circular reservoir is visible in the foreground. The background shows a vast, flat landscape with a large body of water and distant, hilly terrain under a blue sky with scattered white clouds. The text "Purpose of Meeting and Introduction" is overlaid in the center in a large, white, sans-serif font.

Purpose of Meeting

- To engage early with NRC staff on ENNN's approach of using historical license-based volcanic information from co-located nuclear facilities
- To identify technical or policy issues that might affect this approach
- To ensure predictability in the NRC's response to ENNN's future Construction Permit Application (CPA) related to volcanic hazard analysis

Bottom Line Up Front

Volcanic hazard analyses for Columbia Generating Station (Columbia) and other Hanford Sites are applicable to the Cascade Advanced Energy Facility (Cascade):

1. 2011 and 2020 US Geological Survey (USGS) assessed ashfall hazards for the Hanford Waste Treatment and Immobilization Plant (WTP) consistent with Regulatory Guide (RG) 4.26
2. Ashfall hazard for Columbia bounds the USGS 2020 result
3. NRC approved Columbia's volcanic hazard in 1983

→ RESULT: Historical analyses will be used for Cascade CPA.

Introduction

- ADVANCE Act Section 505(c) requires the licensing bases for existing utilization facilities at the site be used to the extent practicable for new facilities.
 - ENNN proposes to build 12 small modular reactors (SMRs), known as the Cascade Advanced Energy Facility (Cascade), next to Columbia, a licensed operating facility, and Washington Nuclear Project (WNP)-1/4, cancelled projects with construction permits.
 - NRC approved Columbia's volcanic hazard for initial license in 1983
 - USGS studies of ashfall hazard were completed in 2011 and 2020.
- ➔ **RESULT:** ENNN plans to utilize the Columbia volcanic hazard definition.

Cascade Project Background and Plans



History of Energy Northwest Nuclear Projects

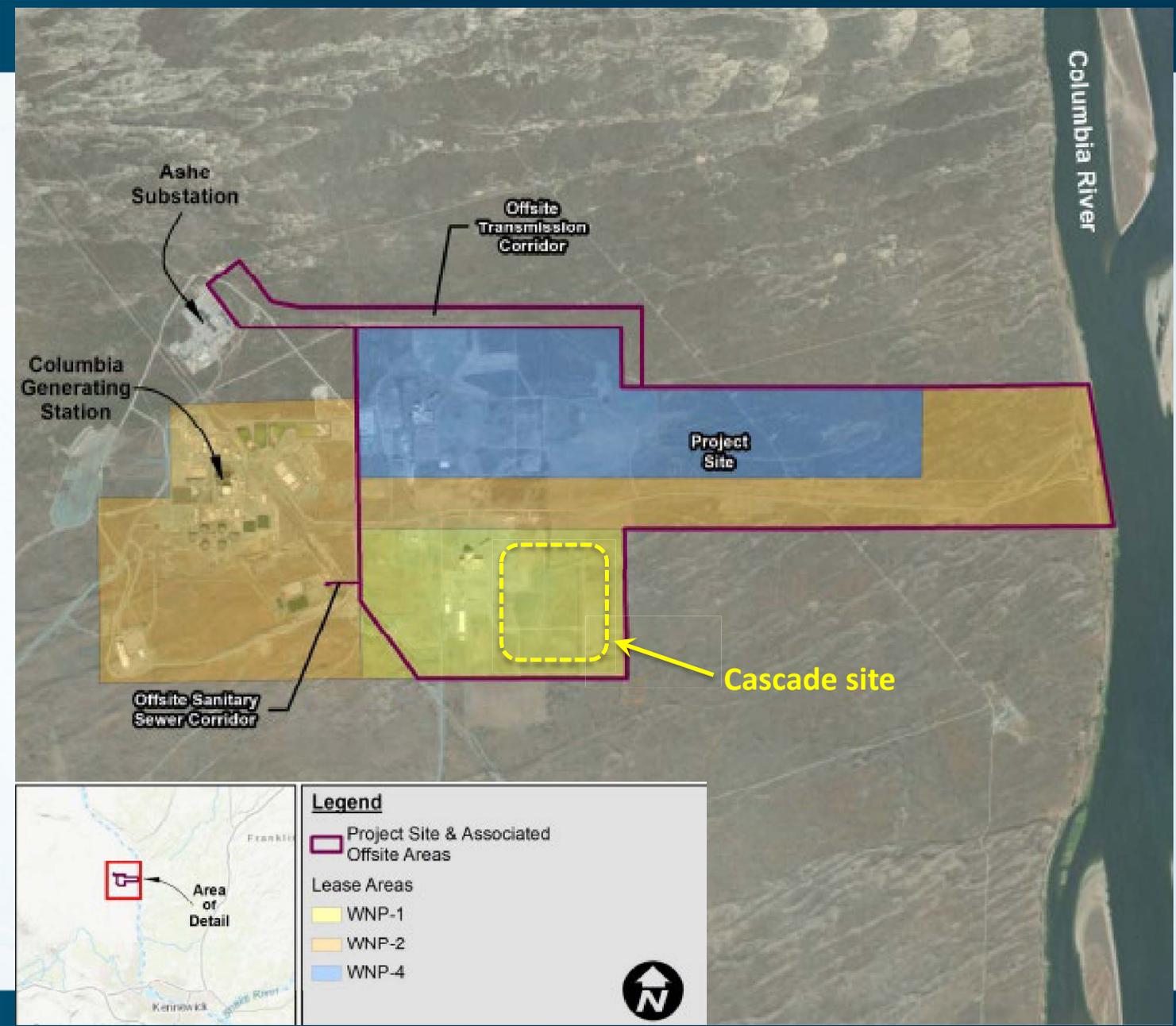
- Columbia
 - Licensed in 1984, extension granted 2012
- WNP-1/4
 - CPs issued in 1975 and 1978
 - Construction halted in 1982

Cascade SMR Project Background

- ENNN plans to construct and operate up to 12 Xe-100 high temperature helium gas-cooled reactors on former WNP-1/4 site
- Total of 960 MWe
- Cascade site
 - One mile east of Columbia
 - Initial build will be one multi-module plant of four reactors

Proposed Cascade Site

(conceptual)



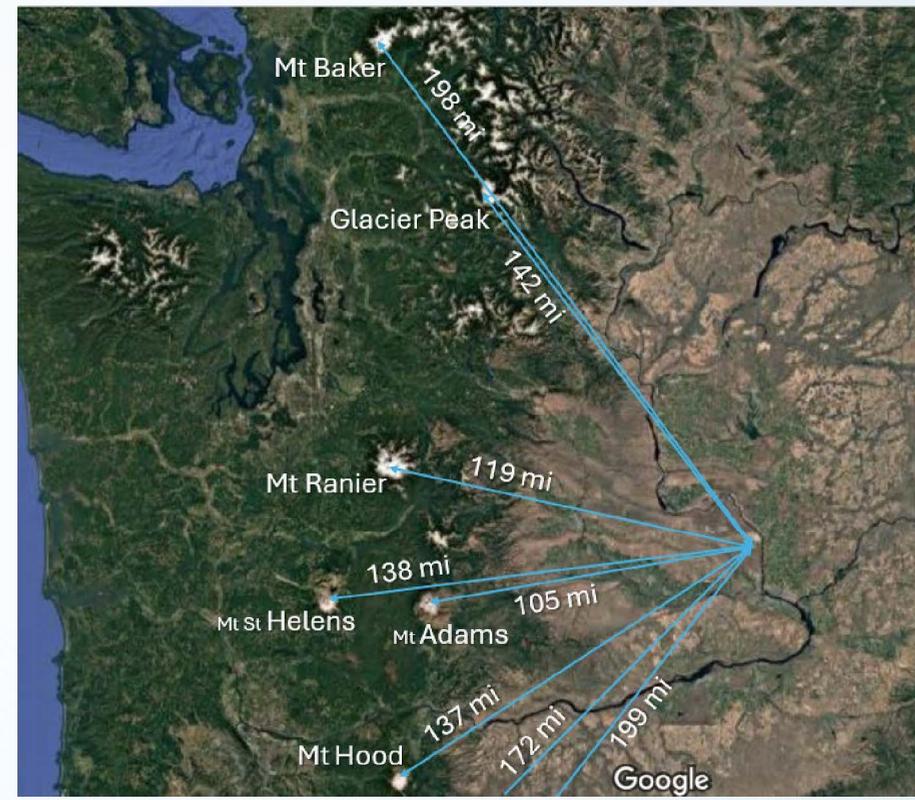
May 18, 1980, Mt. St. Helens Eruption

- On the order of 1 cubic kilometer of ash sent airborne
- Actual ashfall at Columbia ~1mm over 9 hours
- Maximum ashfall with redirected ash plume could have been up to 2” compacted at Columbia
- No loss of power at Columbia

Volcanic Hazard Evaluations

- Ashfall
- Opening of a new vent
- Lava flows
- Pyroclastic Density Currents
- Debris flows
- Volcanic earthquakes
- Other Proximal Hazards: debris avalanches, seiche, volcanic gas

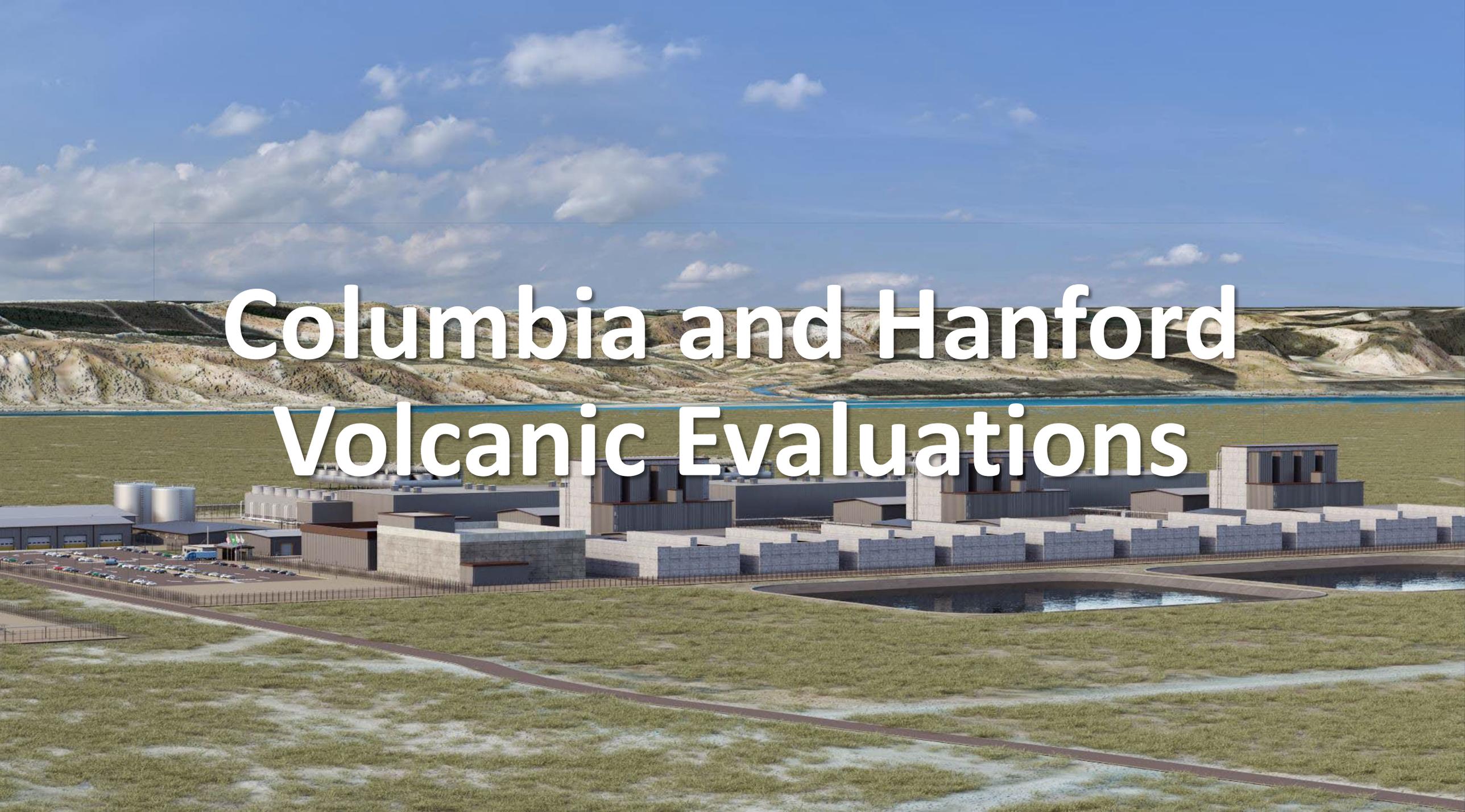
➔ **RESULT:** Only ashfall is credible for Columbia/Cascade due to distance and geography



Active Volcanos within 200 miles of the project site

- Approximate distances:
1. 105 mi - Mt Adams
 2. 119 mi - Mt Ranier
 3. 137 mi - Mt Hood (Ore)
 4. 138 mi - Mt St Helens
 5. 142 mi - Glacier Peak
 6. 172 mi - Mt Jefferson (Ore) (not shown)
 7. 198 mi - Mt Baker
 8. 199 mi - North Sister (Ore) (not shown)

Columbia and Hanford Volcanic Evaluations



Columbia Volcanic Hazard Evaluation

- TM-1250, “Volcanic Ash Study,” December 1981
- Energy Northwest (EN) response to NRC Q.360.009 with FSAR Amendment 21, December 1981
- NUREG-0892 Supp 1, WNP-2 Safety Evaluation Report (SER), August 1982, with USGS assessment
- GO2-82-825, “Volcanic Ashfall Protection,” October 1982
- NUREG-0892 Supp 3, WNP-2 SER, May 1983, Accepted EN evaluation
- USGS 2020 ashfall evaluations for Hanford Site are bounded

Comparison of Results

Evaluation	Columbia Design Basis (TM-1250, 1981)	1980 Mt. St. Helens, max at Columbia	USGS 2020
Duration of ashfall	20 hrs	12 hrs	6-16 hrs (Duration doesn't correlate well with total ashfall)
Compacted ash thickness	3 inches	2 inches	2 inches
Average Concentration	200 mg/m ³	200 mg/m ³	1513 mg/m ³
Density of ash	96 pcf (dry, compacted)	57-110 pcf (dry, compacted)	Assumes 62.4 pcf
Average grain size	0.075 mm	0.075 mm	Extensively reported in the paper; statistically varied for the calculations

ENNN Evaluation Process



Methodology for Determining Applicability of Historical Information

1. Regulatory Changes – same regulations?
2. Analysis Methodology – same methods?
3. Scope of Analysis – same scope of analysis?
4. Site Changes – site unchanged?
5. Quality Assurance (QA) – done under Appendix B Program?
6. Copy of Record – copy of record exists?

Volcanic Acceptability Evaluation



Question 1, Same Regulations?

- No, because:
 - Principal Design Criteria (PDC) apply to Cascade per RG 1.232 while General Design Criteria (GDC) apply to Columbia per 10 CFR 50 Appendix A
 - 10 CFR 100 Subpart B applies to Cascade, not 10 CFR 100 Appendix A
 - 10 CFR 100.23 added in 1997 for 10 CFR 100 reorganization
 - USGS reports do not describe guidance used
- However, acceptable because:
 - X-energy's PDC-2 for Cascade replaces GDC 2
 - No changes to 10 CFR 100 Subpart B
 - No material changes to requirements since 1983
 - USGS under 10 CFR 830, Nuclear Safety Management, and 10 CFR 830.202, Safety Basis

Question 1, Same Regulations? (cont.)

GDC 2	X-energy PDC-2
<p>Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect:</p> <ul style="list-style-type: none"> (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena and (3) the importance of the safety functions to be performed. 	<p>Safety-significant structures, systems, and components shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect:</p> <ul style="list-style-type: none"> (1) Appropriate consideration of the severity of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal, anticipated operational occurrence, design basis event, and design basis accident conditions with the effects of the natural phenomena, (3) the safety-significance of the functions to be performed.

➔ RESULT: No changes needed to historical analyses based on this criterion.

Question 2, Same Analysis Methodology?

- No. RG 4.26 was introduced in 2021

Evaluation	Eval Date	Guidance Used for Historical Analyses	Rev Used	Current Guidance	Current Rev
TM-1250	1981	None	N/A	RG 4.26	R1, 8/2023
USGS	2011	None	N/A		
USGS	2020	None	N/A		

- However, acceptable because:
 - Columbia and USGS evaluations parallel RG 4.26
 - USGS reports for Department of Energy (DOE) nuclear facility expected to meet DOE standards

Question 2, Same Analysis Methodology? (cont.)

RG 4.26 Step	Guidance	Columbia TM-1250	USGS
1) Quaternary Volcanoes in Region or Vicinity?	Include if volcano or its deposits within 200 or 25 miles of site, respectively, within past 2.6 million years	Identified five volcanoes based on proximity and ashfall in site vicinity	Examined 16 volcanoes within 450 miles of Hanford Site
2) Screen Volcanic Hazards	Determine maximum distance potentially hazardous volcanic phenomena can travel from volcanic source	Determined that ashfall is only hazard, used Adams or Rainier as primary source	Focused on ashfall as only hazard
3) Develop Initial Risk Insights	Calculate the likelihoods of future volcanic eruption and associated hazards	Deterministic, source Adams or Rainier with max St. Helens eruptive volume	Developed annual eruption and wind direction probabilities
Engineering Analysis Option?	Proceed directly to Step 6 or 7; beyond the scope of this white paper	Completed for Columbia	N/A

Question 2, Same Analysis Methodology? (cont.)

RG 4.26 Step	Guidance	Columbia TM-1250	USGS
4) Evaluate Eruption Potential and/or Hazard Potential	Determine product of probabilities of eruption and of hazard reaching the site	N/A	Identified Mt. St. Helens as most significant volcanic hazard source
5) Develop Risk Insights	Product >1E-4 is design basis; 1E-4> product >5E-7 is beyond design basis event. Determine level of hazard; e.g., amount and ashfall grain size distribution	Determined amount of ashfall as 7.4 cm, density and grain size distribution	Evaluated ashfall thickness from 14 volcanoes at exceedance probability of 1E-4: 5.1 cm, mass load and grain size distribution (USGS, 2020)

Question 2, Same Analysis Methodology? (cont.)

RG 4.26 Step	Guidance	Columbia TM-1250	USGS
6) Evaluate Structures, Systems, and Components (SSC) Performance	Beyond the scope of this white paper	Completed for Columbia	N/A
7) Evaluate Mitigating Actions	Beyond the scope of this white paper	Completed for Columbia	N/A

➔ RESULT: No changes needed to historical analyses based on this criterion.

Question 3, Same Scope of Analysis?

- Yes.
 - Columbia and Cascade about one mile apart
 - WTP about 10 miles northwest of Cascade
 - Ashfall independent of location

→ RESULT: Historical analyses may be used based on this criterion.

Question 4, Site Unchanged?

- Yes.
 - No changes to Columbia or Cascade sites that would affect ashfall.

→RESULT: No changes needed to historical analyses for this criteria.

Question 5, Appendix B Program?

- Yes. Columbia TM-1250 evaluation per Appendix B
- No. USGS reports not under NRC requirements
- However, acceptable because:
 - USGS reports for DOE nuclear facility expected to meet DOE standards: 10 CFR 830.202, Safety Basis
 - USGS maintains a comprehensive QA program

→ **RESULT:** Historical analyses may be used based on this criterion.

Question 6, Copy of Record?

- Yes. Reports are publicly available or retained by EN.

→ **RESULT:** Historical analyses may be used based on this criterion.

Summary and Conclusions



Question Summary

Evaluation	Columbia	USGS
Same Regulations?	No but justified	No but justified
Same Methods?	No but justified	No but justified
Same Scope of Analysis?	Yes	Yes
Site Consistent?	Yes	Yes
App B Program?	Yes	No but justified
Copy of Record?	Yes	Yes

Conclusions

- Evaluation inputs and results can be applied to the Cascade site.
- Columbia TM-1250 ashfall results bound USGS 2020 results.
- CPA will document justification for using historical analyses.

→ RESULT: Historical analyses will be used for Cascade CPA. Specifically, Cascade will adopt Columbia's design basis ashfall.

Questions and Comments?



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