



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

November 15, 1977

Mr. Lee V. Gossick
Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: REGIONAL TECTONICS OF THE PACIFIC NORTHWEST

Dear Mr. Gossick:

The Advisory Committee on Reactor Safeguards met and considered matters related to the regional tectonics of the Pacific Northwest at its 209th and 211th meetings. Subcommittee meetings have been held on this subject on September 1-2, 1977 in San Francisco, California and on October 27-28, 1977 in Portland, Oregon. The Committee and its consultants have had the benefit of presentations on this matter by representatives of the Nuclear Regulatory Commission (NRC) Staff, the U. S. Geological Survey (USGS), Puget Sound Power and Light Company, Portland General Electric Company, Washington Public Power Supply System, their consultants, and members of the public.

The Committee and its consultants have given extensive consideration to the possible intensity of the 1872 Wenatchee earthquake. The USGS, as a consequence of the manner of application of the Modified Mercalli (MM) criteria, considers that the assigned intensity of this earthquake cannot be less than MM Intensity VIII and is probably MM Intensity IX, based primarily on the occurrence of a large landslide at Ribbon Cliffs, believed to have been caused by this earthquake. This higher intensity differs from the previously cited Intensity of VII - VIII, usually given in prior studies and discussed in the Coombs Review Panel Report. The Committee and its consultants have considered this matter and have concluded that the 1872 Wenatchee earthquake should be considered as an Intensity VIII. In reaching this conclusion, the Committee considered the bases on which the relation between MM intensity and horizontal ground acceleration relationships were derived. The Committee recognizes that higher MM intensities often are reported when seismic data are scanty and multiple MM criteria cannot be used. The extensive data compiled by the utilities and their consultants have been reviewed by the ACRS and its consultants. These data pertain not only to the 1872 earthquake but also to the regional tectonics, regional geology, and the various mechanisms considered responsible for the seismic events observed throughout the Pacific Northwest. Based on a review of these data, the Committee agrees with the

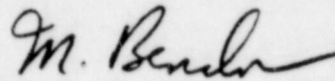
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opinions expressed by most participants and ACRS consultants that arbitrary movement over extended distances of a prototype 1872 earthquake, for purposes of seismic design, should be reexamined. This is particularly true for the Columbia Plateau which appears to be either a different tectonic province than that in which the 1872 earthquake occurred, or a region of lower seismic activity with regard to frequency and intensity.

The Committee believes that the studies currently being performed on the tectonics of the Pacific Northwest will better identify the seismic potential of the various regions within the Pacific Northwest. The studies being performed for the Columbia Plateau Region are particularly promising with respect to better defining its seismic potential. The Committee wishes to be kept informed of the progress of these studies and to discuss these matters with the NRC Staff when they have completed their review.

Sincerely yours,



M. Bender
Chairman

References:

1. H. A. Coombs, "Report of the Review Panel on the December 14, 1872 Earthquake," dated December, 1976.
2. Puget Sound Power and Light Company: "Preliminary Safety Analysis Report for Skagit Nuclear Power Project, Units 1 and 2," Chapter 2.5 and Appendix 2J, "Investigation of the December 14, 1872 Earthquake in the Pacific Northwest," by Bechtel Corporation, Inc., dated June, 1975.
3. Portland General Electric Company: "Preliminary Safety Analysis Report for Pebble Springs Nuclear Plant, Units 1 and 2," Chapter 2.5.
4. Washington Public Power Supply Systems: "Preliminary Safety Analysis Report for WPPSS Nuclear Power Projects 1 and 4," Chapter 2.5 and Amendment 23.
5. Weston Geophysical Research, Inc., "The 1872 Earthquake - Significant Data and Conclusions," undated.
6. Woodward-Clyde Consultants, "Review of the Pacific Northwest Earthquake of December 14, 1872," undated.
7. N. H. Scott, "Evaluation of the Epicenter and Intensity of the Pacific Northwest Earthquake of December 14, 1872," dated September 13, 1976.

8. Shannon and Wilson, Inc., "Reconnaissance Investigation of the Ribbon Cliff Landslide, Entiat, Chelan County, Washington," dated August, 1976.
9. Shannon and Wilson, Inc., "Geologic Studies of Columbia River Basalt Structures and Age of Deformation, The Dalles-Umatilla Region, Washington and Oregon, Boardman Nuclear Project," dated November, 1973.
10. Shannon and Wilson, Inc., "Regional Geologic and Seismic Investigations, Boardman Nuclear Project," dated January, 1973.
11. Letters from D. L. Renberger, Washington Public Power Supply System, to O. L. Parr, Office of Nuclear Reactor Regulation, dated September 14, 1977 and September 2, 1977, respectively, concerning the results of field investigation of the Fraser River - Straight Creek Fault Zone.
12. E. S. Cheney, "Interim Report on the Seismic and Geologic Hazards to the Proposed Skagit Power Site, Sedro wooley, Washington," Revision of October, 1977, unpublished manuscript.
13. U. S. Geological Survey, "A Study of Earthquake Losses in the Puget Sound, Washington Area," Open File Report 75-375, dated 1975.
14. U. S. Geological Survey, "Maximum Intensity of the Washington Earthquake of December 14, 1872," dated April 1, 1977.
15. U. S. Geological Survey, "Status of Review - Skagit, Washington," by W. Hays and S. Brockman, dated July 21, 1977.
16. Portland General Electric Company: "Final Safety Analysis Report for the Trojan Nuclear Plant," Chapter 2.5.
17. Washington Public Power Supply System: "Preliminary Safety Analysis Report for WPPSS Nuclear Project No. 2," Chapters 2.6 and 2.7.
18. Letter from Edson G. Case, Acting Director, Office of Nuclear Reactor Regulation, to R. F. Fraley, Executive Director, Advisory Committee on Reactor Safeguards concerning the review of the geology and seismology for the Skagit Nuclear Project, dated July 28, 1977.