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Docket No.: 50-344

MEMORANDUM FOR: Robert A. Clark, Chief
Operating Reactor Branch No. 3
Division of Licensing

THRU: William V. Johnston, Assistant Director
Materials, Chemical and Environmental Technology
Division of Engineering

FROM: Ronald L. Ballard, Chief
Environmental and Hydrologic Engineering Branch
Division of Engineering

SUBJECT: PORTLAND GENERAL ELECTRIC SPIRIT LAKE FAILURE
EFFECTS ON TROJAN

Plant Name: Trojan
Docket Number: 50-344

The report dated July 1, 1983 from Portland General Electric (PGE) to you concerning flood potential at the Trojan site has been reviewed by the Hydrologic Engineering Section. We found that the report is deficient in several respects. The PGE report seems also to be an abbreviated version of a more detailed report from the consultant. If this is the case, it would be far more useful for us to work from the original report. We have prepared a set of questions to elicit further information of the licensee. We would like to have the PGE report reviewed by the USGS, who is performing an independent review, but no decision has yet been made on extension of their contract. This review has been conducted by R. Codell, with input from H. Fliegel and myself.

Checked by Ronald L. Ballard

Ronald L. Ballard, Chief
Environmental and Hydrologic
Engineering Branch
Division of Engineering

Enclosure:
As stated

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HYDROLOGIC ENGINEERING SECTION

Additional Questions "Potential Mudflow from a Hypothetical Failure of Spirit Lake Blockage" (July 1, 1983 response from PGE)

1. The report appears to be a summary of a more detailed analysis and report. As such, however, it does not contain the information necessary to enable us to evaluate it. If you have a more complete report please provide it.
2. The important case of a mudflow during a low Columbia River flowrate, with consequent high sedimentation in the Columbia River, followed by a large flowrate has been neglected. Records have shown that high flowrates (1,000,000 CFS) have followed periods of low flow by only a few days. Analyse the potential for flooding of the site by this scenario, or justify why this case was not considered.
3. Item 1.3 The procedure used to reduce the sediment concentrations from 39, 52, and 65 percent to 20, 30, and 45 percent respectively, as summarized in Table 1 should be discussed and all assumptions should be justified. For example, what is the basis for reducing the volume of material into the Cowlitz by 40% (column 2)? What is the basis for the ratio of sand to finer material of 2 to 1 (columns 3 and 4)? Etc.
4. Item 1.4 Please explain the basis for the 30 percent moisture assumption. Is this figure based on available pore volume or on total volume of dry solid? What porosity was used and what is its basis?
5. Item 1.6 What is the basis for assuming a Columbia River sediment concentration of 500 ppm? What effect would varying this concentration have on your results?
6. Several references are used in the text, but are not documented. For example, the "Colby method" in item 2.4. Provide the references.
7. Item 2.5 Define the term "bulking Factor"
8. Item 2.6 Give basis for your assumption that the shape of the mudflow sediment deposit at the confluence of the Cowlitz and Columbia rivers can be ratioed from the configuration of the deposition following the May 18, 1980 mudflow. That mudflow deposition was rather flat compared to other known mudflow slopes. What is the sensitivity of your results to variations in the slope of deposited sediments?
9. Item 3.4 Give basis for calculations of sediment load. Were formulas employed derived from relationships for sediment transport in rivers? If so, justify that these formulas are acceptable for the very-high sediment loads of the present case?
10. Item 3.8 Why is 400,000 CFS the "most reasonable Columbia River flow to evaluate"? Is there a probabilistic basis for this conclusion (e.g., NRC safety goal)?

11. Table 1

(a) Column 8 is unclear. I believe that the expression should be $(\text{col } 6 + \text{col } 4)/1.4$. Explain the meaning of the value 1.4, and why it is used here.

(b) - Explain the difference between column 1 and 2. Also, why is "material" used in column 1 and "sand, silt and clay" used in column 2?