



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 02 1983

Dr. S. T. Algermissen
U. S. Geological Survey
P. O. Box 25046, M. S. 966
Denver, CO 80225

Dear Ted:

As you are aware, we have been monitoring ongoing activities associated with Mt. St. Helens volcanic activity as it relates to WNP-3 and the Trojan nuclear power plant and other facilities in the region. The U. S. Geological Survey also has a contract related to volcanic hazards with the NRC Office of Research.

Recently, we were made aware by private sources of ongoing studies by the U.S.G.S., F.E.M.A., and the U. S. Army Corps of Engineers. These studies deal with the geotechnical integrity of the natural dam that is impounding Spirit Lake, the potential for downstream mudflows, and seismicity related to the Mt. St. Helens Zone. A 1983 report (Water-Resources Investigation 82-4125), published by the U. S. Geological Survey, in cooperation with FEMA, addresses the mudflow hazard associated with the hypothetical failure of the Spirit Lake blockage. The authors of the report, Charles H. Swift III and David L. Kresch, are located at the USGS's Tacoma, Washington facilities. Because of the potential significance of this information to the Trojan and WNP-3 facilities, I am requesting that the U. S. Geological Survey provide us with continuing updated information related to these ongoing or proposed studies. We request that this information be provided as a monthly letter report for the next six months with the first report due on April 1, 1983. After that time, we will reassess any needed modification to this request. The effort for this activity should start immediately and be charged to Geosciences Case Reviews IV, Task 1 - Advisory Services of Contract No. 03-83-105, FIN B8633. As soon as possible we will forward a new task to cover this activity.

Dr. Stephan Brocoum, Leader, Geology Section, will be the contact for this activity. He can be reached at FTS 301-492-4414.

Sincerely,

Robert E. Jackson, Chief
Geosciences Branch
Division of Engineering

cc: See next page

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6pp

A/7

M. Fliegel

MAR 07 1983

Ray: for Trojan
file

cc: R. Vollmer
J. Knight
S. Brocoun
L. Reiter
H. Lefevre
J. Devine, USGS
R. Morris, USGS
W. Hays, USGS
C. Poslusny
R. Clark
C. Trammell
G. Lear
~~██████████~~
L. Beratan

~~Will come~~
~~Copy to Fliegel pls,~~
~~to me~~
~~Return this~~
~~2/19~~

Task 3 -- Mount St. Helens Volcano - Spirit Lake Blockage

Technical Monitor: S. Brocoun

Estimated Level of Effort: 0.10 SY (FY 83)
0.15 SY (FY 84)
0.15 SY (FY 85)
0.05 SY (FY 86)

Background

A heterogeneous mass of debris resulting from the 1980 eruption of Mount St. Helens has blocked the normal outlet channel of Spirit Lake. This has impounded the lake and has created a potential flooding hazard to downstream inhabitants, communities and perhaps the Trojan Nuclear Plant. A report released in early 1983 by the U. S. Geological Survey addresses the postulated, controlled failure by piping (subsurface erosion) of this Spirit Lake blockage and the effect of the resulting water/debris mass on the Toutle and Cowlitz river valleys as far as the Longview/Kelso, Washington area at the confluence of the Cowlitz and Columbia rivers. The postulated impact of this debris mass on the Trojan Nuclear Plant located upstream on the Columbia River, about 5 miles from the Longview/Kelso region was not addressed in this report. To mitigate the likelihood of the failure of the blockage by piping, the Corps of Engineers is attempting to stabilize the lake on a temporary basis by pumping and maintaining the lake at a level about 13 feet below the easily erodable soil constituting a large portion of the crest of the blockage. In addition to the State of Washington, several Federal agencies including the U. S. Army Corps of Engineers, (COE) the U. S. Geological Survey (USGS), the U. S. National Weather Service (NWS), and the Federal Emergency Management Agency (FEMA), are involved in assessing the impact of a potential mudflow (debris) as a hazard to residents downstream of the Spirit Lake blockage. Additional blockage failure model studies may be conducted by the U. S. Geological Survey including the postulated failure as a result of earthquake-induced liquefaction, perhaps producing a blockage breach and peak flow larger than that assumed to be associated with the postulated piping failure model. A number of permanent, engineered alternative methods of providing natural drainage to Spirit Lake have been proposed and are currently under review by the Corps of Engineers. Considering the potential hazard to the Trojan Nuclear Plant posed by the hypothetical failure of the Spirit Lake blockage it is prudent that the U. S. Nuclear Regulatory Commission be informed, on a timely basis of the status of the blockage stability by an agency (the USGS) directly involved in both the potential hazard assessment and the development and employment of an ultimate solution to the problem.

Objective

The objective of the task is to apprise the NRC staff on a monthly basis (more frequently if the situation warrants) of the stability of

4/1/83

Trojan NPP - Mt St Helens, Spirit Lake

MIKE:

of the COE (FTS' 8-423-6454)

I spoke to Ed Daugherty to see whether he has any new information concerning the USGS study of the effects of a Spirit Lake breakout on the Columbia River. Mr. Daugherty hasn't received any new information from the USGS since he spoke to you. As you know USGS estimates that it needs about a year to do this study and prepare a report. This time span is too long for the needs of the COE so they requested the USGS do a quick-and-dirty study. Mr. Daugherty told me that USGS is quite reluctant now to do a short study so he does not know what will be done. He promised to find out and let us know. I requested that he send copies of the report "Mount St. Helens, Eruption - The Challenge to Restore and Protect, Oct. 1981, COE - Portland". He said that this report is just a historical account of COE activities after the May 1980 eruption and has nothing to do with future eruptions or mudflows. I told him to send us a copy anyway.

rec'd
4-8-83

Lay

ALS

1-April 1983

Notes on USGS Spirit Lake breakout report

There are about 3.9×10^9 cy of material in the Upper North Fork Tottle River. About 2.6×10^9 cy is readily available along the potential flow path of a Spirit Lake break-out. 2.4×10^9 cy is necessary to attain a mudflow concentration of 65%. Although some of this sediment would deposit in overbank areas of low velocities, entrainment will probably occur along the predominant flow paths where velocities are high so the mudflow could maintain a fairly constant sediment concentration by entraining the same amount of sediment that is depositing.

1.09×10^6 cfs Columbia River - Spirit Lake Breakout - 1980
Mudflow elev at Longview approx elev 50' msl. 1983.

SE of pt. → In 1980, 45×10^6 cy deposited in Columbia River.
200 ft. → Flood reach elev. 42.5 feet. on May 19, 1980
in lower Corvally. 30' = 6,100 cfs 42.5' = ? cfs

In 1980, much of the sediment deposited was in a 6 mile stretch between RM 62 and RM 72.

(72.5)

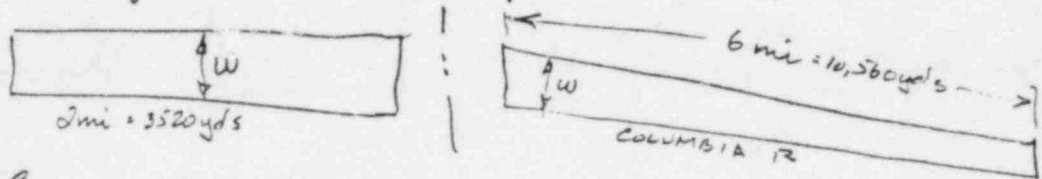


72.5
66

TROJAN

8/9

- 1) Assume river is 2 miles across and that sediment is deposited along a 6 mile stretch of the Columbia. Assume 50% of sediment is deposited i.e., 1.2×10^9 CY.



$$1.2 \times 10^9 \text{ CY} = (3520)(10,560)(W)$$

$$W = 32 \text{ yds} = \underline{97 \text{ ft deep}}$$