UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON D. C. 20555

50-344

AUG 8 1984

MEMORANDUM FOR: William V. Johnston, Assistant Director for Materials, Chemical and Environmental Technology, DE

FROM: Gus C. Lainas, Assistant Director for Operating Reactors, DL

SUBJECT: SPIRIT LAKE AND TROJAN

At our meeting with PGE and USGS on February 23, 1984, we learned that USGS was conducting a more refined sediment transport routing model to further study the impacts of a Spirit Lake breakout on the Columbia River. It was expected that this more realistic analysis would show lower flood elevations at Trojan.

We have just received a copy of a letter to PGE from FEMA Region X which has, as its enclosure, a letter from USGS (Laird) to FEMA Region X and which summarizes the results of the further USGS study as it applies to Trojan.

Among other things, it shows a flood elevation at Trojan of el. 40 feet for a Columbia River discharge of 750,000 cfs (recurrence interval of 50 years). Mr. Laird further states that he will expedite the final formal approval process and hopes to be able to provide the complete report to FEMA X within several weeks (from July 24). Thus, we expect that it should be available at any moment.

In view of this most recent information showing acceptable flood elevations at Trojan, it would seem that the Spirit Lake issue does not pose an obstacle to safe operation (scheduled to start up on or about August 22).

We request that you issue a final safety evaluation of this matter as soon as possible. Should you not agree with this course of action, please let me know.

Gus C. Lainas, Assistant Director
for Operating Reactors, DL

Enclosure: FEMA ltr dtd 7/31/84 (w/attached USGS ltr dtd 7/24/84)

cc w/enclosure:
J. R. Miller
R. Ballard

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A/S1

Ray Gonzales
P-314

Federal Emergency Management Agency

Region X Federal Regional Center Bothell, Washington 98011

JUL 31 1984

Jack W. Lentsch, Manager
Generation Licensing & Analysis, Nuclear Division
Portland General Electric
121 Salmon Street
Portland, Oregon 97204

Dear Mr. Lentsch:

In response to concerns you raised in a recent telephone conversation with Chuck Steele regarding flood levels resulting from a Spirit Lake breach in the vicinity of the Trojan Nuclear Power Plant, I requested information from the U.S. Geological Survey on the status of their investigation. Although their report is not yet final, Les Laird, District Chief of the Water Resources Division, sent a letter dated July 24, 1984 explaining how the report currently reads in the area you are concerned about. Enclosed is a copy of that letter. Please feel free to contact me if you need any additional information.

Sincerely,

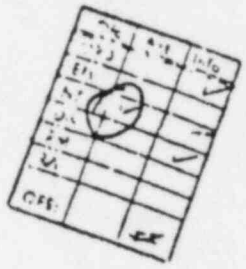
Wm. H. Mayer
Regional Director

Enclosure

Copies to: Messrs. Withers, Orser, Steele, Yundt, Lentsch, Gaidos, Hoag, Zimmerman, Burton, Jordan, Holm, LIS, TNP:GEN ENGR 7 FSAR:2.1, Bushnell

NO PGE ACTION NSRD ACTION - Zimmerman

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
Pacific Northwest District
1201 Pacific Avenue - Suite 600
Tacoma, Washington 98402



July 24, 1984

Mr. William Mayer, Regional Director
FEMA - Region 10
Federal Regional Center
Bothell, Washington 98011

Dear Mr. Mayer:

As a result of our telephone conversation of July 23, I wish to document the status of the report on the investigation of the "Impact of an outburst of Spirit Lake on the Columbia River," which has been supported financially by your office. The report has had colleague technical reviews by Dr. Danny Fread of the National Weather Service and Dr. Carlos Alonzo of Agricultural Research Service. We are processing the report for approval by the Director of the Geological Survey, which will probably take several additional weeks.

You advised that the Nuclear Regulatory Commission (NRC) will not allow Portland General Electric Company (PGE) to return the Trojan Nuclear Power Plant to full generating capacity until the NRC is informed of the results of our study, specifically the impact of flooding on the Trojan Plant affected by a mudflow produced by a theoretical outbreak of Spirit Lake at Mount St. Helens.

With the understanding that the data are provisional and subject to further review and revision, we can provide some information on our results that may be useful to you, the NRC, and PGE.

We used Dr. Fread's non-linear, time-dependent, one-dimensional flow model, slightly modified, as the basic analytical tool and used the following major assumptions:

Content of Spirit Lake	0.51 billion yds^3 = 316,116 ac-ft
Bulk volume of material eroded from the debris avalanche at Mount St. Helens	1.3 billion yds^3 = 805,755 ac-ft
Water from debris material to Spirit Lake volume	0.37 billion yds^3 = 229,[illegible]

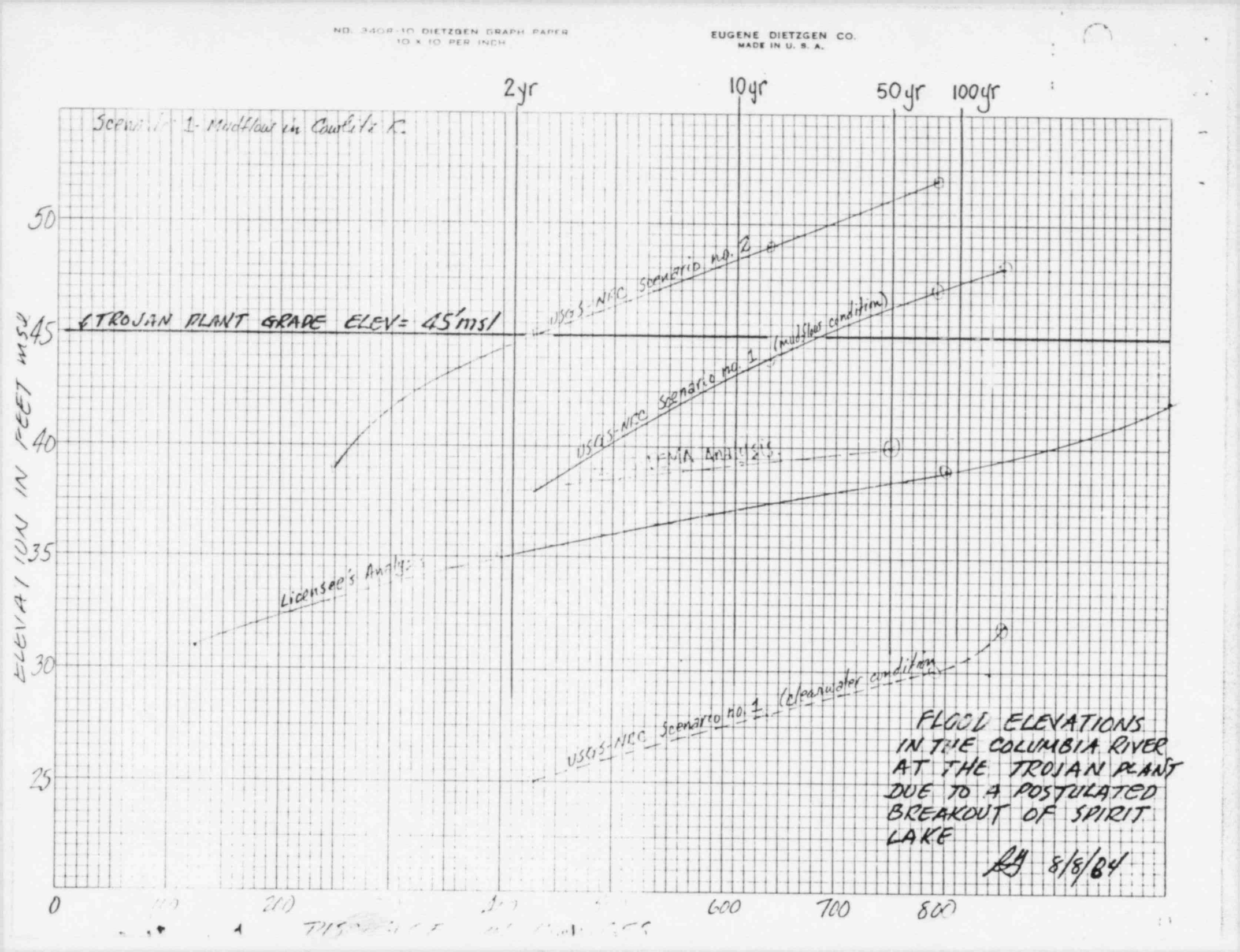
Solids from debris material	0.88 billion yds^3 = 545,455 ac-ft
Sediment concentration of mudflow near the debris avalanche	50 percent by volume
60 percent of mudflow would be deposited in the Toutle-Cowlitz Valleys → (60%)(.88 billion yd^3) = .53 billion yds^3	
Solids removed from the flow in the deposits	0.53 billion yds^3 = 328,512 ac-ft
Water removed from the flow and remaining in the deposited sediments	0.25 billion yds^3 = 154,959 ac-ft
Volume of flow entering the Columbia River	0.88 billion yds^3 = 545,455 ac-ft
Percent solids of flow entering Columbia River	40 percent (40%)(.88 bcy) = .35 billion yds^3
Sediment wash load (not deposited, but carried out to sea)	25 percent (25%)(.35 bcy) = .09 billion yd^3
sediment deposited in Columbia River —	— (75%)(.35 bcy) = .26 billion yd^3

Using these assumptions and a flow of 410,000 cfs (2-year recurrence interval) in the Columbia River, the model analysis indicated the backwater in the Columbia River, produced by sediment deposition in the Columbia, would produce a stage of less than 38 feet at the Trojan Plant--which compares to critical level of 45 feet, above which the plant would be flooded. At a Columbia River discharge of 750,000 cfs (recurrence interval of 50 years) the elevation at the Trojan Plant would be 40 ft--again, using the assumptions outlined above.

We will expedite the formal approval process for the report and hope to be able to provide it to you within several weeks. In the interim, we hope that the above data will be useful to you, NRC, and PGE.

Sincerely yours,

L. B. Laird
District Chief



FLOOD ELEVATIONS IN THE COLUMBIA RIVER AT THE TROJAN PLANT DUE TO A POSTULATED BREAKOUT OF SPIRIT LAKE

8/8/84

TABLE 2

Flood elevations in the Columbia River at the Trojan Nuclear Plant

Columbia River Discharge	Licensee's Analyses	USGS Analysis			USGS Study for FEMA on impacts of breakout on the Columbia River
		Scenario No. 1		Scenario No. 2	
		Mudflow Conditions	Clear-Water Conditions		
125,000 cfs	31 ft msl				
250,000 cfs				39 ft msl	
400,000 cfs	35 ft msl				
410,000 cfs					< 38 ft msl
430,000 cfs		38 ft msl	25 ft msl	45 ft msl	
640,000 cfs		34 ft msl	28 ft msl	49 ft msl	
*690,000 cfs		*45 ft msl			
750,000 cfs					40 ft msl
790,000 cfs		47 ft msl	30 ft msl	52 ft msl	
800,000 cfs	39 ft msl				
850,000 cfs		48 ft msl	32 ft msl		

* 690,000 cfs flow in the Columbia River was not considered by either the USGS or the Licensee. This flow was extrapolated by the NRC staff to correspond to a water level at the Trojan Plant of 45 ft msl which is the plant grade elevation.

TABLE 1

	Licensee's Analyses	USGS ANALYSIS Scenario No. 1 Mudflow Conditions	USGS ANALYSIS Scenario No. 1 Clear-Water Conditions	USGS ANALYSIS Scenario No. 2	
Spirit Lake volume/elevation at time of breakout	310,000 ac-ft/ ---	314,000 ac-ft/ 3,475 ft	314,000 ac-ft/ 3,475 ft	314,000 ac-ft/ 3,475	316,000 ac-ft
Sediment concentration in percent by volume entrained from debris blockage	65%	65%	65%	65%	50%
Sediment concentration in percent by volume in mudflow at the mouth of the Cowlitz River	45%	65%	65%	65%	
Peak of mudflow into Columbia River	3.86×10^5 cfs	1.1×10^6 cfs	1.1×10^6 cfs	1.1×10^6 cfs	
Sediment volume deposited in Columbia River	0.28×10^9 yd	0	0	0.50×10^9 yd^3	$.26 \times 10^9$ yd^3
Slope of sediment deposited in Columbia River upstream of Cowlitz River	-7.5 ft/mi	NA	NA	-2.5 ft/mi	
Assumed tide level in Columbia River at downstream end of reach	7.5ft	9.0 ft	9.0 ft	9.0 ft	
Assumed hydraulic properties of flow in Columbia River downstream of Cowlitz River	clear water	mudflow	clear water	clear water	

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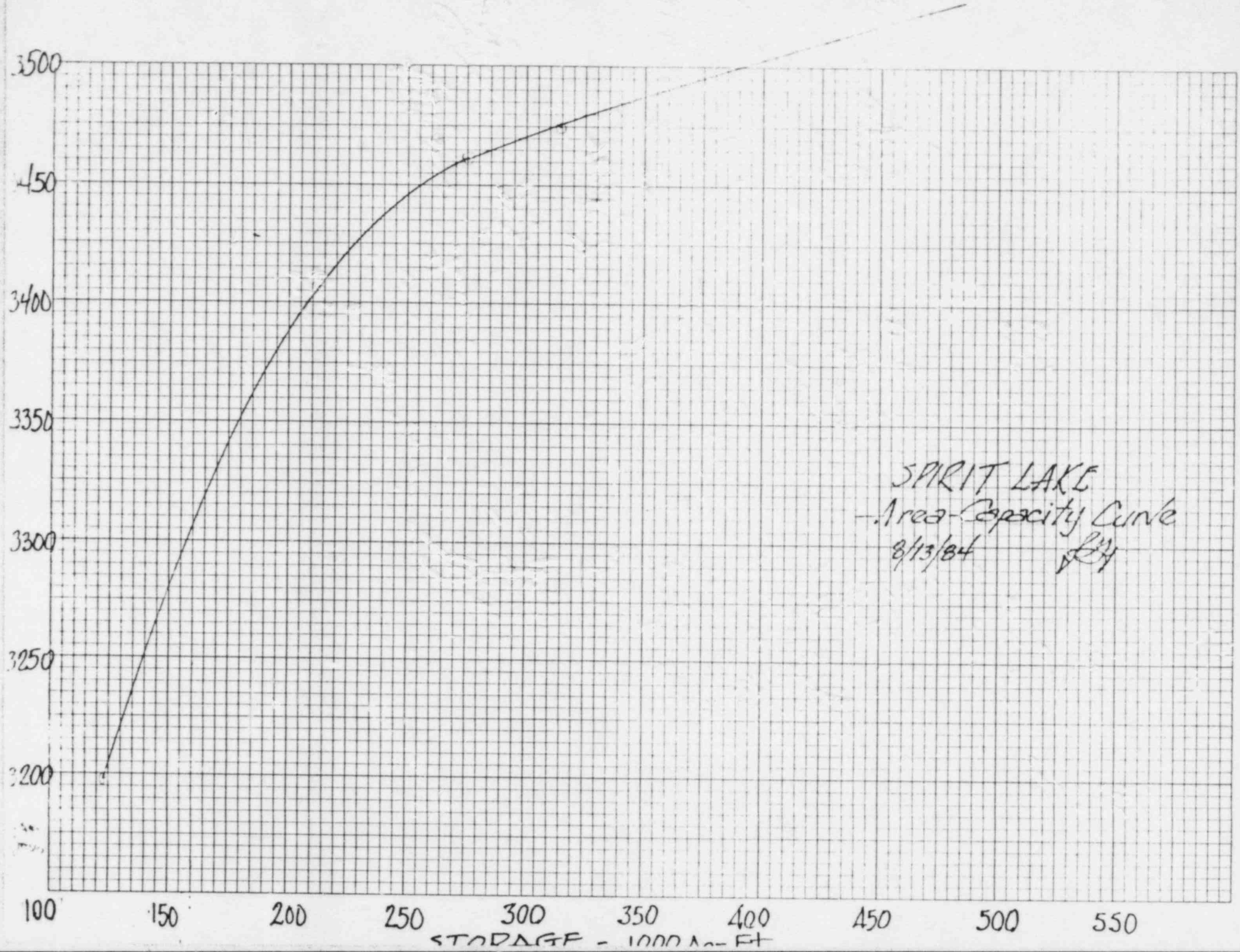

R. González

RECORD OF TELEPHONE CONVERSATION

DATE: 15 October 1984 PROJECT: Mt. St. Helens - Spirit Lake Blockage

RECORDED BY: H. E. LEFEUNE CLIENT: Trojan - Portland General Electric

TALKED WITH: John Saeger OF Corps of Engineers, Portland Oregon District Office

ROUTE TO: INFORMATION ~~ACTION~~

C. Trammell ✓ R. Ballard G. Biese-Koch

S. Brocoum L. Leor P. Sobel

L. Reiter R. McMullen

L. Heller J. Kimball

MAIN SUBJECT OF CALL: CONSTRUCTION OF SPIRIT LAKE DISCHARGE TUNNEL - GEOLOGIC CONDITIONS ENCOUNTERED ALONG TUNNEL ALIGNMENT

ITEMS DISCUSSED: TUNNEL: The 8,500' tunnel, which will eventually serve as a permanent outlet structure, maintaining a Lake level of 3,640' (20' below present Lake level) is now about 4,000' long and is scheduled for completion by March, 1985. (See Attachment for Tunnel Location)

GEOLOGY ALONG TUNNEL ALIGNMENT - The Corps is mapping the tunnel geologically. A fault zone about 30' wide was encountered about 200' from the west end of the tunnel. The Corps accepts the position of Weaver and Smith regarding the Mt. St. Helens Seismic Zone and attendant faulting. The Corps does not anticipate encountering the Seismic Zone fault along the tunnel alignment, but suspects, based on epicentral trends, that the fault lies west of the tunnel location.

SUBDUCTION ZONE REPORT - The Corps believes that Portland General Electric and WPPSS have commissioned a study by Cal Tech to look into the potential effects of a large Subduction zone origin EQ on the Trojan and WNP-3 facilities. Perhaps the Trojan PM can verify this matter with PGE and obtain a copy of the report, if available

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