WHITE RIVER INVESTIGATION

AND

ANALYSIS OF OTHER CONTROLLED RIVERS

DEPARTMENT OF ECOLOGY
JOHN A. BIGGS
DIRECTOR

August 1976

ACKNOWLEDGEMENT

This report was a total Department of Ecology effort, requiring the assistance of many departmental personnel who contributed their professional knowledge and support.

My sincere appreciation goes to the original team members, Duane Wegner, Walter Bergstrom, and Kris Kauffman, who conducted the investigation and directed the preparation of the report.

The following Department of Ecology personnel have contributed to specific phases of the report and their willing cooperation has made our task much easier:

Judy Alwine	Greg Hastings
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A special thanks is due the Word Processing Center and the many others who cooperated in the investigation and report preparation.

Robert McCormick
Report Manager

August 31, 1976

On July 15, 1976, a sharply accelerated increase in the flow of the Stuck River resulted in the accidental drowning of two young girls. This tragedy brought about not only widespread public feelings of sympathy for the families of the children involved, but also serious public concerns as to why the accident occurred and what circumstances were involved.

While there are oblique references to the subject of public safety in our water resource laws, they are less than specific in assigning responsibility. Thus, the question of who has actual official authority for ascertaining the facts surrounding this tragedy remains unclear.

Because the Washington State Department of Ecology is charged with the overall administration of the state's water resources, we felt it to be desirable and in the public interest that we undertake a study of the factors and circumstances involved in the happening, and we have done so.

We have completed this study in what I consider to be an impartial and professional manner. It does not attempt to fix definitive responsibility for this unfortunate happening. It does factually examine, describe, and set forth the factors and circumstances involved in the accident with supporting data, and addresses itself to the potential for similar happenings on other streams in the state.

In completing it, we are attempting to discharge what we consider to be our responsibility to the people of this state.

John A. Biggs, Director

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by

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TABLE OF CONTENTS

Introduction 1

White River System 3

Major White River Projects 5

Sequence of Events 13

Hydraulics 19

Analysis of Projects Having

Potential for River Surging 27

Conclusions 38

Recommendations 42

Technical Glossary 45

INTRODUCTION

On July 15, 1976, two young girls were drowned while playing with friends on a gravel bar in the White (Stuck) River near Pacific, Washington.

Recognizing the seriousness of the tragic drownings and the probability that controllable factors within the White River system may have contributed to the incident, John A. Biggs, Director of the Department of Ecology, instructed his staff to begin an investigation of the incident.

The Department's investigation was designed to examine every possible contributing factor. The investigators hoped to:

1. Determine what natural conditions existed in the river system prior to the drowning incident;

2. Determine how existing conditions (at the time of the incident) differed from the natural conditions;

3. Determine if the unanticipated surge in the system was due to natural phenomena;

4. Determine if the surge could be attributed to one or both of the man-made flow control facilities in the river system and under what conditions those facilities operate;

5. Determine whether man-controlled operations cause these surges on a repetitive basis and what procedures are practiced to protect downstream water users;

6. Determine what practical recommendations can be made to prevent a recurrence of this type of incident.

The above issues are addressed in the Department of Ecology's complete report of the investigation on the following pages. Included are a hydrologic evaluation of river conditions before and during the incident, a reconstruction of the circumstances related to the incident, and a review of the operating activities at the Mud Mountain Dam and the Puget Sound Power and Light Company diversion dam during the time the incident occurred. Much of the information results from interviews with persons involved in the incident, media reports, and other sources knowledgeable of the circumstances surrounding the drownings.

It is not the function of the Department of Ecology to render judgments as to responsibility in this matter. It is the function of the Department to relate the facts.

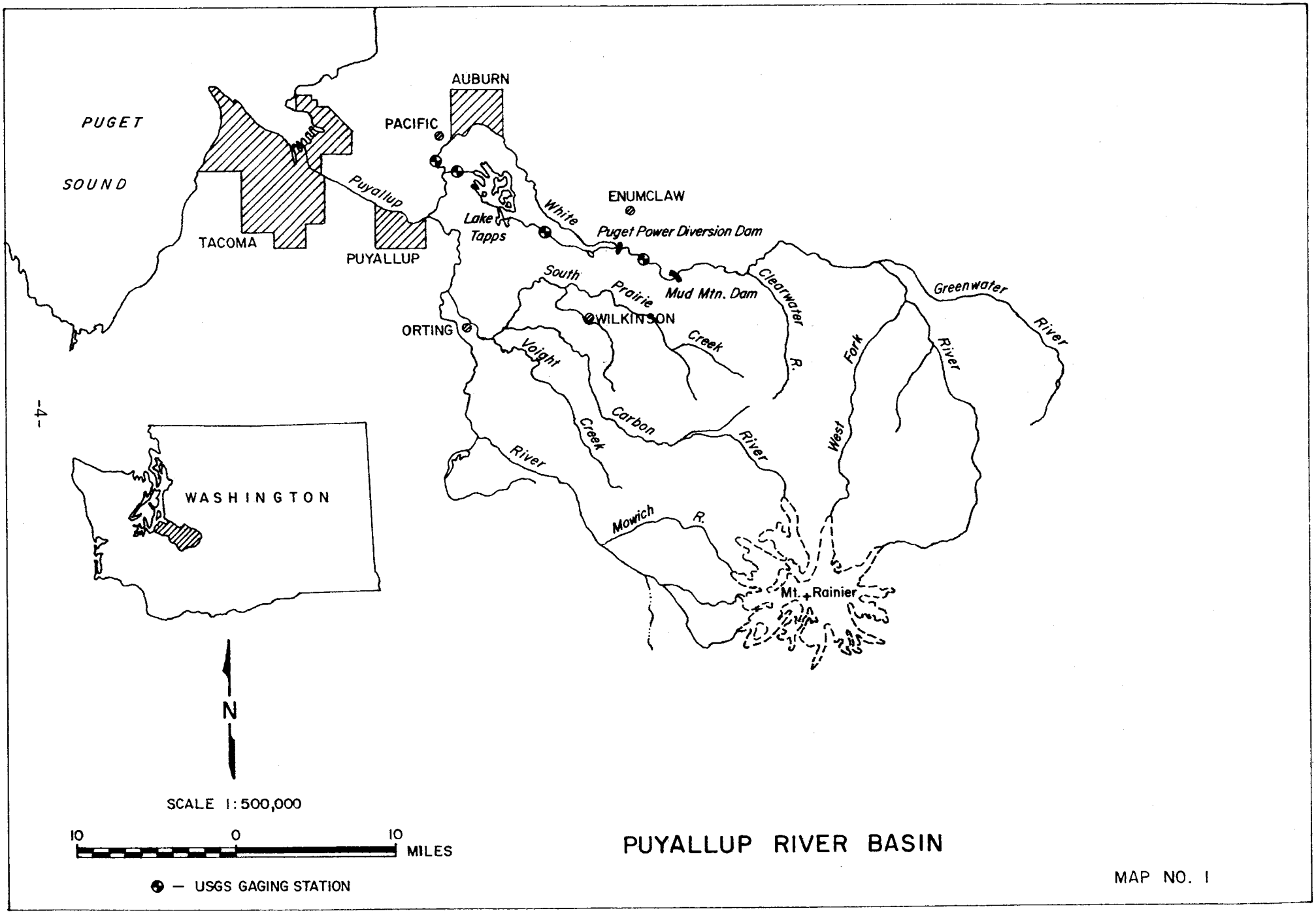
The following report does this, clearly indicating that there was a failure to coordinate controllable factors which did contribute directly to the tragic drowning of two young girls. It also points out numerous factors that must be considered to insure that accidents like this will be prevented in the future.

WHITE RIVER SYSTEM

White River, the principal tributary of the Puyallup River, drains approximately 500 square miles in the Puget Sound region in the State of Washington. The drainage area is adjoined on the north by the basin of the Green River, on the east by the basin of the Naches River, and on the south and west by the main stem of the Puyallup River.

The White River headwaters flow from the Emmons and the Winthrop glaciers on Mount Rainier and, with its tributaries, drains the whole northeast quadrant of Mount Rainier, as well as part of the western slope of the Cascade Range. It flows for about 57 miles in a general northwesterly direction through a comparatively wide valley with an average gradient of 46 feet per mile to a point just south of the City of Auburn. From this point the gradient drops significantly. The river makes a large, nearly 90-degree bend and thence flows southerly to its junction with the Puyallup River at river mile 10.4 on the Puyallup, in the vicinity of Sumner, Washington.

There are two projects on the White River that regulate the water flow. Mud Mountain Dam, a flood control structure that stores water during periods of high flow, is a federal project operated by the U.S. Army Corps of Engineers. The other project, 5.4 miles below Mud Mountain Dam, is a White River hydroelectric development known as the White River Project. It is owned and operated by Puget Sound Power and Light Co. and functions primarily to divert water from White River to Lake Tapps. The accident site is in the vicinity of Pacific, Washington, about 19 miles below the Puget Power diversion dam.



PUYALLUP RIVER BASIN

MAP NO. 1

MAJOR WHITE RIVER PROJECTS

Sixty-six years ago, the existing Puget Sound Power and Light Company hydroelectric project was constructed.

Inter County River Improvement, an agency of King and Pierce counties, was formed in 1914 for the purpose of constructing and maintaining control works to divert the White River, through the Stuck and Puyallup rivers, to Commencement Bay.

Mud Mountain Dam was constructed by the U.S. Army Corps of Engineers for the purpose of controlling peak flood flows of the lower Puyallup River.

A brief description of the projects follow:

Puget Power White River Project (PSP&L)

The project consists of a low diversion dam near the Town of Buckley, which diverts water from the White River, at river mile 24.2, into a series of flumes, canals, and settling basins to Lake Tapps. Water is then taken by penstocks directly to the powerhouse located near Dieringer.

The four units of the plant discharge into an artificial tailrace emptying into the White (Stuck) River a river mile 3.4, bypassing 20.8 miles of river channel. The flow line from diversion dam to the powerhouse is approximately 14 miles long. Initial development of 9,500 kw. was completed in 1911 and was increased several times to its present capacity of 63,000 kilowatts.

The diversion dam is a wood, concrete and rock-filled crib structure, 352 feet long and 11 feet high, above the natural bed of the river. The spillway extends the entire length of the dam. The water level above the dam is normally increased 7 feet above the spillway crest by a system of flashboards which may be easily removed during flood conditions or heavy debris runs. The flashboards are 2" x 12" x 6' long

timbers retained by hinged "I" beam posts which can be released by tripping breaking links from a cable tramway installed over the dam.

A work platform may be lowered from this tramway and positioned above any part of the dam. This cable way is motor-operated through the necessary gearing and drums from a position on the south bank of the river. The "I" beam posts are designed so that when excessive flood flows top the diversion dam, failure of the breaking links will occur and the diversion dam will breach, allowing the flashboards to wash down stream. The breaking links will rupture when the depth of water is 1.5 to 2 feet deep over the flash boards. The dam was originally designed with the flash board system to prevent damage to the flume system and headworks.

Once the flash boards are removed, they cannot be easily replaced until the flow in the river is reduced naturally or by the operation of Mud Mountain Dam. (See Cross Section of Dam drawing No. 1-A.)

Fish-handling facilities, including ladders and traps, are built into the flume intake structure, which were constructed and are now maintained and operated by the U.S. Army Corps of Engineers in cooperation with the Washington State Department of Fisheries. These fish facilities were added to the project in 1949 by the Corps to conserve fish resources of the White River affected by the construction of the Mud Mountain Dam. Twenty-five cfs of water is taken continuously from the intake through a regulating valve and a weir to supply these facilities. An additional 5 cfs are provided through a rock spill, or other ways, for a total of 30 cfs past the diversion dam, as required by court decree. The adult salmon are then transported by tank trucks and returned to the river above Mud Mountain Dam, several miles upstream from the diversion dam.

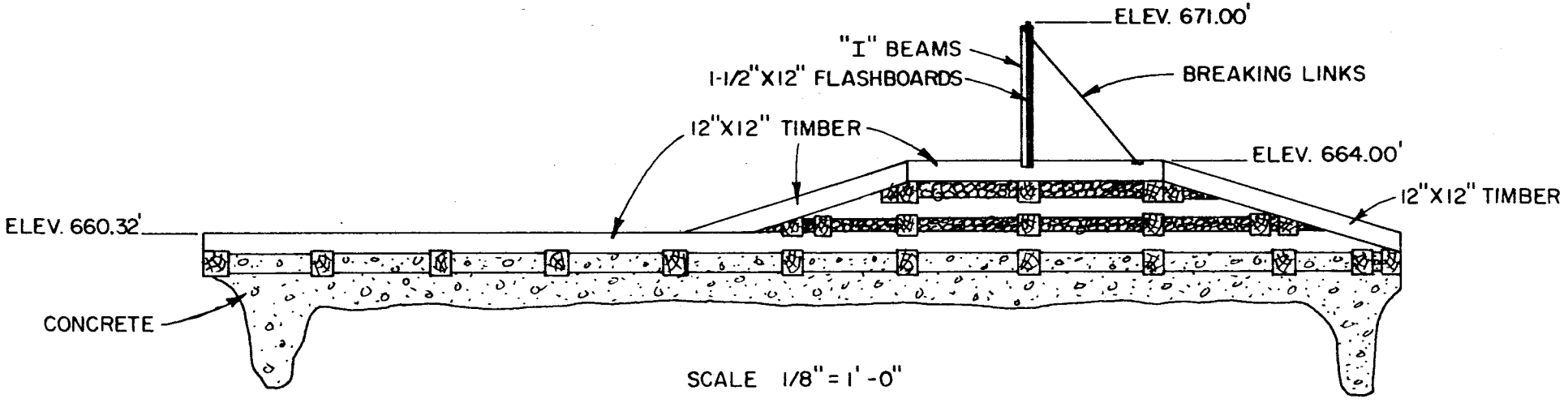
The flume intake is provided with two vertical lift gates, each 13' high by 15' 6" wide, separated by a concrete pier. The rack gearing is motor-operated, with an emergency 4 hp, gasoline engine drive. Grooves for stop logs are provided above the gates.

A wooden flume 28' wide and 8' high, with a capacity of 2,000 cfs and a gradient of 7 feet to the mile, carries the water a distance slightly over 5,000 feet from the headgates. An 80" wide sluice gate, with a maximum opening of 3 feet, is located a short distance downstream from the headgates. It discharges the accumulation of rocks entering the flume into an outlet flume which returns them to the river below the diversion dam. The gate is motor-operated and power is transmitted through a belt-drive and double-reduction gear boxes. A second rock-spill, located further downstream, is manually operated.

Since the inception of the project, Puget Power has flushed Walslegal settling basin into the White River. In the interest of improving water quality, the Department of Ecology requested, in 1974, that they cease this practice and instead remove the silt by the dredge referred to in this report. The dredged materials are being deposited in Wickersham Basin.

The headworks area is shown in the photo appendix. The Lake Tapps reservoir originally consisted of Lake Tapps, Lake Crawford, Kirley Lake, and Church Lake. By constructing 2-1/2 miles of earthen dams around the basin, the water was raised 35 feet above the original elevation. This created one large lake with a surface area of 2,566 acres and a storage capacity of 46,700 acre-feet between normal full pool elevation (543 feet) and minimum pool elevation (515 feet). The diversion dam on the White River has no appreciable storage.

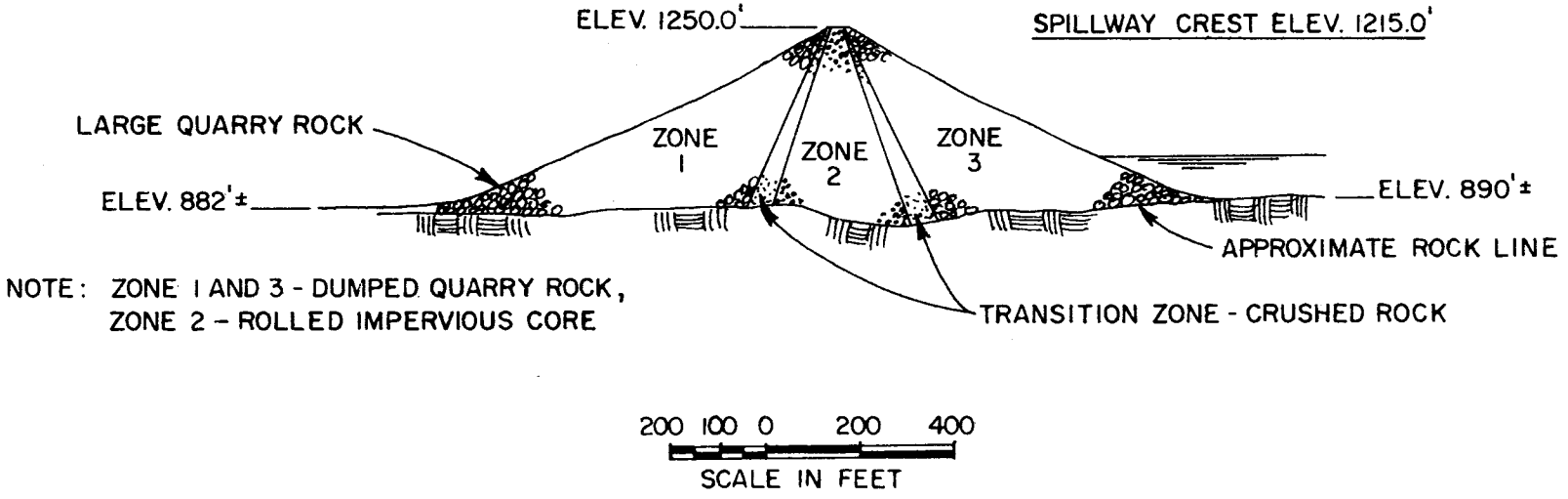
Puget Power has filed a claim to a vested water right under the terms of the Water Rights Claims Act of 1967. The amount claimed is 2,000 cfs of White River water for power generation. Jurisdiction by the Federal Power Commission over the operation of this project has been disputed since the early 1960's. Puget Power filed an application for major license with the FPC on November 20, 1964.



CROSS-SECTION OF PUGET POWER DIVERSION DAM, WHITE RIVER

DRAWING 1A

DRAWING 1B



EMBANKMENT CROSS-SECTION OF MUD MOUNTAIN DAM, WHITE RIVER

Corps of Engineers Mud Mountain Dam Project (MMD)

Through the Flood Control Act of June 22, 1936, Congress authorized construction of Mud Mountain Dam. Work on the project began August 25, 1939, but World War II brought construction to a halt in 1942 and it was not resumed until 1947. Installation of the penstocks, regulating valves, and valve house was completed in 1948 while the fishway structure and a hydrologic radio network were finished in 1949.

Mud Mountain Dam is located on the White River, 7 miles southeast of Enumclaw, Washington, at river mile 29.7. It is one of man's highest earth core and rock fill dams.

The dam is built in a narrow box canyon where rock cliffs on both sides of the gorge rise almost vertically nearly 230 feet above the river channel. This rock canyon is 90 feet wide at the river bed and 150 feet wide at the top. Boulder-strewn ground at the top of the gorge slopes steeply away to a width that allowed construction of a dam 700 feet across the top and 425 feet above the lowest bedrock in the White River. The reservoir can store up to 106,000 acre-feet of water.

Since the dam's primary purpose is flood control, the reservoir is normally empty. Normal flow and flood waters are discharged through two tunnels, each about 2,000 feet long. The smaller 9-foot tunnel passes normal river flow and is usually kept open. The larger 23-foot tunnel contains three penstocks, each controlled by a regulating valve.

A radio network has been installed at Mud Mountain Dam enabling the operation's personnel to obtain information instantly. This information comes directly from stream gages on tributaries within the Puyallup River system that are not regulated. This system gives the operators advanced warning of rising waters that affect the Lower Puyallup. Mud Mountain Dam releases are made on the basis of what is occurring on other tributaries.

Four stream gage situations are a part of this network: one on the White River near Buckley; one on the Carbon River; and, two on the Puyallup River near Orting and Puyallup.

Silt and debris accumulations in Mud Mountain Reservoir cause major problems in the operation and maintenance of this facility. Silt accumulation in excess of 50-foot depths have occurred. It is estimated that approximately 800,000 cubic yards of silt and gravel have collected in the reservoir this year. During normal flows, water, sediment and small debris pass through the trash rack into the 9-foot tunnel and then passes into the river. A problem occurs during flood flows when large debris collects on the trash rack thereby trapping smaller debris and causing a seal which prevents further downstream movement of silt, sediment, sand and gravel.

After flood periods, silt and debris accumulations must be removed to restore the reservoir capcity. This operation involves the use of a barge equipped with a small hydraulic crane and grappling hooks to remove debris from the bottom of the reservoir. The operation of the barge in debris removal requires changing of water level in the reservoir at intervals. This permits relocation of the barge and accomodates the limited vertical reach of the crane. As the debris is removed by the crane operation, the silt deposits are flushed through the 9-foot tunnel. (See photo Appendix A.)

The sediments which are flushed downriver from this reservoir continue to present a problem since it adversely impacts the Intercounty River Improvement and their efforts to maintain channels for flood flow control.

INTERCOUNTY RIVER IMPROVEMENT (ICRI)

The Intercounty River Improvement (ICRI) Agreement has been in existence since January 19, 1914. The agreement was the result of negotiations between King and Pierce counties beginning in 1906.

Through ICRI, river improvement construction projects were completed during a six-year period and provisions made for future maintenance to be performed by the ICRI employees.

The major works constructed under the Intercounty River Improvememt Agreement are:

A. Drift barrier near river mile 12 -- constructed to trap floating debris for easy collection and disposal.

B. Auburn Barrier Dam -- built to guarantee the White River would forever flow into the Stuck River.

C. Crossover Channel -- connecting channel from Barrier Dam to White River channel (constructed in an old flood channel).

D. Puyallup River section.

ICRI has attempted to maintain the channel and related works since construction was completed. The State of Washington, through grants issued under chapter 86.16 RCW, supported this effort from 1937 through 1974. Lack of State matching funds, local funds and other problems has lead to some deterioration of the maintenance program.

Other ICRI operational problems are:

A. Funding -- necessary projects have become more difficult to fund because of other county needs.

B. Muckleshoot Tribe/Access agreement -- All ICRI work on the White River bordering the Muckleshoot Reservation has been stopped because of problems securing access agreements.

C. Permit Limitations -- Permit requirements by many agencies have restricted the ICRI's ability to perform the necessary maintenance of the channel.

D. Project delays -- ICRI schedules channel maintenance operations to coincide with low flow periods. Sudden flow increases have, in some cases, caused rapid scrambles to save equipment in the path of oncoming water. Such hasty retreats occurred on July 13, 14, and 15, 1976.

ICRI received a hydraulics permit for removal of the gravel bar in the vicinity of the accident site for 1976. Negotiations with the Department of Natural Resources over gravel royalties have delayed the project. The project may not be completed this year because of these delays.

As a result of these problems, the ICRI informed the U.S. Army Corps of Engineers that they would no longer be able to maintain the channel capacity as agreed prior to construction of the Mud Mountain Dam.

SEQUENCE OF EVENTS

Personnel of the Department of Ecology investigating the accident interviewed eyewitnesses and others in proximity to the accident site. In addition, interviews were conducted with personnel of the following agencies:

Puget Sound Power and Light Company
- Officials of Bellevue, Washington, Headquarters
- Operators of Diversion Works

U.S. Army Corps of Engineers
- Officials of Seattle District Office
- Operators of Mud Mountain Dam

Intercounty River Improvement (ICRI)
- Foreman and operations personnel

Pierce County Sheriff's Office

Pacific Police Department

U.S. Geological Survey, Tacoma, Washington

Muckleshoot Tribal representatives

From these interviews the following sequence of events was prepared.

On July 12, 1976, a Puget Power employee discussed projected flows for the week with Mud Mountain Dam personnel and was informed that there would be an extra 500 to 600 cfs increase daily for the entire week. The extra flow was to begin around 9:00 or 9:30 a.m. and lasting until the Mud Mountain reservoir level was lowered enough for debris removal.

On July 13 and 14, Puget Power noted that the extra flow overtopped the dam by 1' to 1'3". They also noted that the water was "dirty" on July 14. The overtopping occurred in the afternoon, according to Puget Power employees, beginning at approxiamtely 3:30 p.m. and lasting about one hour.

Corps records indicate that on July 13, extra flow was increased around 8:30 a.m. from 1890 cfs to 2660 cfs. It was reduced back to 1600 cfs at

3:30 p.m. On July 14, Corps records show an increase from 1500 cfs to 2660 cfs at 9:00 a.m. It was reduced from 2530 cfs to 1500 cfs at 3:45 p.m.

Under normal procedures, the Puget Power mechanic lead man calls Mud Mountain at 1 p.m., daily, for elevation of pool, discharge rate, inflow rate and valve settings on the discharge tunnels.

On July 14, Puget Power called Mud Mountain Dam at 4:30 p.m. to ask if debris removal operations were to be undertaken. They were informed that if conditions were right, debris removal would begin and therefore river sediments might increase the following day.

On July 15 at 8:05 a.m., Mud Mountain Dam called Puget Power to inform them that the discharge from the project would increase by about 750 cfs. The discharge was then 1850 cfs.

At 8:15 a.m., Puget Power called Mud Mountain Dam to discuss debris removal operations and was told that the debris removal work could cause high turbidity below Mud Mountain Dam. Puget Power said that they might or might not cease diversion.

Beginning at 8:25 a.m., the discharge from Mud Mountain Dam was increased by 786 cfs in three stages over a ten-minute period to lower the reservoir to position the working barge for debris removal. This increase in flow resulted in an increase in river height of .7 foot (8.4 inches) at the Buckley gage 1.8 miles below Mud Mountain Dam. By 8:35 a.m., the discharge was 2636 cfs.

The following sequence of events was developed from an interview with the Puget Power crew working at the diversion works the morning of July 15.

At about 8:45 a.m., Puget Power made the decision, because of increased turbidity of the water, to close the flume gates and remove part of the diversion dam. The crew started removing the diversion dam stop logs with two crew members in the carriage over the dam, one crew member working the hoist, and the Headwork attendant controlling the flume gates. The first stop log post removed was No. 6, causing sections 6

and 7 to be washed downstream by the river. Then posts 5, 4, and 3 were removed, causing sections 5, 4, and 3 to wash downstream. Reusable sections 1 and 2 were then removed and placed on the diversion dam abutment deck.

The Relief Headworks attendant closed the flume gates while the rest of the crew was removing the sections of the diversion dam. This entire procedure took about 15 minutes (removing seven sections of diversion dam and closing the flume gates) and was considered by the operating crew to be a routine operation.

The procedure started at about 8:55 a.m. and was completed about 9:10 a.m. A total of seven 6' x 7' sections were removed in this procedure. The mechanic lead man noticed that the crew was just laying the second reusable dam section down on the abutment deck as he left the dam structure. It takes about 2-1/2 to 3 minutes to close the flume gates.

While the crew was walking back up to the crew headquarters, they heard the diversion dam being overtopped by an increase flow in the river. The time was estimated somewhere between 9:15 and 9:20 a.m.

The Headworks attendant notified Dieringer operations by phone when the diversion activities were completed. At approximately 9:45 a.m. Puget Power called Mud Mountain Dam to inform them that diversion had been discontinued. According to Puget Power, they had been diverting 1750 cfs.

There are no written procedures or letters of instruction to Puget Power project personnel to cover the operations involved in closing the flume gates or removing parts of the diversion dam. The decision of how many sections of the diversion dam are to be removed is based on experience. However, long-standing practice has developed routine procedures for operating the 66-year old facility.

An interview was also held with a Corps of Engineers employee who visited the diversion dam and head works on the morning of July 15. He arrived

at the diversion dam between 9:00 a.m. and 9:15 a.m. and noticed that sections of the diversion dam had been removed. He did not speak to anyone at the dam, and noticed only one Puget Power employee in the vicinity of the crew's quarters.

He estimated that he was at the dam site performing his work until approximately 9:40 a.m., and he did not notice any overtopping of the remaining portion of the diversion dam while he was there.

The log at the Corp of Engineers office, under the entry of July 16, at 8:15 a.m., indicates that Puget Power informed Mud Mountain Dam personnel that the closing of the diversion dam by Puget Power was completed by 9:00 a.m. on July 15.

It is noteworthy that the statements given by Puget Power personnel and the log of the Army Corps of Engineers differ significantly, especially as it relates to the timing of events.

At about 1:30 p.m., seven children were playing in the shallow waters adjacent to a gravel bar near the middle of the river, about 1/4 of a mile south of the park in Pacific, Washington. They were accompanied by two women.

The women noticed a change on the river surface and the water level rising rapidly. One woman described the event as a "wall of water" coming down the river, while the other described it as a "wave." Both noted that it was very dark brown in color and contained some logs and debris. The river level rose so rapidly one woman was unable to save her purse.

One of the women was able to reach the west bank with three small children, while the other woman went to assist four girls playing closer to the east bank. Two of the girls were able to reach the east bank, but the other two could not because of the depth and velocity of the water.

While attempting to reach these two girls, the woman lost her footing and was swept downstream approximately 3/8 of a mile. The current carried her back close enough to the west bank to allow her to get out of the river. At about this same time, the two girls were swept down the river.

The two women, after briefly searching for the missing girls, notified the Pacific Police Department at 2:04 p.m. The police responded and began a search of the river banks. The Pacific Police Department dispatcher notified Mud Mountain Dam at 2:55 p.m. about the possible drownings and requested a reduction in flow to assist in the search effort.

At 3:20 p.m., the log of the gate settings at Mud Mountain Dam indicates that the flow was reduced from 1760 cfs to 108 cfs. (Corps of Engineers operating log kept in Seattle office shows flow reduced from 1760 cfs to 150 cfs).

At 3:25 p.m. and 4:15 p.m., the State Departments of Fisheries and Game, respectively, were notified by the Corps of Engineers that the flow in the White would be reduced from about 2500 cfs to about 200 cfs in less than one hour because of reported drownings downstream.

The Department of Fisheries indicated a concern that the rapid reduction in water flow might trap the spring chinook salmon in the river. The Department of Game made no comment.

At 3:02 p.m., the Pacific Police Department notified the Pierce County Sheriff's Office and, from that time until darkness, the Pierce County search and rescue unit, assisted by members of the Iron Horseman Search and Rescue, Washington Kyak Association, Explorer Search and Rescue, Tacoma Citizen Band Radio Association, and an Army Helicopter searched the river from the accident site downstream to the lower Puyallup River with no results.

On July 16, the search was continued aided by divers from Pierce County Sheriff's Office and the Scubaneers, Washington Kyak Club, Explorer Search and Rescue, and an Army Helicopter. After searching to the mouth of the Puyallup River, the search in the White River was suspended at 9:00 p.m.

On July 25, the body of one victim was found in the Puyallup River just below the mouth of the White River. On July 26, the other body was recovered near the mouth of the Puyallup River.

Other witnesses in or near the White River around 1:30 p.m. on July 15 noted that the water level took an estimated 3 to 5 minutes to go from a very low flow to a very high turbulent flow, with some logs and sawn timber in it. They also noted that the water was a dark brown color, differing from the milky gray appearance of a glacial melt water river.

HYDRAULICS

On July 15, 1976, a stream flow regulation incident occurred on the White River. It was a hydraulically complex incident related to three major events differing from normal day-to-day activities on the river.

1. Beginning at 8:25 a.m., personnel at Mud Mountain Dam began an additional release of more than 700 cfs over an existing release of about 1800 cfs.

2. The White River project diversion dam of Puget Power was purposely breached for a distance of 42 feet out of its 352-foot length between 8:45 a.m. and 9:15 a.m. The flashboards on this dam are 7 feet high. During this same time, the diversion canal was closed. It had been diverting between 1700 cfs and 1800 cfs (adjusted from the flume gage (0990)).

3. A surge of water traveled downstream.

The purpose of this section is to describe the timing, magnitude, and component parts of this hydraulic event. The fact that this type of occurrence is not unique is documented in representative stage charts dating from 1968 to 1972 and 1976 with additional discussion, including hydrology, in the Hydrology and Hydraulics Appendix. Out of 43 incidents reviewed, 14 occurred in winter, 5 in spring, 14 in summer, and 10 in fall.

This report uses the term "surge" or "wave" throughout. The probable surge shape at the site is shown in Figure A with general surge and wave shapes at other locations depicted in Figure J, (see Hydraulic Appendix).

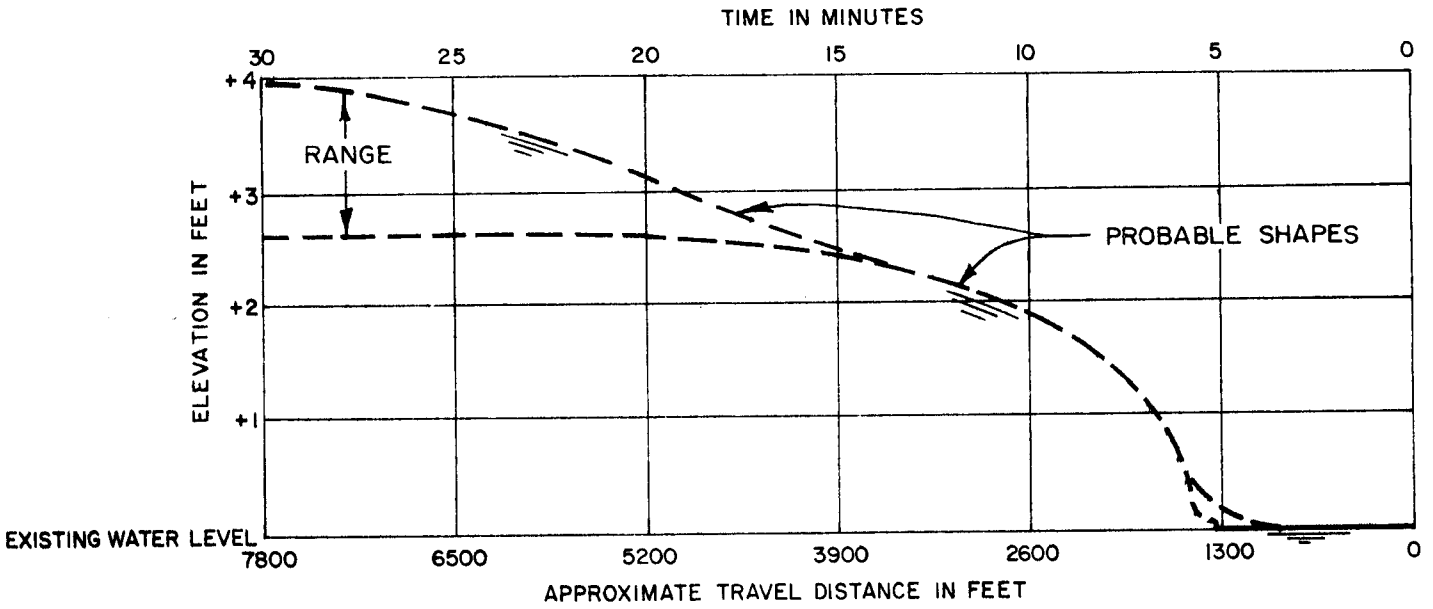


Figure A. PROBABLE SURGE/WAVE FORM IN VICINITY OF PACIFIC, WASHINGTON, ON EARLY AFTERNOON OF JULY 15, 1976.

It appears that the positive surge between Mud Mountain Dam and Puget Power's diversion dam traveled downstream at an average velocity of between 9 and 15 mph. Figure "B" is a flow chart (hydrograph) showing the probable range of what happened immediately downstream of Puget Power's dam on July 15, 1976. The derivation of this hydrograph is in Table 3, Hydrology and Hydraulic Appendix.

The section of river below Puget Power's diversion dam appears to have been subject to flows ranging between one of the two following conditions:

1. Canal open (Puget Power's flashboards in place) - Mud Mountain Dam surge overtops Puget Power's dam and enters canal. A flow of about 700 cfs moves downstream in White River to be followed no later than one-half hour by over 1700 cfs flow from the breaching of 42 feet of Puget Power's dam. This second wave (1700 cfs) would travel faster than the previous 700 cfs surge in the river and would catch up to the previous 700 cfs surge prior to the surge reaching the Pacific Park area. See Figure B, Condition 1.

2. Canal closed - Puget Power opened a 42-foot section of their dam prior to the time that the 700 cfs surge from Mud Mountain Dam passed Puget Power's dam. This initial 1,700 cfs surge would be similar to a wave occurring from a rapid gate opening or from a partial dam failure. Riverbed friction would create turbulence and slow this surge (see Figure B, Condition 2).

Figure B indicates by cross hatching the probable range in time between 8:30 a.m. and 9:30 a.m., during which these events could have occurred on July 15, 1976. However, under either Condition (1) or (2) above, the nature of the flow would be such that the two surges would be combined well before reaching the accident area. Figure C shows a range for the synthesized hydrograph immediately downstream of the accident site, with the most probable hydrograph noted.

The section of river at and upstream of the town of Pacific has a slope which would sustain flow between 3 and 6 MPH, with a probable river rise varying from 2 to 5 feet in height within one-half hour for the surge from the flow indicated in Figure C.

Cross sections near the site of the drownings (Figure D) show the probable depth of water both before and after this surge occurred immediately upstream and downstream of the accident site. Note that the upstream right channel flow transits to the downstream left channel flow. The probable increase in velocity of flow is also noted on Figure D.

The surge moved downstream in the White River to join the residual flow from the shutdown of the Dieringer Power Plant and combined with other flows in the Puyallup River as indicated in records of the Puyallup River gage shown in Figure E.

Records of the U.S. Geological Survey used in this work were preliminary and may be subject to change. However, substantial review of the records used has been made.

See Hydrology and Hydraulics Appendix for further information.

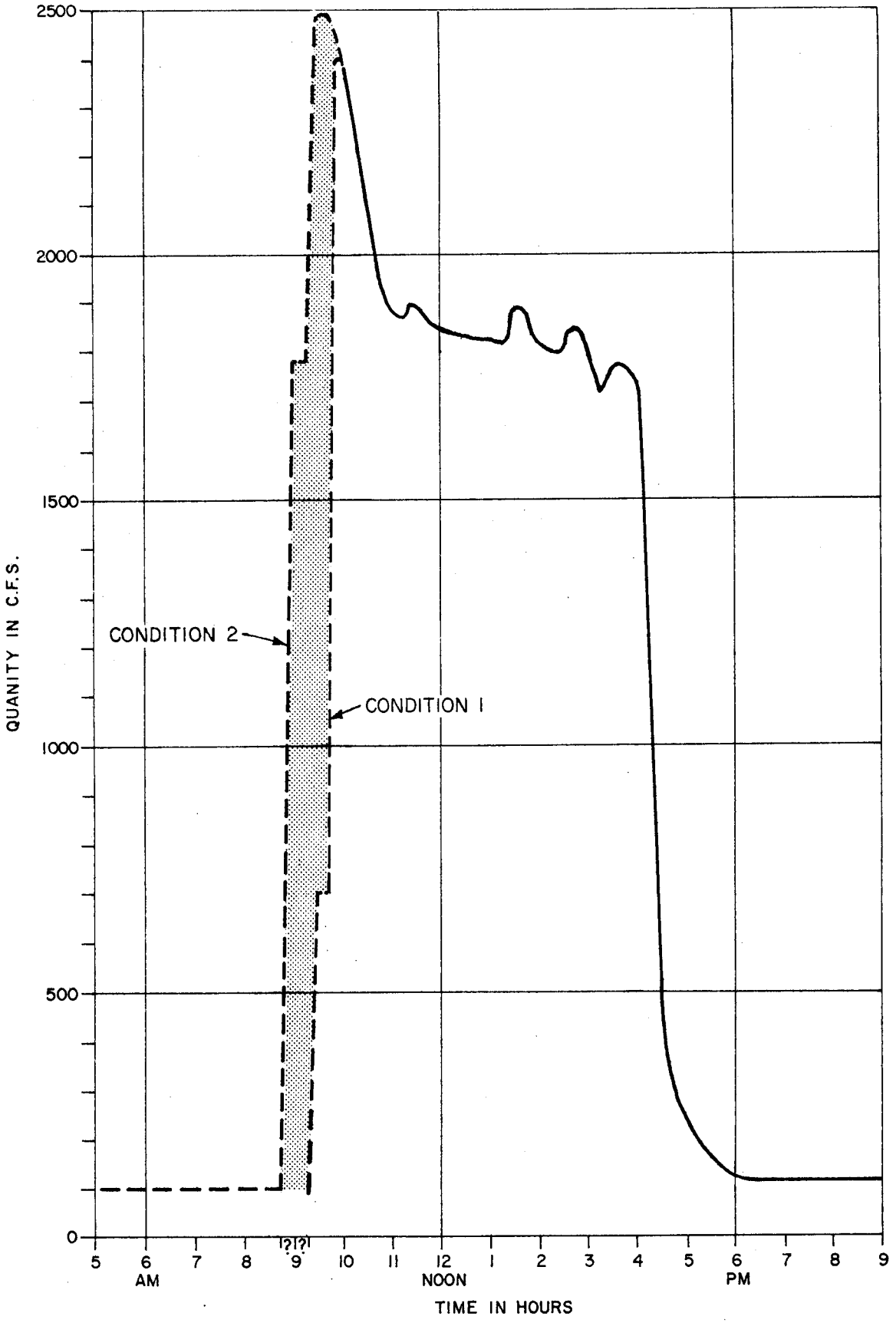


Fig. B. DERIVED HYDROGRAPH RANGE FOR WHITE RIVER, RM 24.0 (WHITE RIVER IMMEDIATELY BELOW PUGET POWER DAM)

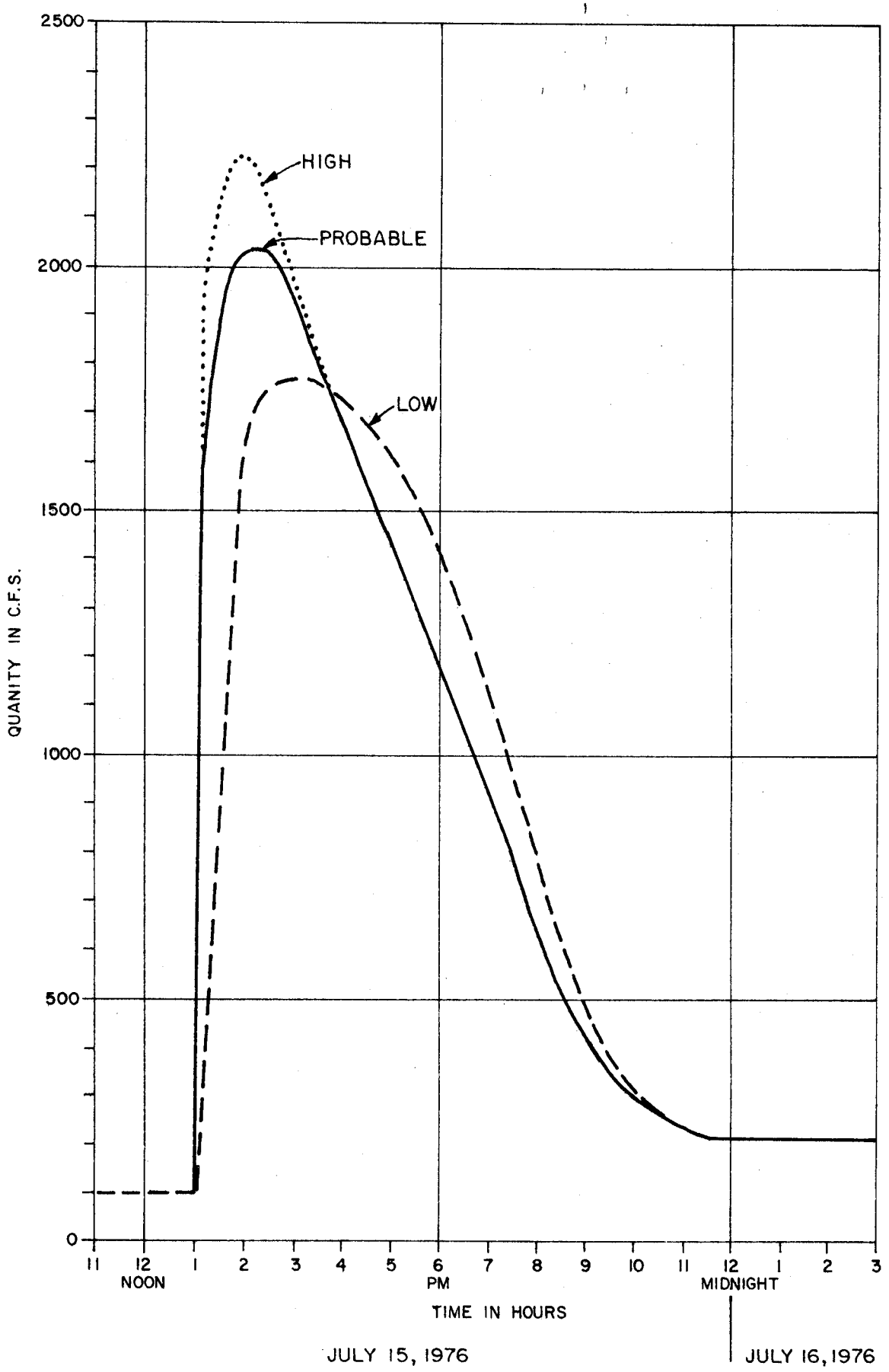
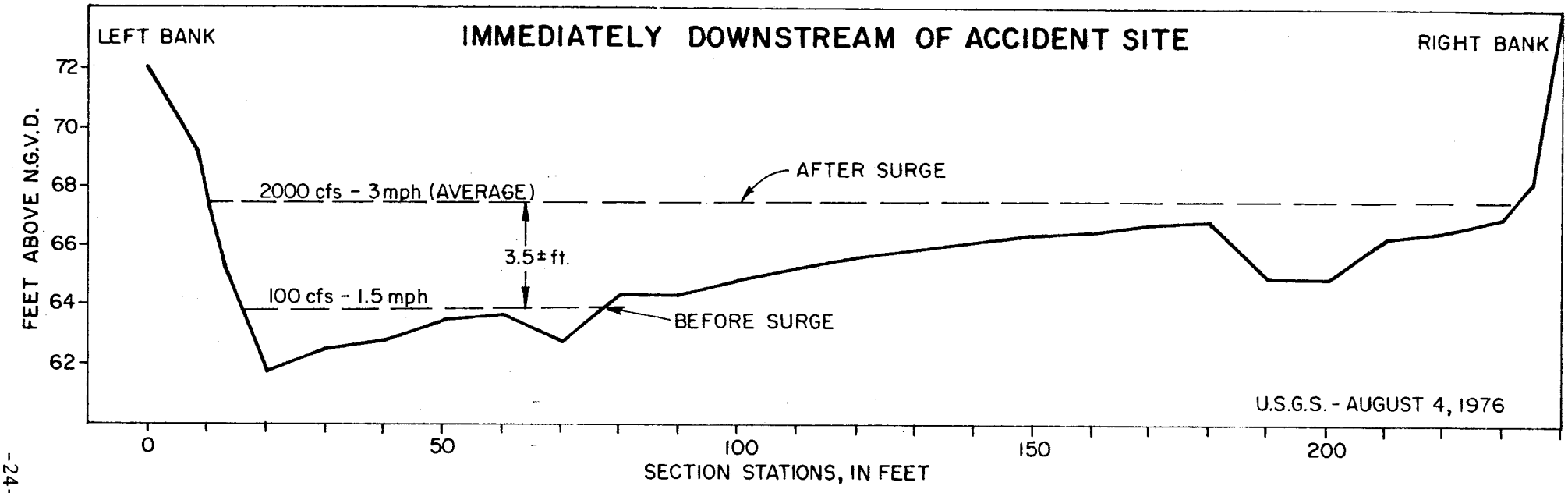


Fig. C. DERIVED HYDROGRAPH RANGE FOR WHITE RIVER, RM 4.9
(WHITE RIVER BELOW EIGHTH STREET BRIDGE)



WHITE RIVER - STATION 5.52

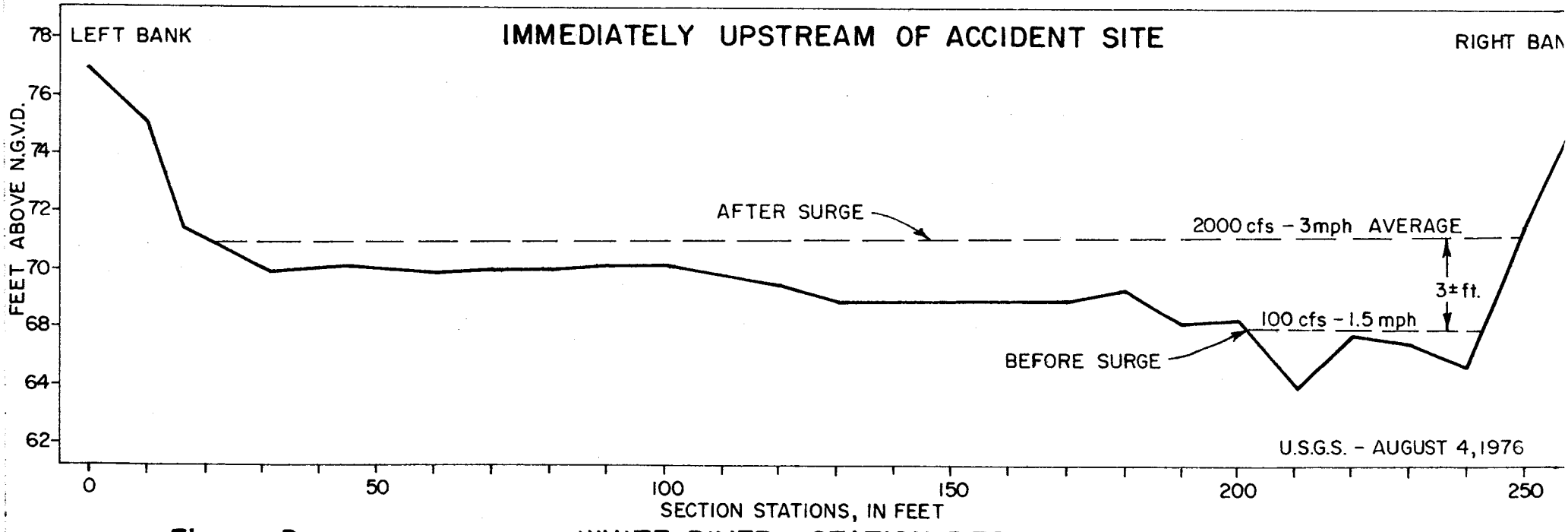
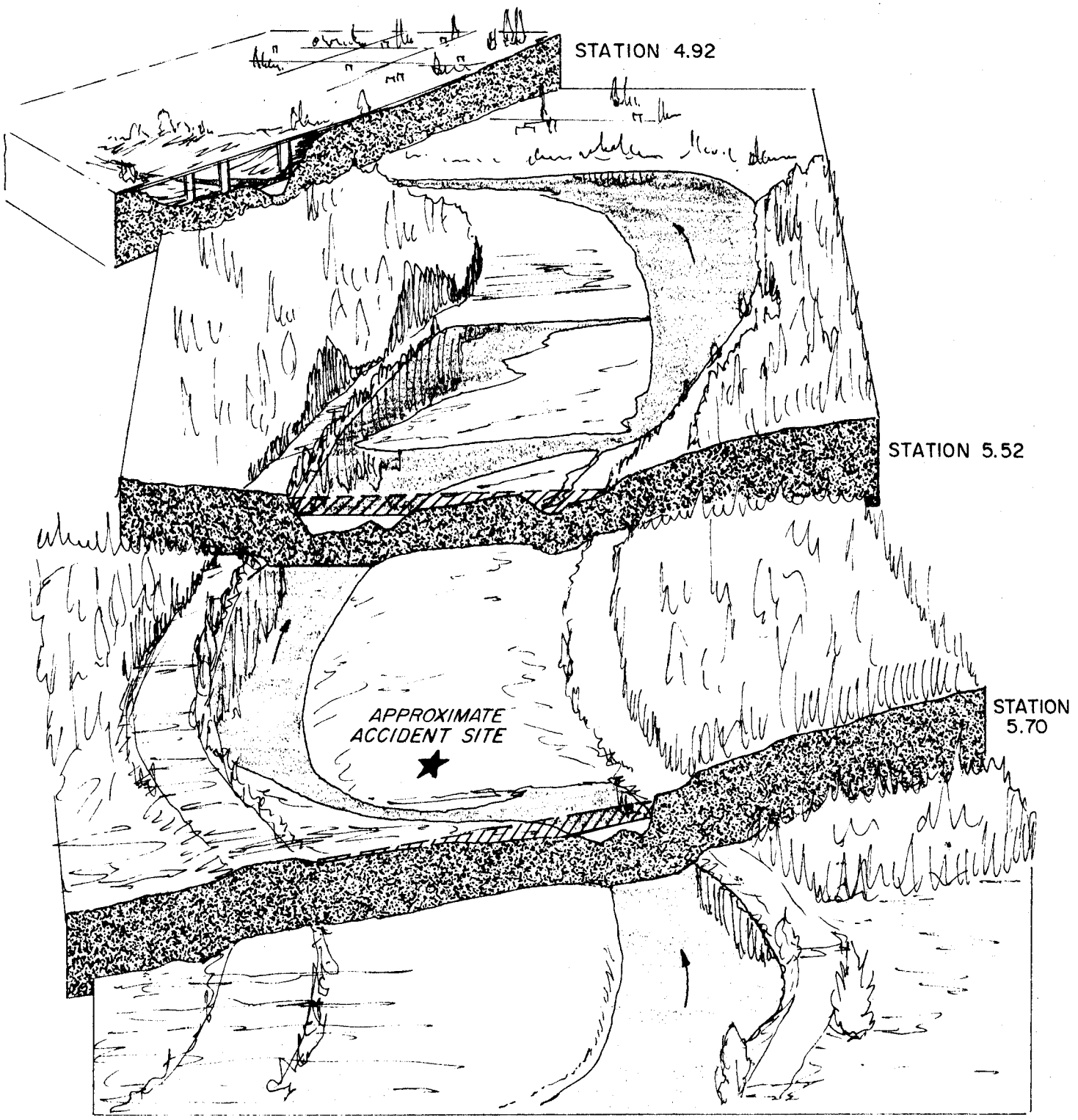


Figure D. WHITE RIVER - STATION 5.70



WHITE RIVER LOOKING SOUTHERLY AT RIVER BANK FROM PACIFIC PARK TOWARD 8TH STREET BRIDGE.

FIGURE D.1

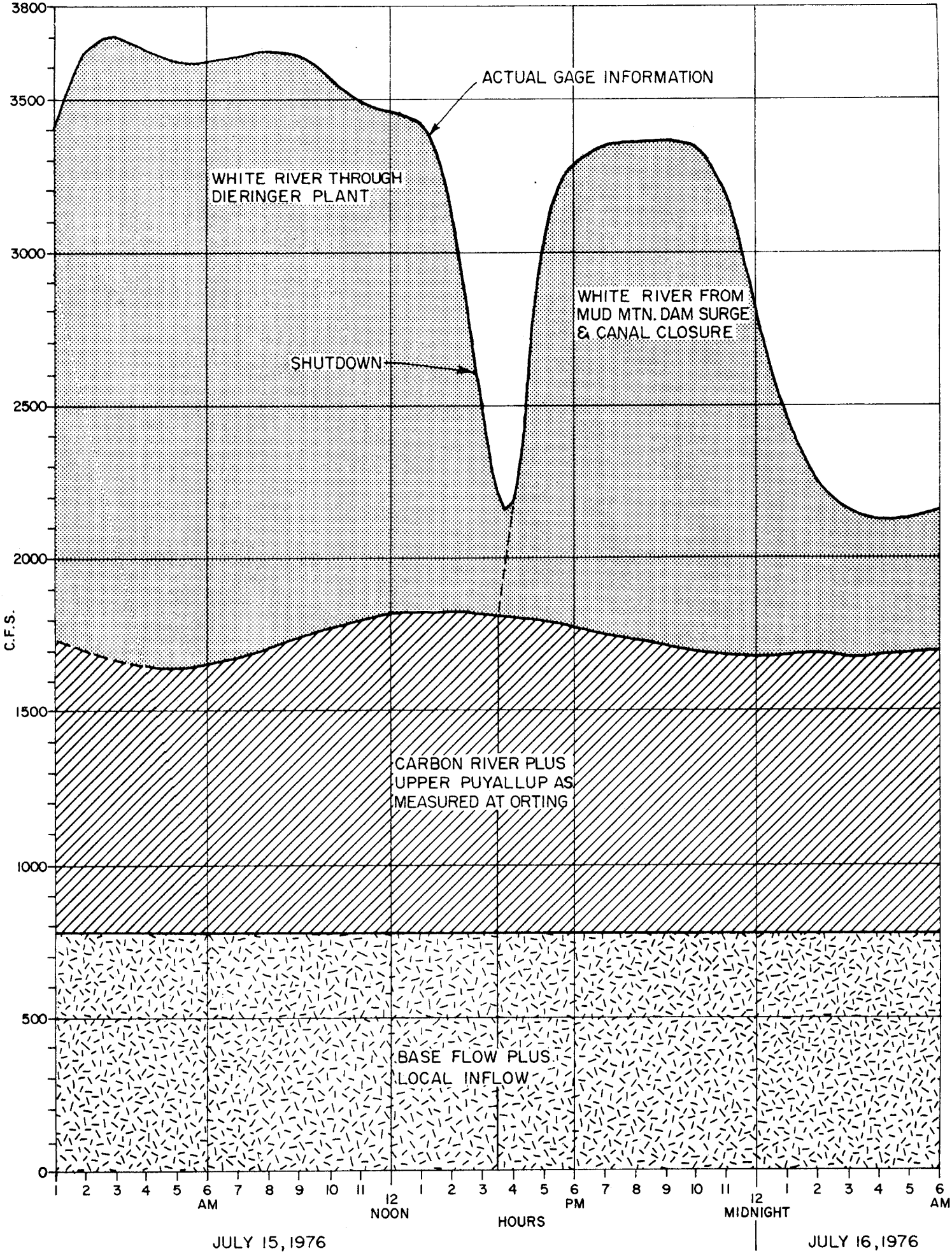


Fig. E. FLOW OF PUYALLUP RIVER AT PUYALLUP (RIVER MILE 6.6)

ANALYSIS OF PROJECTS HAVING POTENTIAL FOR OPERATIONAL RIVER SURGING

In 1974, the Department of Ecology, under contract with the U.S. Army Corps of Engineers pursuant to PL 92-367, conducted an inventory of dams in the State of Washington. This inventory found approximately 670 man-made impoundments with storage capacity of ten or more acre-feet or where the structure was ten feet high or taller.

An examination of the dam inventory indicated that approximately 61 projects had the potential for the rapid release of sizable quantities of water. Within this category, 46 generate electric power, 6 provide municipal and industrial water supplies, 7 provide irrigation water, and 2 are used for flood control. These projects are listed by county in Table 1.

Table 1 also shows the affected streams; appropriate downstream gaging stations that had records suitable for surging analysis; and the distance between the projects and downstream gaging stations in miles. Time constraints did not permit a thorough analysis of the surging potential of all projects. Consequently, with the exception of main stem Columbia and Snake River dams, a representative group of projects was selected for a more detailed analysis. Each of these selected projects is identified by an asterisk in the table.

The surging analysis consisted of an examination of a sample of recent river stage records for the appropriate gaging station. For the purpose of isolating significant surges, this criteria was used: a rise in river stage of one foot or more in one hour or less. The results of this analysis are as follows:

Chelan Dam

Large quantities of water are released to the gorge below the dam during the spring flood period as a normal operational procedure. However, prior to each occurrence, the owner publishes a notice of the forthcoming event in local newspapers. On the day of the event he makes a visual

inspection of the gorge to assure all warning signs are in place and no people are present in the gorge. The initial release is then made at a deliberate low rate. This release is followed by a second visual inspection to again assure no one is present downstream. Upon completion of these precautionary measures, full flood flow operations are begun.

Elwha Dam

Examination of flow records below the dam indicate the downstream reach is subject to only occasional operational surges. During the 1974 water year (i.e., October 1, 1973 through September 30, 1974), only one incident was noted equal to the defined criteria for surging.

Glines Canyon Dam

The 1974 water year record sample at gaging station No. 12.0455.00 indicated considerably more surging in the reach of river between Glines Canyon Dam and Lake Aldwell than in the reach below Elwha Dam. About 14 incidents occurred during this period; however, 12 were concurrent with natural high runoff events and most of these were less than one foot per hour.

Swift, Yale, and Ariel Dams

Composite operation effects of the three major projects on the Lewis River - the Swift, Yale, and Ariel Dams - are reflected in the record of gaging station No. 14.2205.00. A record sample for the 1973 water year indicated that this river is subject to frequent surging. A total of 209 incidents were observed during the sample period, many exceeding an overall magnitude of five feet within two to four hours.

Wynoochee Dam

During the initial year of project operations (1973), 15 incidents of approximately one-foot rise per hour were observed. However, in the 1975 water year, only three such incidents occurred.

Howard A. Hanson Dam

Occasional surging occurs in the Green River as a result of operational activities at Howard Hanson Dam. In addition, some fluctuation is

imposed on the lower river by the operation of the City of Tacoma water supply diversion works located near Palmer.

During the 1969 water year, about 16 significant surges occurred at gaging station No. 12.1059.00, located 0.7 of a mile below Howard Hanson Dam. In 1970, a total of 14 incidents were recorded. A few of the flow releases created stage increases of two to three feet, but these generally occurred over a two- to three-hour period.

Tacoma Diversion Works

At gaging station No. 12.1067.00, located 0.6 of a mile below the diversion dam, 16 surges of one or more feet per hour were recorded for the 1972 water year and 6 occurred during the 1973 water year. The upper Green River is the Tacoma watershed and is closed to public access.

Masonry Dam

The reach of the Cedar River between the Masonry Dam and the Landsburg diversion is subject to frequent fluctuation averaging about 1.5 feet per hour immediately below Masonry Dam. The fluctuation is generally less than 1.0 foot per hour above the Landsburg diversion dam. In the 1970 water year, about 180 incidents occurred, mainly between January and June, at gaging station No. 12.1175.00 near Landsburg. The section of the river between the Masonry Dam and Landsburg diversion is in the Seattle watershed and is closed to public access.

Landsburg Dam

The Cedar River below Landsburg Dam is subject to frequent small fluctuations that range from about 0.3 to 0.7 feet per hour. During the 1970 water year, about 120 incidents occurred at gaging station No. 12.0090.00, mainly between February and June.

Mud Mountain Dam

The effects of the Mud Mountain Dam operation are reflected in the record of gaging station No. 12.0985.00. This gage on the White River at Buckley indicated a total of 18 surges in excess of one foot per hour during the sample 1972 water year. Many of these incidents exceeded a

total rise of three feet in one hour. This gage is about 1.5 miles below the dam and does not accurately reflect conditions in the lower reaches of the river.

Cle Elum Dam

The 1975 water year record sample indicated that surging below the Cle Elum Dam at or slightly above one foot per hour occurred six times, two were specifically for debris removal with a one-foot surge in one-half hour.

Kachess Dam

The 1975 water year record sample indicated only two significant surging incidents occurred, both were operational and concurrent with natural high runoff events.

Keechelus Dam

The 1975 water year record sample indicated five surging incidents, all were operational and concurrent with natural high runoff events. The composite operational effects of the four projects on the Yakima River - the Cle Elum, Kachess, Keechelus, and Easton Dams - are reflected in the record of gaging station No. 12.4795.00 at Cle Elum. This gaging station is about 31 miles below the most distant project, Keechelus Dam. Its 1975 water year record sample indicated no surging incidents. One surging incident of 0.8 foot in one hour was found in the 1974 water year record, probably due to sudden formation of an ice jam.

Condit Dam

The 1974 water year record sample indicated surging from 1.0 to 2.0 feet per hour occurred 24 times.

Mayfield and Mossyrock Dams

The combined operations of Mayfield and Mossyrock Dams were observed in the record of gaging station No. 14.2380.00. Approximately 38 surging incidents were found for the 1973 water year, however, most of these were only at a rate of one foot in one to two hours.

Cushman Dam No. 2

During the five water years from 1969 through 1973, occasional sizable releases were made which were generally concurrent with spring snowmelt runoff. Specifically, six incidents occurred in 1969, four in 1971, and eleven in 1972. Some of these surges occurred at a rate of 2.5 to 3.0 feet per hour.

Boundary Dam

Operational effects of Boundary Dam are reflected in the record of gaging station No. 12.3986.00, located about one mile below the project and very near the international boundary. The 1974 water year record sample indicated surging occurred 649 times at or above the defined criteria; minor surging occurred nearly every hour; surging in excess of three feet in one hour or less occurred 71 times and surging of 5.0, 4.5, and 4.0 feet occurred, respectively, on October 16, November 5, and November 8, 1973. While this record is outstanding among all projects analyzed in this report, the actual effects downstream may be minimal, due to the presence of two more projects below in British Columbia. The backwater of the nearest project extends almost to the tailrace of Boundary Dam. The record merely indicates a normal, long-term operational procedure.

Sullivan Lake Dam

A 19-month record (October 1974 to May 1976) sample for gaging station No. 12.3971.00 indicated surging occurred four times and ranged from 1.1 to 2.1 feet per hour. These releases from the dam were controlled releases for lake level maintenance concurrent with natural high runoff. No power has been produced at this project since 1966.

Alder and La Grande Dams

The combined effect of Alder and La Grande Dam operations is indicated in the record of gaging station No. 12.0865.00. During the 1972 water year, ten incidents were recorded. Most of these did not exceed a one-foot rise; however, a three-foot surge occurring over a period of three hours was observed.

Electron Dam

The record of gaging station No. 12.0935.00, located on the Puyallup River below the Electron Project return discharge, indicated many small fluctuations of 0.3 to 0.5 feet per hour during water year 1970. Only two sizable surges in excess of one foot per hour were observed, and these apparently reflect flows resulting, in part, from natural runoff.

Lake Tapps

With few exceptions, there are daily fluctuations in the Dieringer Power Plant tailrace and discharge channel to the Stuck River. These normally occur between 6 a.m. and 8 a.m. and usually range in magnitude from two to four feet. There is no gaging station on the Stuck River below the Dieringer return to verify the extent of surging in the river. Because of the magnitude of flows involved, these power plant fluctuations can at times produce sizable and sudden changes in flow in the lower river.

Lower and Upper Baker Dams

The combined effect of the Baker River dams are reflected in the record of gaging station No. 12.1935.00 located below the fish barrier dam at Concrete. Although there is only a short reach of the Baker River between the lower project and the confluence of the Baker River and the Skagit River, power plant operations produce numerous surges in this reach. During water year 1973, there were 216 surges that exceeded one foot per hour and most of these averaged 2.5 to 3.0 feet in magnitude.

George Culmback Dam

The location of the Sultan River Gage, 1.9 miles above the water supply diversion to Lake Chaplain, precluded an accurate analysis of surging in the lower river. The record at gaging station No. 12.1375.00 for water year 1970, showed a few sizable fluctuations for the reach of river between the diversion dam and Culmback Dam, however, all but one of these appeared to be the result of flood flow releases from the project.

Skookumchuck Dam

Most of the sudden increases in river stage resulting from the operation of Skookumchuck Dam average less than 0.5 feet. A few incidents have occurred exceeding 1.0 foot, however, most of these reflect storm runoff. At gaging station No. 12.0261.50, located 1.2 miles below the dam, three significant rises occurred in the 1972 water year, four in 1973, and six in 1975.

At gaging station No. 12.0264.00, located about a mile below the intake to the Centralia Power Plant, natural runoff is the basic cause of almost all significant stage increases. Project operations seem to have only a minor effect on fluctuations in this reach. Eight such rises were found for the 1972 water year and six occurred in 1973.

Gorge, Diablo, and Ross Dams

The combined effect of these three Skagit River hydroelectric projects are reflected in the record of gaging station No. 12.1780.00. These projects produce numerous river stage fluctuations and in water year 1974 a total of 249 incidents occurred, ranging in magnitude from 1.0 to 1.5 feet per hour. Signs have been posted in the area warning the public of these river fluctuations.

Bumping Lake Dam

The 1975 water year record sample indicated no surging at or above one foot per hour.

Tieton Dam

An examination of the record for gaging station No. 12.4915.00 for water year 1975 indicated numerous fluctuations well below the assumed criteria of one foot per hour. Only two incidents occurred with a magnitude of one foot per hour. One involved release and flood flow discharge and the other release only.

Table 1

PROJECTS HAVING POTENTIAL FOR OPERATIONAL RIVER SURGING

Name of Project	Stream	Downstream Gage No.	Miles Between Project and Gage
Benton County			
McNary Dam	Columbia River	14.1057.00	103.1
Chelan County			
Chelan Dam *+	Chelan River		
Rock Island Dam	Columbia River	12.4626.00	1.0
Rocky Reach Dam	Columbia River	12.4537.00	0.5
Clallam County			
Elwha Dam *	Elwha River	12.0465.00	1.8
Glines Canyon Dam *	Elwha River	12.0455.00	4.9
Clark County			
Ariel Dam *+	Lewis River	14.2205.00	0.5
Yale Dam *	Lewis River	14.2205.00	15.2
Columbia County			
Little Goose Dam	Snake	13.3530.00	52.5
Cowlitz County			
Swift No. 2	North Fork Lewis River	14.2205.00	
Douglas County			
Chief Joseph Dam	Columbia River	12.4380.00	1.1
Wells Dam	Columbia River	12.4507.00	0.5

** Projects selected for analysis.*

+ Projects with operations that produce highly hazardous surges.

Name of Project	Stream	Downstream Gage No.	Miles Between Project and Gage
Franklin County			
Lower Monumental Dam	Snake	13.3530.00	31.9
Garfield County			
Lower Granite Dam	Snake River	13.3530.00	97.8
Grant County			
Grand Coulee Dam	Columbia River	12.4365.00	0.3
Priest Rapids Dam	Columbia River	12.4728.00	2.6
Wanapum Dam	Columbia River		
Grays Harbor County			
Wynoochee Dam *	Wynoochee River	12.0354.00	0.5
King County			
Howard A. Hanson Dam *	Green River	12.1059.00	0.7
Tacoma Diversion Works	Green River	12.1067.00	0.6
Masonry Dam *+	Cedar River	12.1165.00	2.4
Landsburg Dam *	Cedar River	12.1175.00	20.0
Mud Mountain Dam *+	White River	12.0985.00	1.7
Tolt River Dam	South Fork Tolt River	12.1480.00	1.6
Kitsap County			
Casad Dam	Union River	12.0630.00	1.0

** Projects selected for analysis.*

+ Projects with operations that produce highly hazardous surges.

Name of Project	Stream	Downstream Gage No.	Miles Between Project and Gage
Kittitas County			
Cle Elum Dam *	Cle Elum River	12.4790.00	0.3
Kachess Dam *	Kachess River	12.4760.00	0.3
Keechelus Dam *	Yakima River	12.4745.00	0.1
Klickitat County			
Condit Dam *	White Salmon River	14.1235.00	0.1
Dalles Dam	Columbia River	14.1057.00	2.6
John Day Dam	Columbia River	14.1057.00	26.7
Lewis County			
Mayfield Dam *	Cowlitz River	14.2380.00	1.4
Mossyrock Dam *	Cowlitz River	14.2380.00	14.9
Lincoln County			
Little Falls Dam	Spokane River		
Long Lake Dam	Spokane River	12.4330.00	0.1
Mason County			
Cushman Dam No. 1	North Fork Skokomish River		
Cushman Dam No. 2 *+	North Fork Skokomish River	12.0595.00	7.2
Okanogan County			
Conconully Dam	Salmon Creek		

** Projects selected for analysis.*

+ Projects with operations that produce highly hazardous surges.

Name of Project	Stream	Downstream Gage No.	Miles Between Project and Gage
Spokane County			
Nine Mile Dam	Spokane River		
Thurston County			
Skookumchuck Dam *	Skookumchuck River	12.0261.50 12.0264.00	1.2 15.5
Walla Walla County			
Ice Harbor Dam	Snake	13.3530.00	0.0
Whatcom County			
Diablo Dam *	Skagit River	12.1780.00	6.4
Gorge Dam *+	Skagit River	12.1780.00	2.8
Ross Dam*	Skagit River	12.1780.00	11.5
Upper Baker Dam *	Baker River	12.1935.00	8.3
Yakima County			
Bumping Lake *	Bumping River	12.4880.00	1.2
Tieton Dam *	Tieton River	12.4915.00	0.2
Wenas Dam	Wenas Creek		

** Projects selected for analysis.*

+ Projects with operations that produce highly hazardous surges.

Name of Project	Stream	Downstream Gage No.	Miles Between Project and Gage
Pend Oreille County			
Boundary Dam *+	Pend Oreille River	12.3986.00	0.9
Box Canyon Dam	Pend Oreille River	12.3965.00	0.2
Mill Pond	Sullivan Creek		
Power Lake	Tr-Calispell Creek		
Sullivan Lake Dam *	Harvey Creek	12.3971.00	0.4
Pierce County			
Alder Dam *	Nisqually River	12.0865.00	3.8
Electron Dam *	Puyallup River	12.0935.00	4.8
La Grande Dam *	Nisqually River	12.0865.00	2.1
Lake Tapps *+ (includes White River Diversion works)	White River-Off-stream	12.1011.00	0.2
Skagit County			
Lower Baker Dam *+	Baker River	12.1935.00	0.3
Skamania County			
Swift Dam *	Lewis River	14.2205.00	28.9
Bonneville Dam	Columbia River		
Snohomish County			
George Culmback Dam *	Sultan River	12.1375.00	5.2

* Projects selected for analysis.

+ Projects with operations that produce highly hazardous surges.

CONCLUSIONS

Soon after beginning this investigation, it became apparent that the girls were tragic victims of a complex, but not unusual, dam safety problem.

It also became evident that a tragedy of this kind was, perhaps, inevitable because of inadequate or out-dated public safety precautions at many Washington dams and diversion projects.

The operational conditions of the two river projects on the upper White River are not unique. These projects are, unfortunately, typical of many Washington dams and diversion works constructed in the early part of the century when public safety controls were rarely considered necessary.

When these older projects were built, their operations were primarily single purpose -- to divert water as needed, when needed, with little consideration of the impact on the river or the potential danger downstream.

Most of the projects were constructed in isolated, unpopulated areas where public safety was a small, or nonexistent, concern. Over the years, rapid population growth has occurred in these once wilderness areas creating public safety problems exemplified in the Stuck River incident.

With the growth of communities along the rivers, came an increase in the recreational use of the riverbank areas. Parks and residential areas brought more and more people to the rivers and increased the potential danger of the uncontrolled raising and lowering of river flows.

In most cases, the operators of dams and diversion works have simply been unable to keep up with the rapidly growing need for comprehensive public safety procedures.

Unfortunately, legislation to insure that public safety is a required consideration in every operation of all dams and diversion projects is also deficient.

The conclusions and recommendations on the following pages detail the Department of Ecology's belief that the need for operational dam safety legislation is urgent. Additionally, because of the large number of older dams in Washington, the issue of structural dam safety becomes an increasingly important area of concern.

White River

1. *No evidence was found that the health and safety of downstream water users was adequately considered in flow regulation which took place on July 15, 1976.*

2. A review of historical records indicate that fluctuations of greater than one foot per hour have occurred frequently.

3. Mixed waters from surges caused by an additional Mud Mountain Dam release and the breaching of Puget Power's dam and flume gate closure caused a surge through the lower White River on July 15, 1976, with at least a doubling of velocities and increases in river depth between 2 and 5 feet generally.

4. *No evidence was found to indicate that an adequate warning system to notify the general public has ever existed on the White River.*

5. Puget Power has no operation manual for the river diversion dam and flume headworks operation, however, long standing practice has developed routine procedures for operating the 66-year-old facility.

6. There is no single authority responsible for controlling the rate of change of flow downstream of the major flow control facilities (Mud Mountain Dam and PSP&L diversion dam and flume headworks).

7. The removal of large quantities of debris and glacial sediments is a continuing problem in the operation of Mud Mountain Dam.

8. The present method of debris removal at Mud Mountain Dam requires numerous changes of the reservoir level which result in fluctuations of river flow.

9. *The design, construction, and operation of the dam operated by Puget Power does not enable the operators opportunity to make controlled gradual changes in the rate of flow downstream under varied conditions.*

10. The operational changes in river flow have caused hardships to the Muckleshoot Tribal fisheries program.

11. Intercounty River Improvement has had difficulty carrying out their responsibilities due to restrictive permit conditions and financial constraints.

12. The movement and deposition of sands and gravels downstream has caused the formation of gravel bars that are frequently used by the public for water oriented recreation.

13. The hazards associated with the use of sand and gravel bars in the river for recreational purposes are not apparent to the general public.

State wide

14. *Of the 32 projects selected for detailed flow analysis, approximately 18 displayed operational fluctuations that were of sufficient magnitude and number to warrant concern about the potential safety hazard to life and property.*

15. Flow fluctuations from 9 projects of the 32 examined indicated the existance of highly significant problems in need of immediate attention.

16. DOE has initiated communication with representatives of the 9 projects identified in need of immediate attention to determine if reasonable operational changes could be implemented to reduce downstream hazards.

17. As the future hydroelectric project operations in the State of Washington change to meet peaking load demands, sudden and higher water releases will become more frequent in the future unless public safety and other uses of our water resources are protected.

18. The Department of Ecology proposed to the State Legislature dam safety legislation in the year of 1973. The legislative proposal addressed itself to both the subjects of structural integrity of dams and operational safety. The bill did not proceed through the legislative process. In the light of this examination, it would appear to be highly desirable that such legislation now receive very careful legislative consideration.

RECOMMENDATIONS

White River

1. Methods must be adopted for controlling the rate of change of flow and river level, to insure safety of downstream users in the White River.

2. Re-activation of the White River gage near Sumner, (12-1005), for use as a flow monitoring site for river stage changes.

3. When the flow at the White River gage (12-1005) is below 500 cfs, the combined operations of Mud Mountain Dam and Puget Power should be coordinated so that any flow rate changes, either singularly or in combination, should not create a river stage change exceeding 0.5 foot per hour at the White River gage (12-1005). When the flow is over 500 cfs but less than 4,000 cfs, the stage change should not exceed one foot per hour at the White River gage.

4. *The operating procedures in recommendation 3 should apply until other proposed operating procedures can, by actual field testing, assure that downstream water users are not subjected to hazardous conditions.*

5. The U.S. Army Corps of Engineers should develop an improved method of debris removal from Mud Mountain Dam reservoir.

6. The Puget Power diversion dam should be modified to enable more precise control of the rate of change of flow of the river.

7. *Visual warning signs should be installed and maintained at common public access points by Puget Power and the Corps of Engineers.*

8. *The Corps of Engineers and/or Puget Power should give adequate notice to all downstream governmental agencies and appropriate news*

media of any change of rate of flow that would create hazardous conditions downstream.

9. The location, design, construction, and operation of an adequate sediment trap system should, with interagency cooperation, be undertaken by ICRI.

10. The White River below Dieringer tailrace should be subjected to a review along with other sites of concern in the State.

State wide

There is an urgent need for legislation to better provide for the safety, regulation, and control of dams, control structures, pipelines, conduits, etc., and the flows therefrom to insure that the public safety and welfare is adequately protected.

An Interim Program

The White River tragedy, when coupled with other recent river flow disasters such as the Teton Dam failure, provide teachings over a broader range of perspectives for river management and regulations. As previously noted, the applicable rules and regulations of the federal and state governments covering our nation's stream system have not developed as a comprehensive, integrated whole. Instead, developments have been piecemeal, leaving numerous ill-defined gaps where regulatory control is needed but not clearly defined within the governmental structures of our state or federal systems.

Relying on existing statutory powers the Department of Ecology shall, to the maximum extent of that authority and available resources, immediately initiate a program of investigation and regulation of stream flow variations arising from various dam and associated water diversion activities. One step in this endeavor, the letter referred to in the Appendix, has already been initiated.

The department, recognizing the expansive constitutional and sometimes superseding power of federal control over our state's streams, will initiate conversations with the agencies of the United States, such as the Department of the Interior, Department of the Army, and the Federal Power Commission, for the purpose of developing voluntary cooperative stream control programs. In addition, taking into account the fact that the renewal period for many Federal Power Commission licenses for hydroelectric projects in the state is at hand, the Department of Ecology will initiate a policy of intervening in all of the federal agencies' relicensing proceedings for the purpose, among others, of presenting the state's views on stream flow control and dam safety. Further, to the extent department resources allow, the state shall provide its views on these subjects to federal agencies constructing new or operating existing dams or water diversion facilities.

The department shall carefully evaluate existing state statutory authorities for the purpose of defining needs for improvement in state water regulation, water management, and dam safety programs. Thereafter, the department will submit to the Legislature for consideration in January, 1977, appropriate proposed legislation.

TECHNICAL GLOSSARY

ACRE-FOOT - (Ac-ft) - A unit commonly used for measuring the volume of water or sediment; equal to the quantity of water required to cover one acre to a depth of one foot and equal 43,560 cubic feet or 325,851 gallons.

BARRIER DAM - A dam constructed so as to block flowage for one or more predetermined purposes.

BED LOAD - The sediment and debris carried by a stream.

BREACHED - The breaking of water over or through a wall, dam, etc.

BREAKING LINK - A metal bar, chain, or cable designed to break or fail at a predetermined stress.

cfs - cubic feet per second. A unit expressing rate of discharge. One cfs is equal to a stream having a cross-section of one square foot and flowing at an average velocity of one foot per second. It also equals a rate of 448.8 gallons per minute.

CRIB-STRUCTURE - Generally a small dam built with a framework of wooden or metal bars filled with rock.

DEBRIS - Sand, silt, gravel, trees, logs, limbs, leaves, etc.

DIURNAL - Refers to an event, process, or specific change that occurs every day; usually associated with changes from day to night.

FLASHBOARD - A board or boards placed at the top of a dam to increase the force or depth of a stream.

FLUME - (1) a ravine or gorge with a stream running through it; (2) an inclined channel for conveying water for various uses; (3) a channel placed in a stream of water to measure the volume or rate of flow.

GAGE STATION - A particular site on a stream, lake, or reservoir where systematic observations, gage height, or discharge are obtained.

GRADIENT - Degree of slope or rate of change, especially of a river.

NEGATIVE SURGE - A large mass of moving water traveling in the opposite direction to the underlying flow.

NGVD - National geodedic vertical datum.

PENSTOCK - A conduit for conducting water.

POSITIVE SURGE - A large mass of moving water traveling in the same direction as the underlying flow.

SEDIMENTS - Generally considered silt, sand, gravel, and small boulders.

SEDIMENT TRAP (settling basin) - Structure, pit, enlargement or change in channel designed to reduce velocity and bedload carrying capacity of a stream.

SPILLWAY - Passageway or channel to carry off extra water, especially on a dam.

SURGE - A large mass of moving water.

TAILRACE - The channel into which water from a turbine is discharged.

TRIBUTARY - A stream that contributes its water to a larger stream by discharging into it.

August 31, 1976

State of Washington
Department of Ecology

Mr. John A. Biggs, Director
Washington State Department
of Ecology
Olympia, Washington 98504

Dear Mr. Biggs:

In reaction to the tragic drowning incident that occurred in the White (Stuck) River on July 15, 1976, you directed this department to conduct an investigation of the circumstances surrounding the incident and to report our findings to you.

During the very preliminary stages of our investigation, it became apparent that the drowning incident was probably attributable to the existence of flow control structures in the White (Stuck) River and the methods of operation used at those structures for flow control. As a consequence of the aforementioned determination, we formed teams to make a complete hydraulic evaluation of the river system under consideration and to correlate hydraulic facts with other findings relating directly to the drowning incident.

Briefly stated, our findings are (1) the drowning incident was directly attributable to the operation of the two flow control structures in the White (Stuck) River system; (2) that the drowning incident occurred because of the absence of precise flow control capabilities and an adequate warning system to alert downstream users of the river system when flows are to be increased; and (3) that there is an established need for new laws, rules and regulations that will provide the public with an acceptable margin of safety when using the river systems within the State of Washington. We believe that the contents of this report fully support the aforementioned findings.

This report has been respectfully submitted to you with the sincere hope that it will be the basis for corrective action to preclude any further loss of human life in the State of Washington under circumstances such as those that occurred in the White (Stuck) River on July 15, 1976.

Sincerely,

Robert K. McCormick

Robert McCormick
Report Manager

APPENDIX

Chronology of Investigation

Photos

Hydrology and Hydraulics

Aerial Reconnaissance

Correspondence

Intercounty River Improvement

Federal Power Comission Litigation

CHRONOLOGY OF INVESTIGATION

Date	Event
7/26	Investigation began with staff examination of the White River near Pacific.
7/27	Staff conferred with: 1) Pierce County Sheriff's Office 2) U.S. Geological Survey 3) Corps of Engineers District Office
7/28	Staff conferred with Puget Power officials in Bellevue.
7/29	Staff conducted field investigations at: 1) Puget Power Headworks at Buckley and examined flume section from Headworks to fish screens. 2) Mud Mountain Dam Site 3) Buckley gage 4) Accident site with eyewitnesses. 5) Interviewed other witnesses
7/30	Staff briefed Assistant Director on scope and programs of investigation.
8/2	Staff continued site examination: 1) Examined river in area where Intercounty River Improvement work is being conducted, with Intercounty foreman.

2) Interviewed 2 additional witnesses.

3) Made aerial reconnaissance of river by Air National Guard helicopter (from upstream and of Intercounty River Improvement to Buckley).

8/3 Staff met with Director John Biggs for status briefing. Scope enlarged to include study of other major rivers in state.

8/4 Staff met with parents of girls lost in accident. Discussed procedure and scope of investigation.

8/5 Staff visited Auburn Globe News to review newspaper accounts.

8/6 Staff interviewed Puget Power operating personnel.

8/8 Staff interviewed eyewitness.

8/11 Staff obtained data from U.S. Geological Survey in Tacoma.

8/12 1) Staff interviewed Mud Mountain Dam personnel at site, and observed debris removal operations.

2) Staff obtained additional data from U.S. Geological Survey in Tacoma.

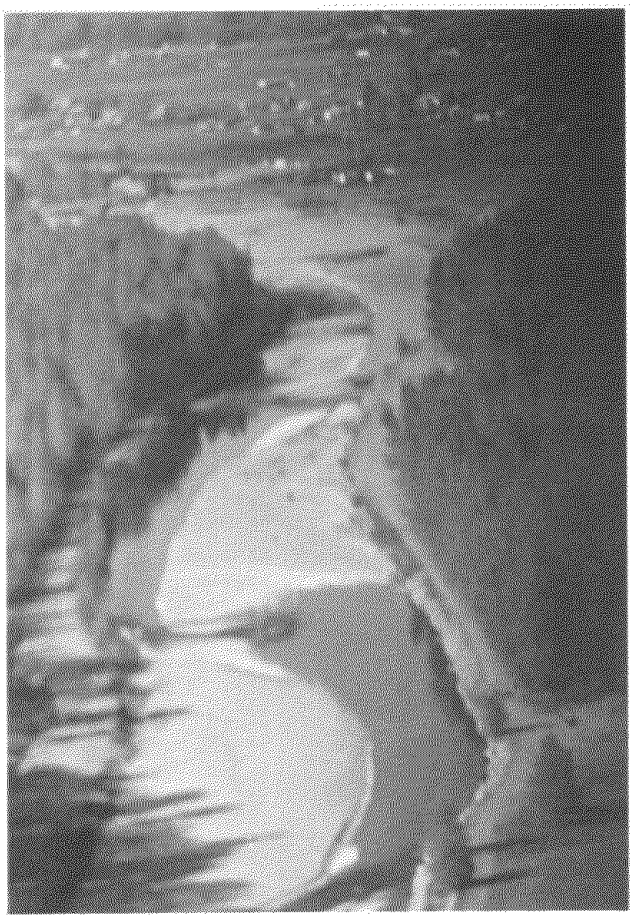
8/18 1) Staff conferred with Muckleshoot Tribal personnel.

2) Staff obtained data from Pacific Police Department.

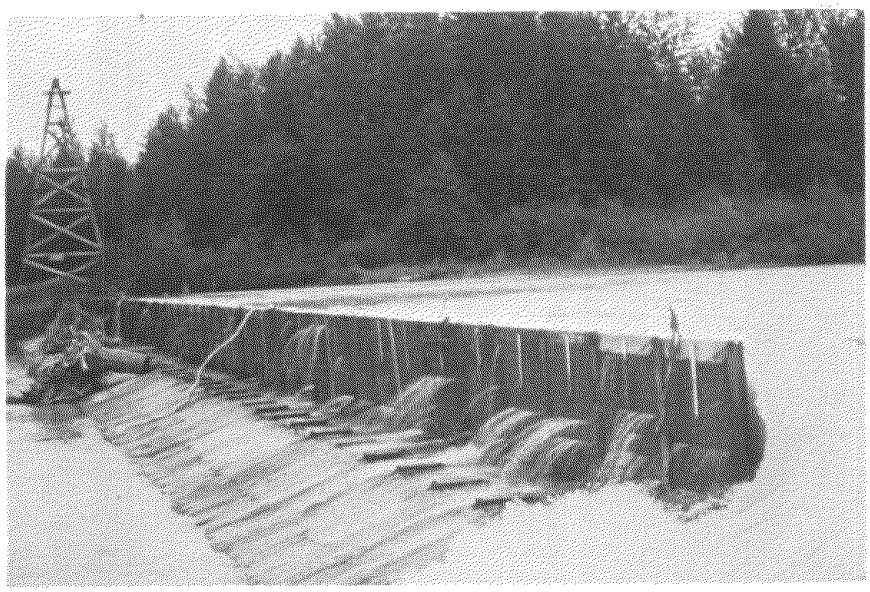
8/20 1) Staff met with Corp of Engineers staff.

2) Staff obtained aerial photos of accident site from Highway Dept.

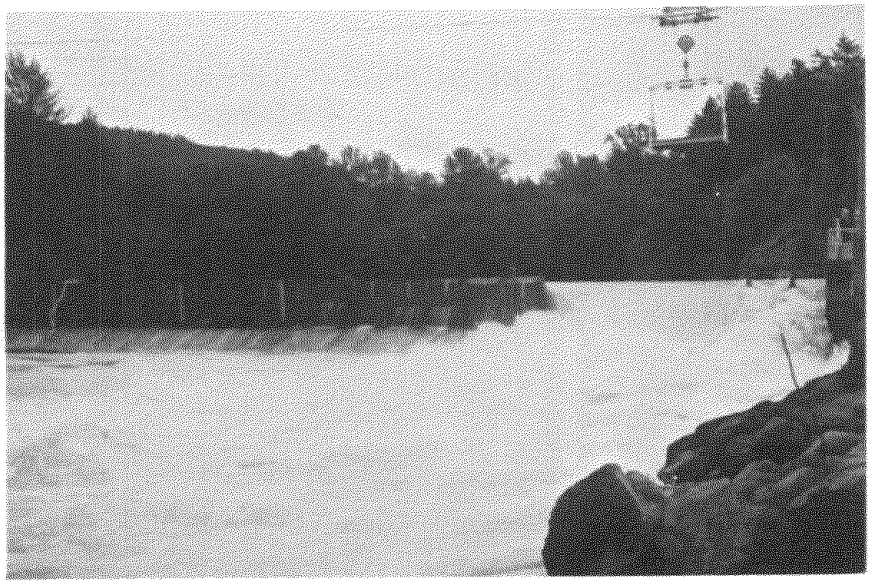
8/24 Staff conferred with Director John Biggs.



White River Looking Southerly At
River Bank From Pacific Park
8th St. Bridge Upper Left 4/29/76



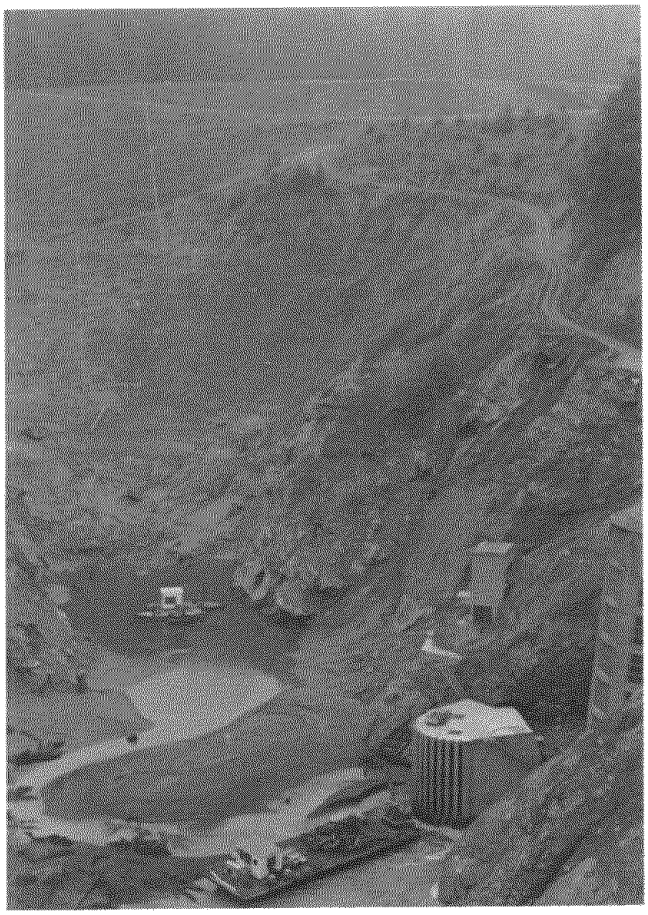
Puget Sound Power and Light Co.
Diversion Dam 7/29-76



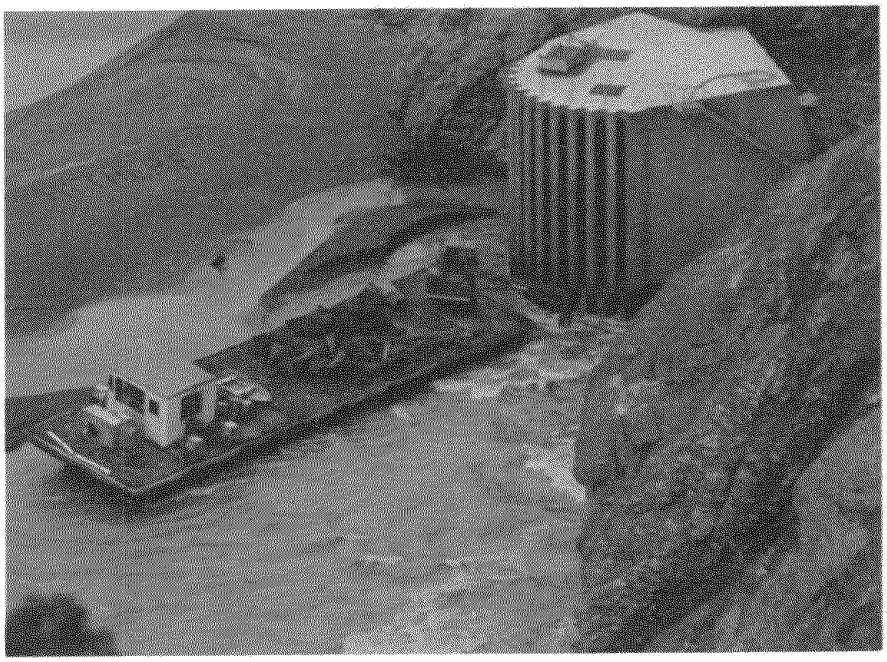
PUGET SOUND POWER & LIGHT CO.
DIVERSION DAM - Showing Discharge with Flume Gates Closed and 7-6 Ft. Wide Sections of Dam Removed 7/29-76

Looking Downstream Past Puget Sound
Power & Light Diversion Dam - Flume
Intake, Fish Trap on Left 7/29/76

White River Looking Upstream From
8th St. Bridge Showing Braided
Channel 7/28/76



Mud Mountain Dam Reservoir Looking
Toward Upstream Face of Dam -
Showing Work Barge Removing Debris
From 9' Diameter Tunnel - Trash Rack -
23' Diameter Tunnel Trash Rack at
Right Edge of Photo 8/12/76'



Mud Mountain Dam Work
Barge removing debris from
Trash Rack 8/12/76

Work Barge - Showing Debris Tongs
8/12/76

Warning Sign Located on Cedar River
Near Maple Valley 8/12/76

APPENDIX- HYDROLOGY AND HYDRAULICS

The White (Stuck) River is a typically steep glacial fed river of slightly under 500 square miles drainage above its confluence with the Puyallup River 10.4 miles from and 30 feet (MSL) above Commencement Bay. White River mile 73 finds Emmonds Glacier on Mount Rainier issuing forth at elevation 5,000+ (MSL). The lower 8.3 miles (below the State Game Farm) of the White River is also known as the Stuck River.

The White River transports significant amounts of debris, glacial till, silts, sands and larger outwash materials.

Floods as high as 28,000 cubic feet per second (December, 1933, estimated) have occurred near the site of Mud Mountain Dam. Since Mud Mountain Dam was completed, flows as low as zero have been assumed with recorded daily minimum flows below 60 cubic feet per second at the Buckley gage below the dam but above Puget Power's Diversion works (5.5 miles downstream from Mud Mountain Dam. Flows below 50 cubic feet per second (including minor inflows from Bowman and Boise Creeks) occur routinely in that reach of the White River between Puget Power's diversion works and the Dieringer power plant tailrace canal (a total of 20.8 river miles).

Average discharge from the basin is approximately 1,500 cfs (1+ million acre-feet per year) compared to approximately 3,400 cfs (2.5 - million

/

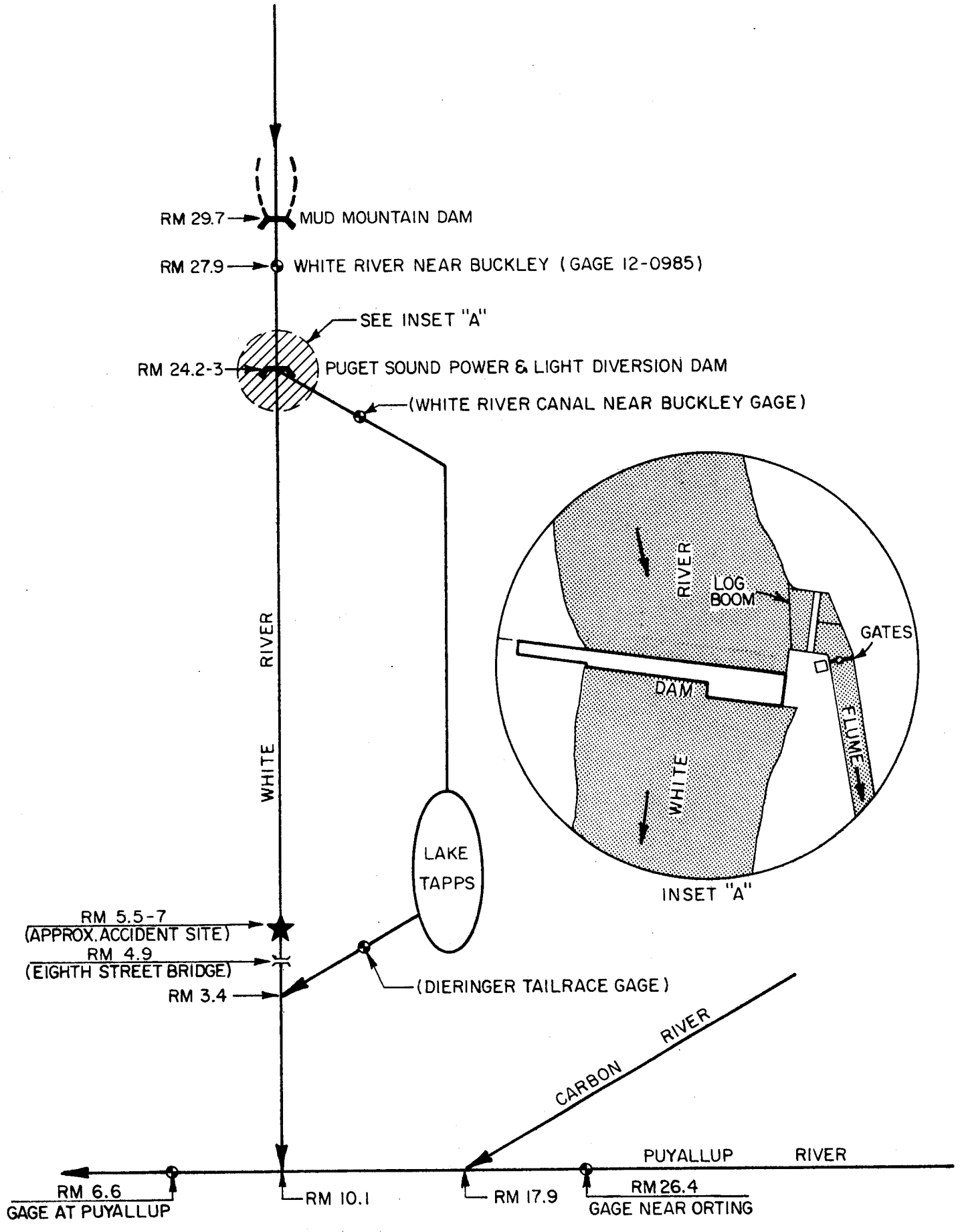


Figure A. LINE DIAGRAM OF WHITE (STUCK) RIVER.

2

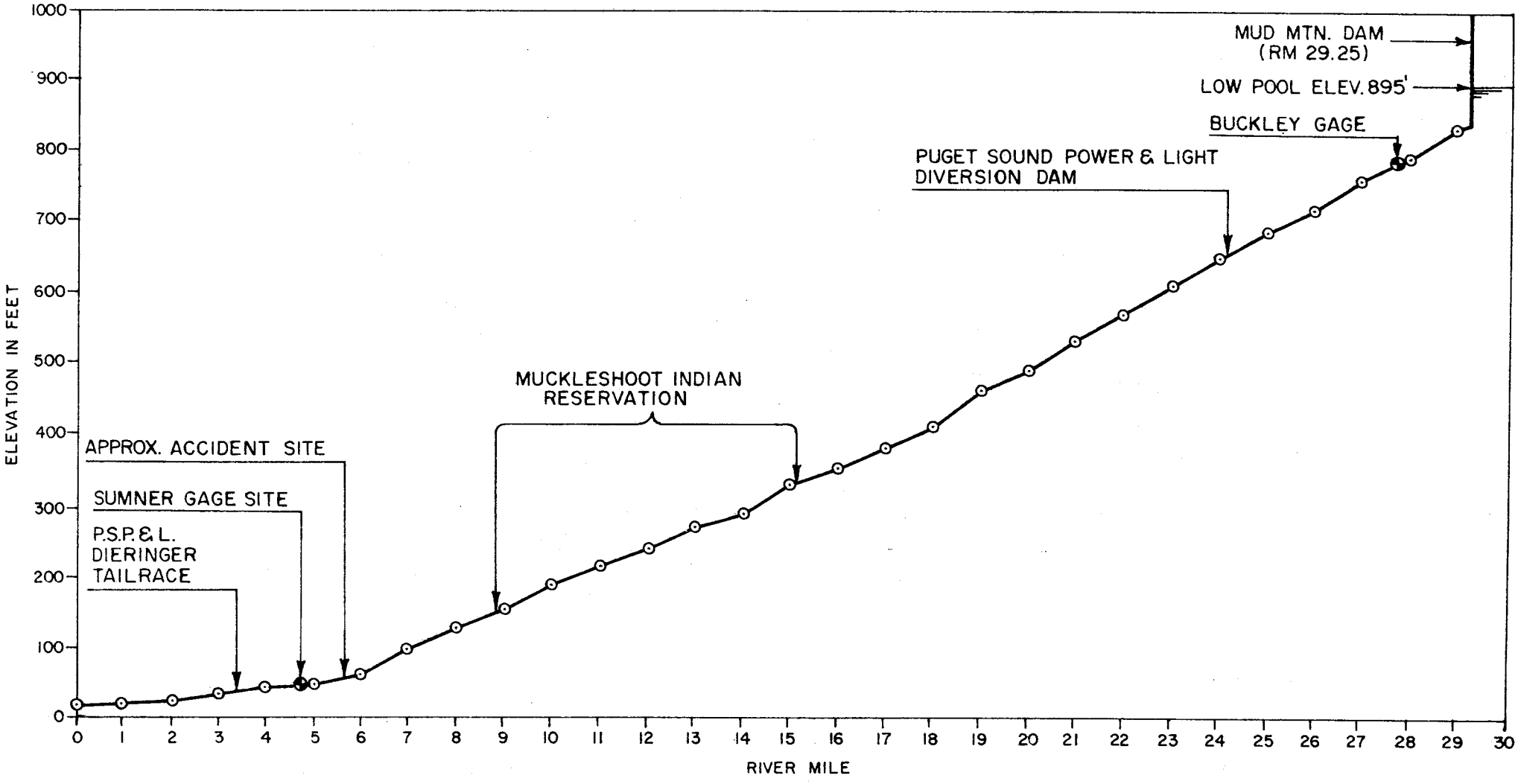


Figure B. WHITE RIVER PROFILE, MOUTH TO MUD MOUNTAIN DAM

3

acre-feet per year) for the entire Puyallup River drainage. Significant diurnal fluctuations occur throughout the Puyallup River System from snow and glacial melt, rain, and/or power and flood control operations.

The hydraulics of the White River downstream from Mud Mountain Dam are of major concern in this situation (see line diagram Figure A). Flows in this reach of the river are controlled by the individual or combined operation of Mud Mountain Dam and Puget Power's diversion works. On July 15, 1976, the two controlling works were operated in such a way as to cause what may best be called a positive reinforced surge wave. The shape of such a wave is approximated in Figure A of the main report, and case 4, Figure G in Appendix C. While this surge cannot be considered to be a "wall of water" it is a form of wave motion in which the water surface raises quite rapidly. Such a wave may be affected by a combination of circumstances including initial discharge characteristics, river channel shape, slope, roughness, and the turbulence of flow (or lack thereof). While it is beyond the scope of this investigation to provide a rigorous hydraulic analysis, the available information was adequate to substantiate what occurred in the vicinity of the drownings on July 15, 1976.

A sizable amount of river gage information is available that bears on this event (See Table 1). A recent 5-year period of record was examined (1968-1972) and 40 incidents where operations on the river caused significant rapid flow changes were reviewed and combined with incidents of July 13, 14, 15, 1976 (see Table 2 for monthly distribution). Eight of these incidents are contained in Figures C through F.

Four incidents for discussion are shown in Figures C and D and are noted as cases 1 through 4.

The top set of lines on Figures C through F show river surface level for the White River 1.8 miles below Mud Mountain Dam (Buckley gage) versus time for the indicated dates (only control is Mud Mountain Dam release).

The middle set of lines on Figures C through F depict the same information 0.5 mile downstream of the drowning location (at a location called the White River gage near Sumner), 23 river miles downstream from and approximately 750 feet lower in elevation (See Profile, Figure B) than the Buckley gage (this location is controlled by MMD and/or Puget Power's diversion operation).

The bottom set of lines on Figures C through F have the same information for a point on the Puyallup River 3.5 miles below the confluence of the White (affected by MMD, PSP&L - diversion and return of both Lake Tapps and Electron projects, base flow and flow of Carbon River and other tributaries, plus spillage of Green River water by the City of Tacoma water supply pipeline). The status of PSP&L's diversion canal is noted also.

The four incidents show the following:

Case 1. MMD Control (March 28, 1969)

An abrupt increase of approximately 2000 cfs from Mud Mountain Dam (2 foot river height increase at Buckley gage) resulted in

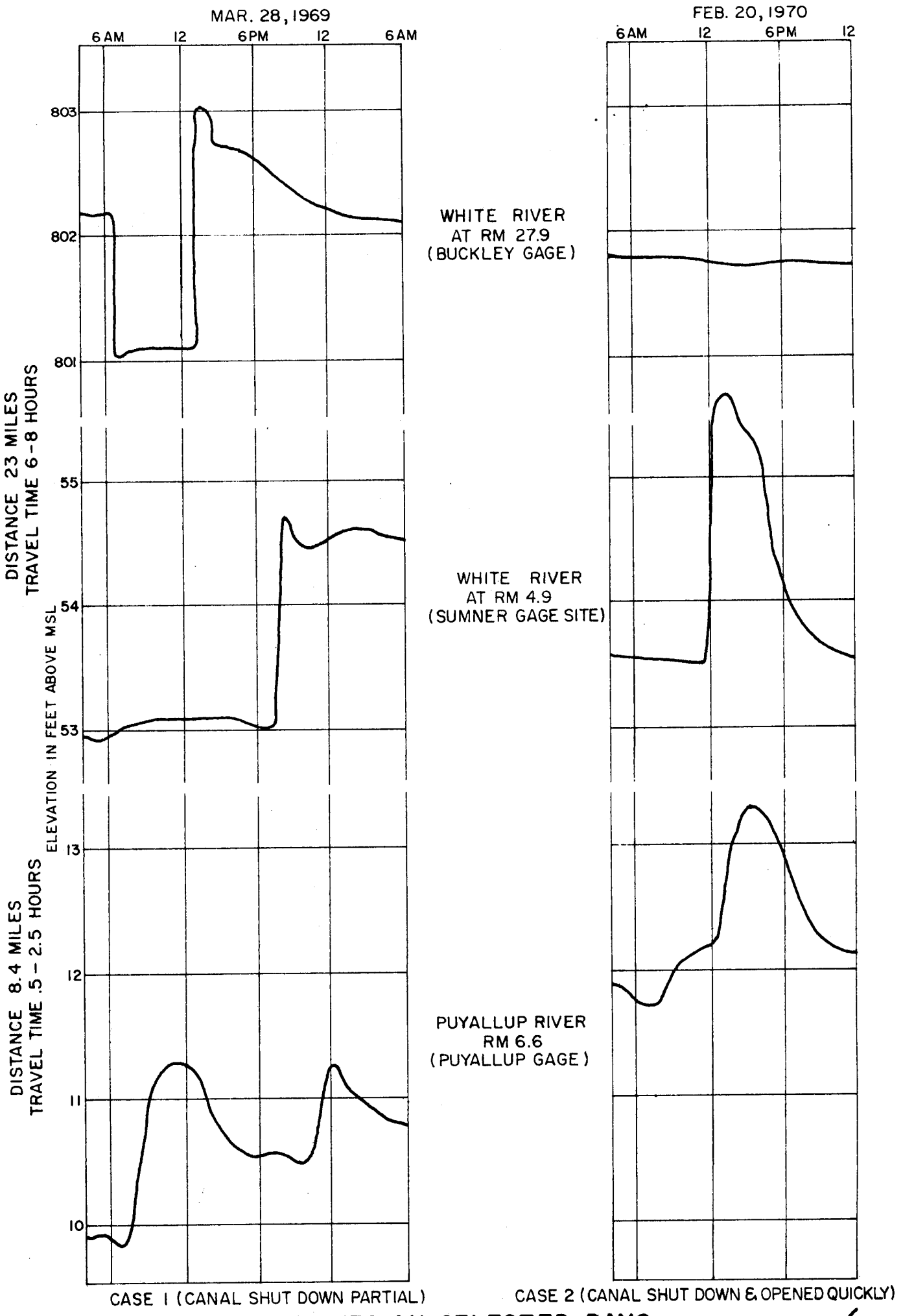


Fig. C. RIVER HEIGHTS ON SELECTED DAYS

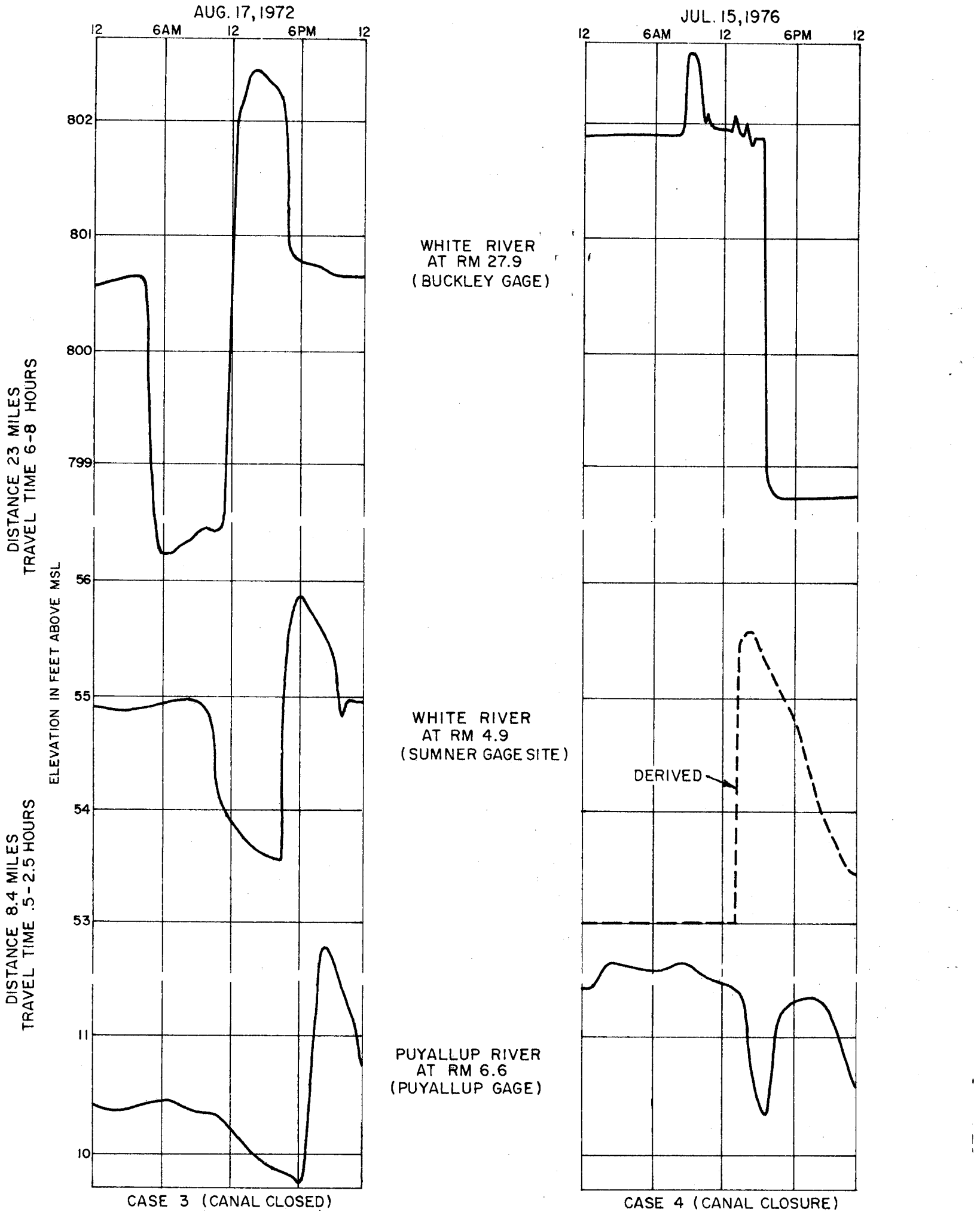


Fig. D. RIVER HEIGHTS ON SELECTED DAYS

an increase of about 1000 cfs (1.7 foot river height increase) at the Sumner gage (½ mile downstream of accident) about 6 hours later. Then, in another two hours, an increase of about 1150 cfs (0.8 foot river height increase) started at the Puyallup gage.

This entire incident was from the operation of Mud Mountain Dam, except for some possible impact from Puget Power's diversion works.

Case 2. PSP&L Control Only (Feb. 20, 1970)

Mud Mountain Dam release remains nearly constant at 1800+ cfs. PSP&L Canal is shut down and their diversion dam opened, causing an abrupt increase of 1900 cfs (2 foot+ river height increase at Sumner gage). Most of the increase occurred within one half hour. This resulted in an flow increase in excess of 1500 cfs (1+ foot river height increase) at Puyallup in about one hour, taking account of other activities affecting the Puyallup River at this location.

Case 3. Major Event (August 17, 1972)

During August, 1972, at the request of Dr. Stephen Burges (a civil engineer, at the time under contract to the U. S. Department of the Interior, Fish and Wildlife Service), flow in the White River was regulated at Mud Mountain Dam to faciliate determination of fish flow requirements. On

August 17, 1972, the water at Mud Mountain Dam was reduced from a background flow to 80 cfs. At 10:40 a.m., the flow was increased slightly and at 1:00 p.m., Mud Mountain Dam's 9 foot gate was opened fully, discharging approximately 2500 cfs (approximately the same as on July 15, 1976). The residual flow at Sumner was about 400 cfs. An abrupt rise of 2000 cfs (2.3 foot river height increase at the Sumner gage) occurred near Pacific five hours later. This same surge then occurred in the Puyallup River 2 hours later than at Pacific with a river height increase of 2 feet (2200 cfs). Puget Power's canal was closed this date and their dam was lowered.

Case 4. Event of July 15, 1976

A combination of cases one and two appears to have occurred having a final magnitude on the order of that represented in case three with the exception that the flow in the White River near Pacific had stabilized in this case at a level between 10% and 25% of August 17, 1972, flow (case 3) i.e., 30 to 100 cfs instead of 400 cfs.

The probable stage chart shown in dashed lines is derived from a synthesized hydrograph for the Sumner gage site (not now in operation) immediately downstream of Pacific.

On July 15, 1976, records show an immediate surge proceeded downstream from Mud Mountain Dam on the White River, and within one-half hour$^{\pm}$ of

reaching PSP&L's dam, Puget Power's dam was partially breached and the flume gates closed. (See Table 3 for flow routing figures immediately below Puget Power's dam)

The probable flow increase at the Sumner gage site was approximately 2000 cfs depending on background flow prior to incident. From the nature of these abrupt flow changes, it appears that the two upstream surges where combined prior to reaching the accident site. This would be the case whichever surge occurred first at Puget Power's dam. The record and hydraulic analysis strongly corroborates this combining or comingling situation.

Stage charts for cases 3 and 4 at Sumner gage site are shown in Figure D with other examples in Figures E and F.

Possible surge/wave shapes for the different situations on July 15, 1976 are shown in Figure J.

The crossection for the Sumner gage station cable site with probable stage increase is shown in Figure H.

Stage charts for the White River near Buckley and the Puyallup River near Puyallup for July 13, 14, and 15, 1976 are shown in Figure I.

The author has in excess of 95% confidence in the reconstitution of the hydraulic events as presented herein. A duplication of the July 15, 1976 regulation events on the White River is suggested should there be concern on aspects of this section of the report.

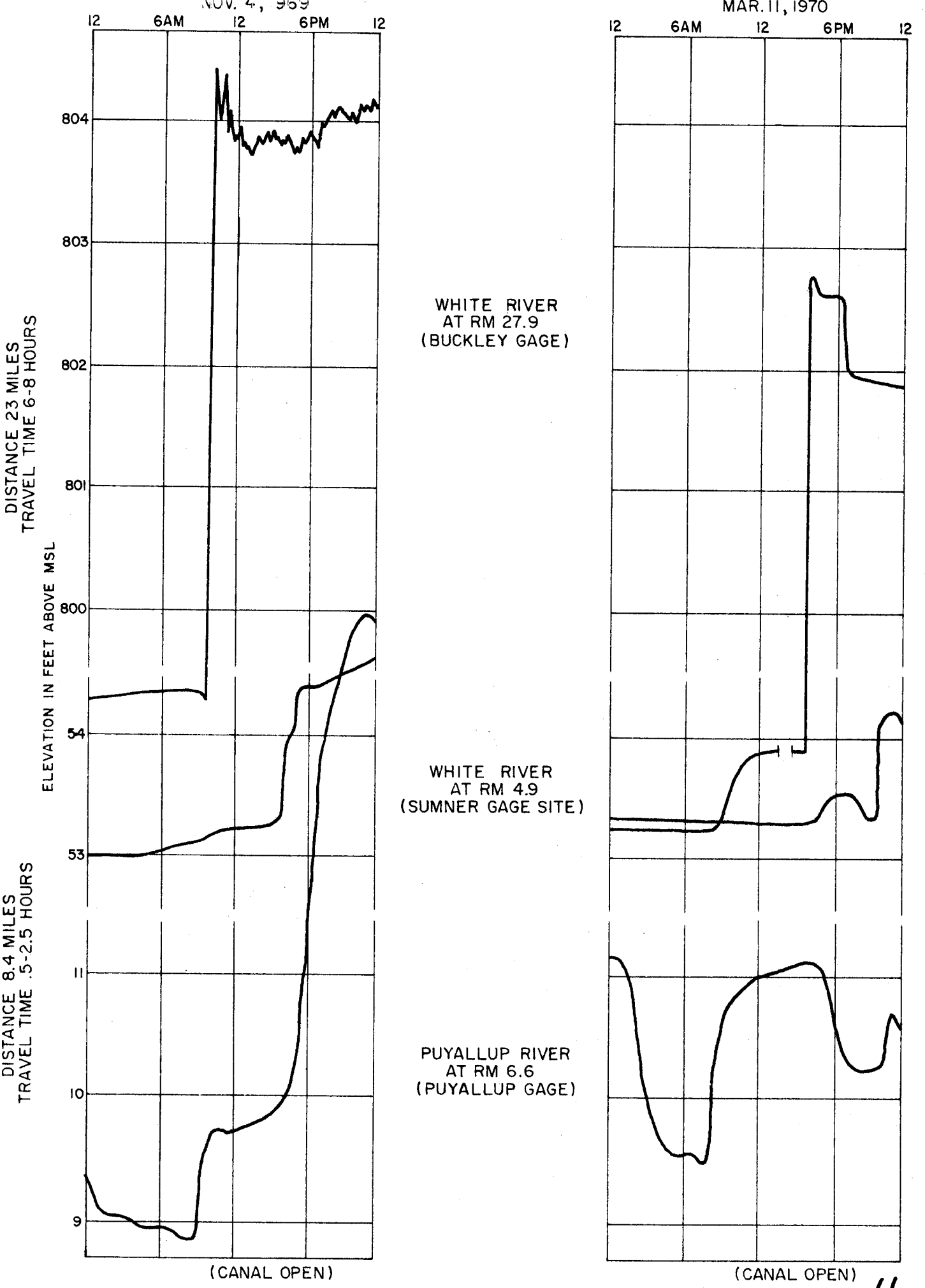


Figure E. RIVER HEIGHTS ON SELECTED DAYS.

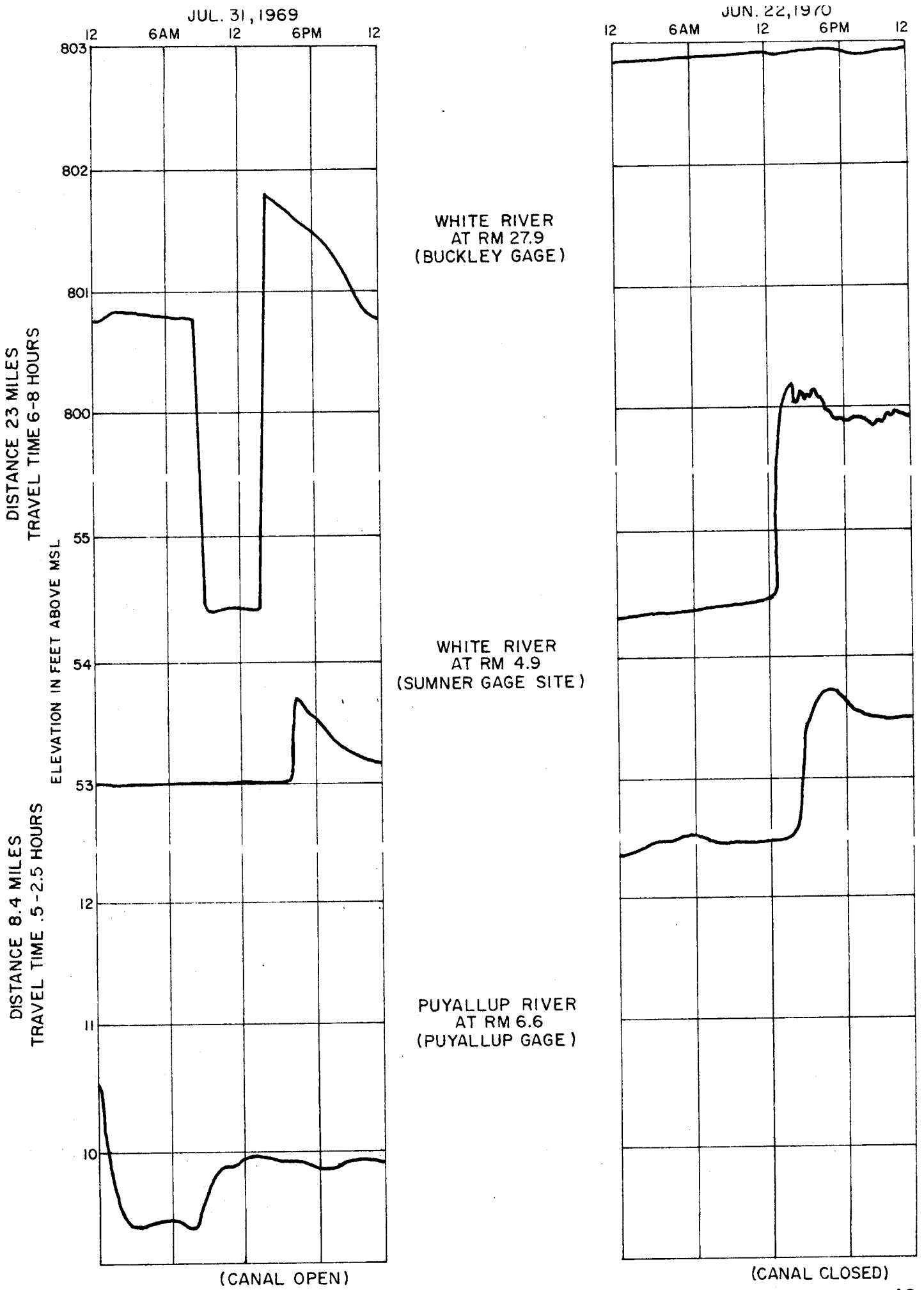
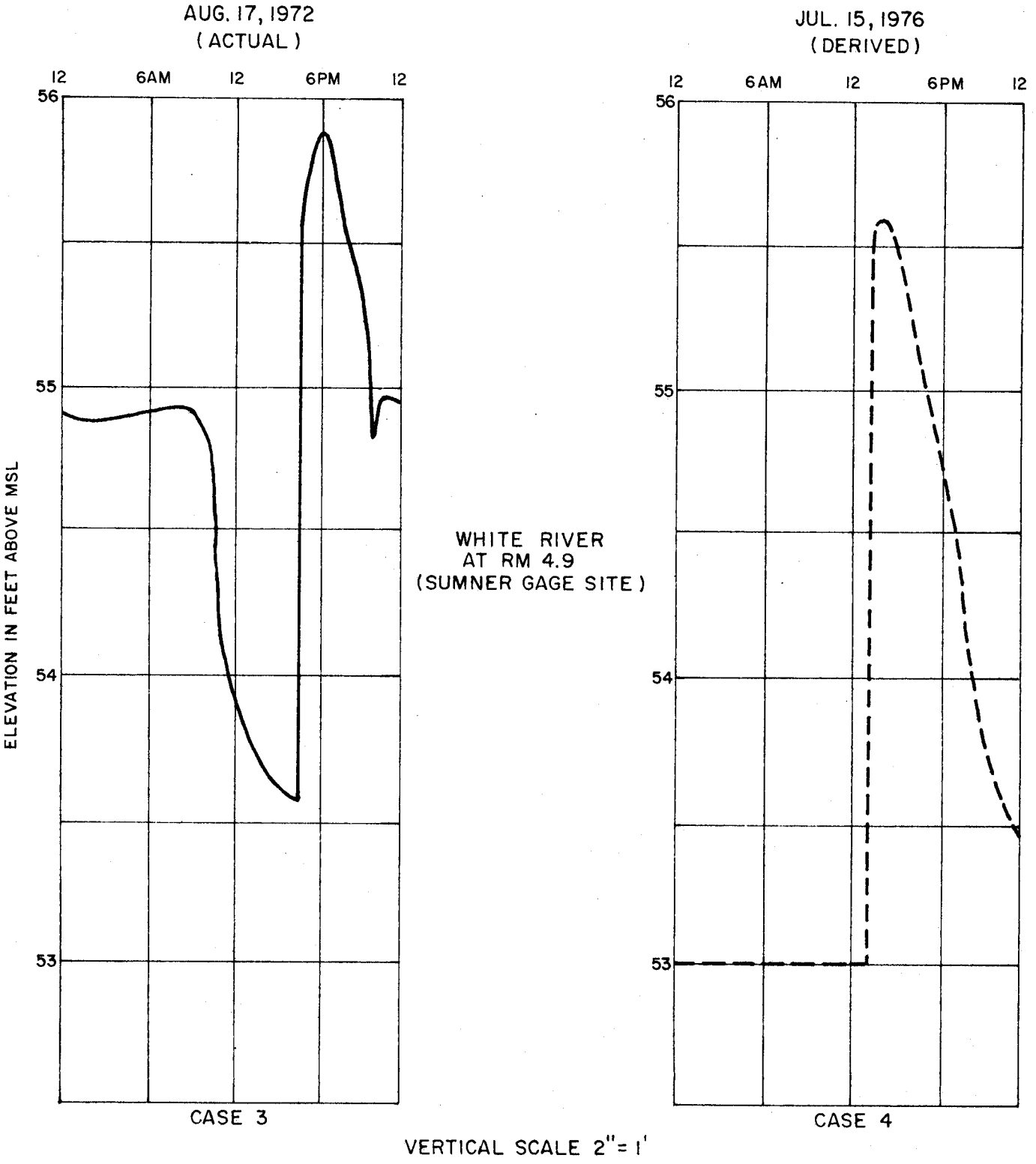
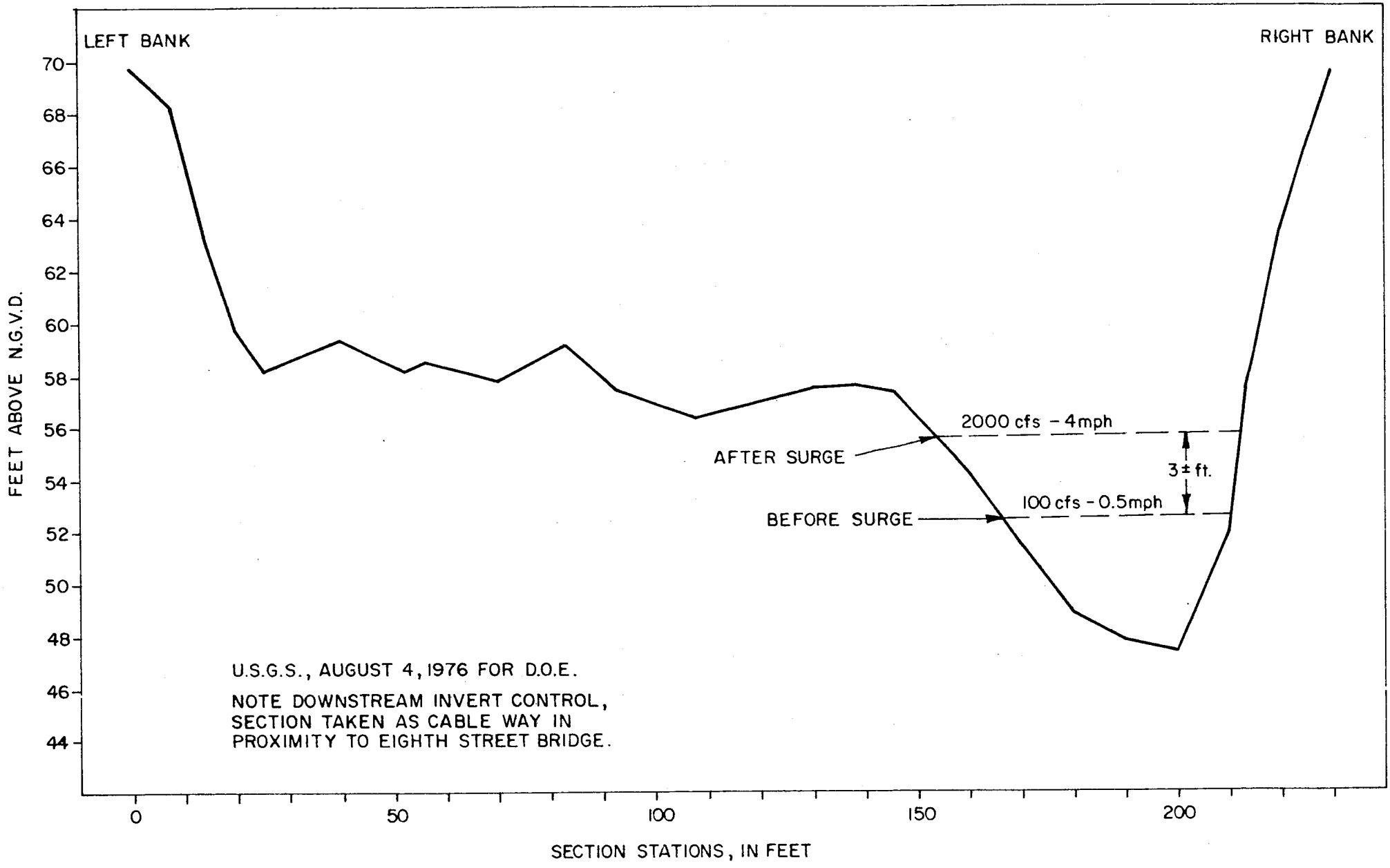


Figure F. RIVER HEIGHTS ON SELECTED DAYS.



CASE 3 SHOWS ACTUAL RECORDED RIVER HEIGHT (STAGE) MEASUREMENTS FOR A NEAR IDENTICAL SITUATION IN TERMS OF FLOW TO THE FLOW SITUATION ON JULY 15, 1976. THE DERIVED (SYNTHESIZED) STAGE CHART FITS VERY CLOSELY THE ACTUAL PREVIOUS STAGE CHART.

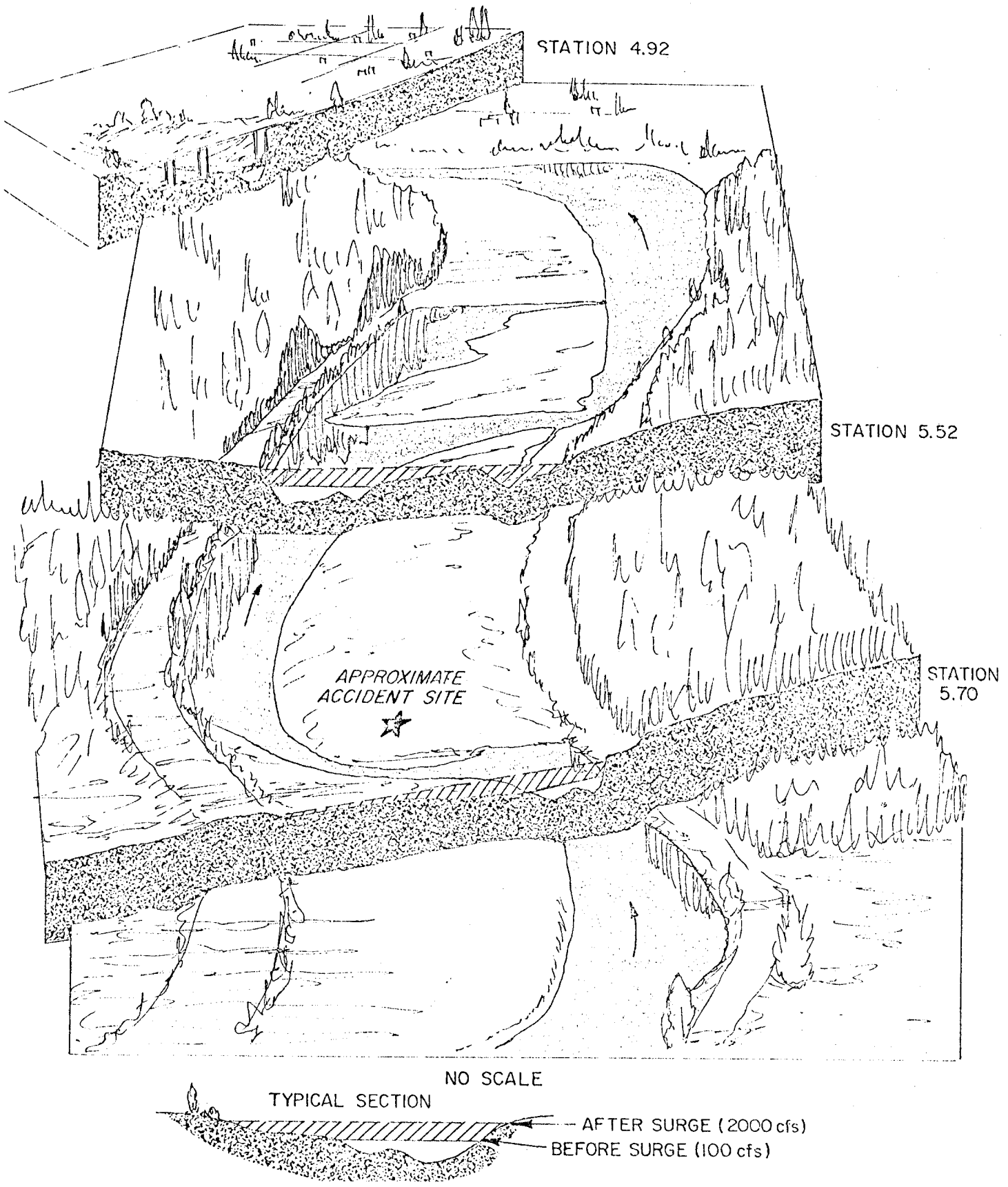
Figure G. RIVER HEIGHT ON SELECTED DAYS



WHITE RIVER

Figure H. STATION 4.92 NEAR GAGING STATION CABLE WAY.

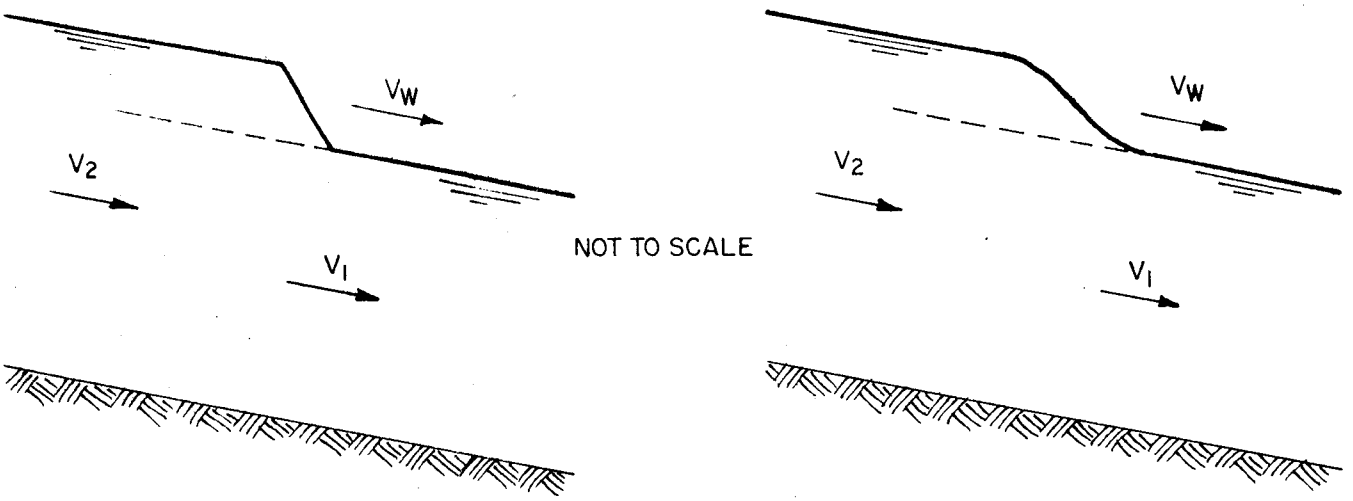
14



WHITE RIVER LOOKING SOUTHERLY AT RIVER BANK FROM PACIFIC PARK TOWARD 8TH STREET BRIDGE.

FIGURE H.1

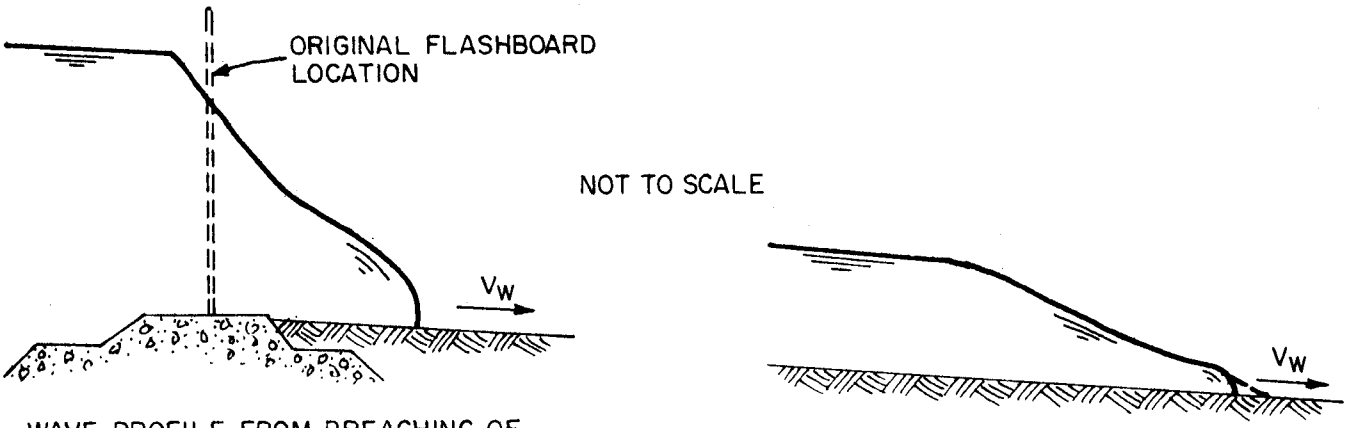
UPPER REACH - RIVER MILE 29.7 - 24.3
MUD MOUNTAIN DAM TO PUGET POWER DAM



POSITIVE SURGE ADVANCING DOWNSTREAM

MONOCLINAL RISING WAVE

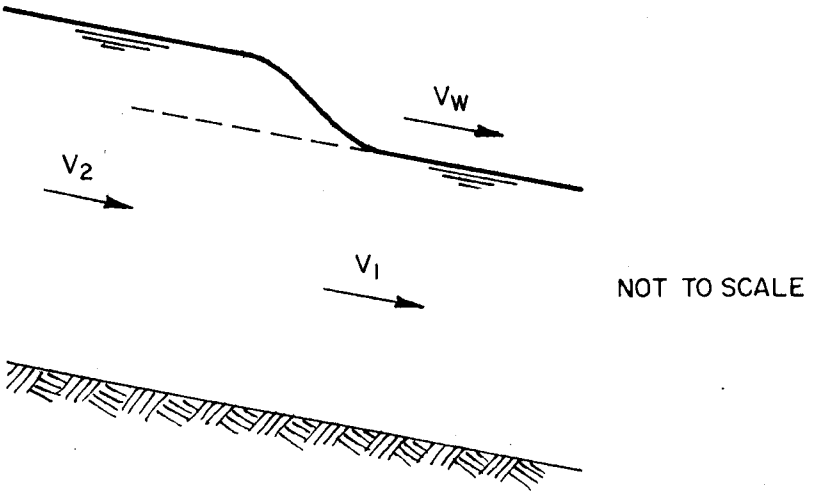
MIDDLE REACH - RIVER MILE 24.3 - 3.4



WAVE PROFILE FROM BREACHING OF PUGET POWER DAM

WAVE PROFILE ON A DRY STREAM BED

LOWER REACH - RIVER MILE 3.4 TO MOUTH



MONOCLINAL RISING WAVE

Figure J. POSSIBLE SURGE / WAVE FORMS, WHITE RIVER REACHS - JULY 15, 1976 EVENT.

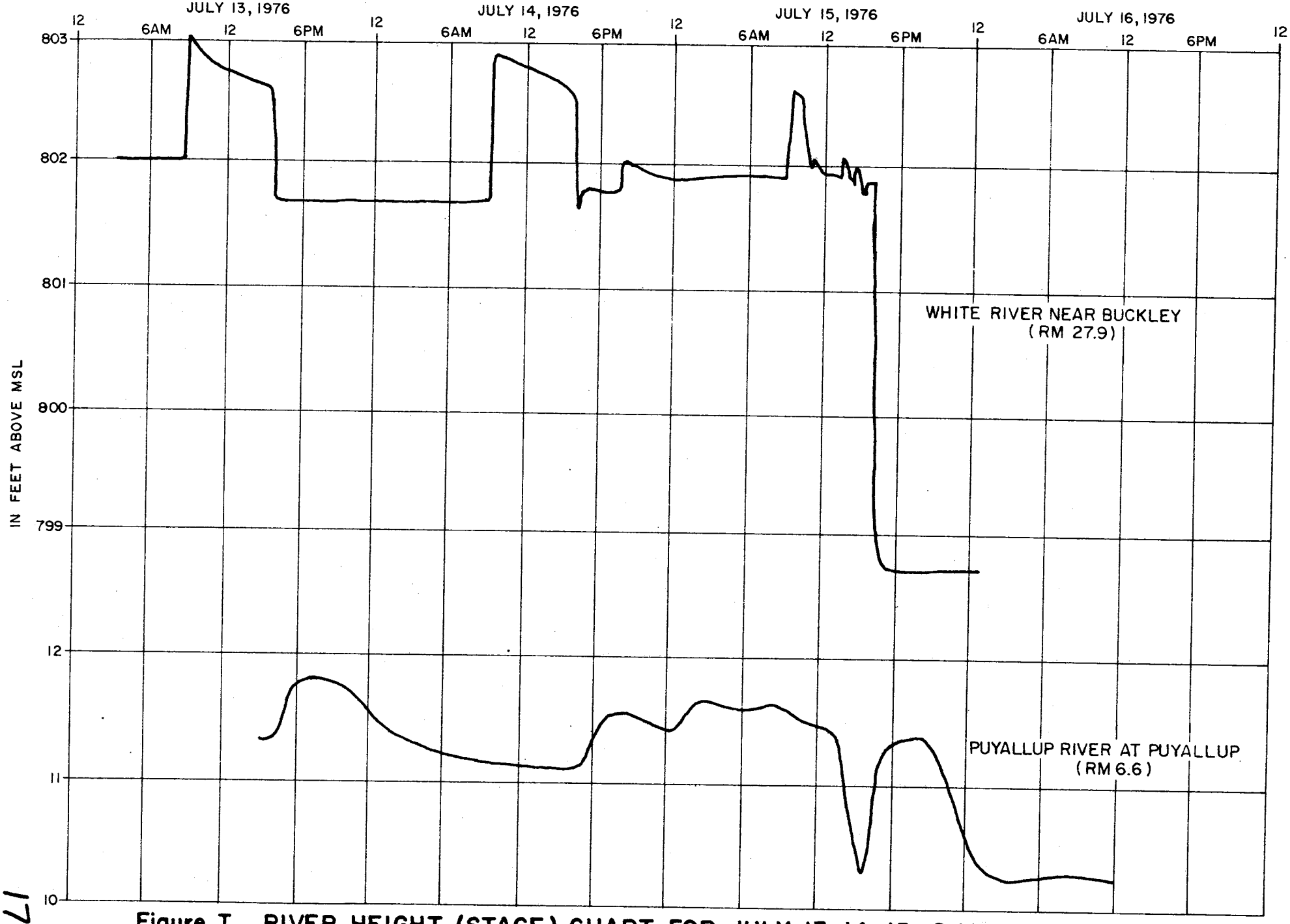


Figure I. RIVER HEIGHT (STAGE) CHART FOR JULY 13, 14, 15, & 16, 1976.

Table 1

River Gages in the Puyallup River Basin Used in This Report

Stream Name	Station Name & No.	River Mile	Period of Record	Comment
White R.	Near Buckley 12-0985	27.9 (White)	10/28 - 11/33 10/38 - present	Primary
White R.	Near Sumner 12-1005	4.9 (White)	1945 - 1971	Primary
Puyallup R.	At Puyallup 12-1015	6.6 (Puyallup)	5/14 - current year	Primary
PSP&L Flow Line	Canal at Buckley 12-0990	3.9 miles down flume		
PSP&L Flow Line	Diversion at Dieringer 12-1011	3.4 Confluence with White	4/58 - current year	
Carbon R.	At Fairfax 12-0939	17.7 (Puyallup)	11/10 - 7/12 10/65 - current year	
Puyallup R.	Near Orting 12-0935	26.4 (Puyallup)	9/31 - current year	

Table 2

Rapid Change Incidents*

Month	Season	No. of Incidents	1968 through 1972 Mean Time of Incident At Eighth Street Bridge
January		4	10 am
February	(Winter (14))	4	12 pm
March		6	2 pm
April		0	
May	(Spring (5))	1	9 pm
June		4	3 pm
July		7	2 pm
August	(Summer (14))	6	12 pm
September		1	12 am
October		3	11 pm
November	(Fall (10))	3	12 pm

Caused by either MMD releases or PSP&L's diversion operation, or both.

Table 3

RECONSTITUTION OF HYDROGRAPH RANGE BELOW P.P. DAM

July 15, 1976

Time	Location and Quantity*					
	Buckley Gage		Immediately Below Puget Power's Dam & Flume Entrance		Flume Gage***	
	MMD	MMD + 1.8	MMD + 5.5 Miles		MMD + 9.4	
			Alt. 1***	Alt. 2*****		
8:00 AM	1780**	1780	30+	30+	1,700	
8:15	1780	1780	30+	30+	1,700	
8:25	(2400)	1780	30+	30+	1,700	
8:30	(2500)	1780	30+	1780	1,700	
8:45	2500	2500	30+	1780	1,700	
9:00	2490	2490	700	2500	1,800	
9:15	2460	2460	700	2500	1,800	
9:30	2420	2420	2490	2490	1,780	(Shut down impacts gage)
9:45	2250	2250	2460	2460	1,700	
10:00	2030	2030	2420	2420	1,600	
10:15	1900	1900	2250	2250	1,480	Receding flow in canal
10:30	1880	1880	2030	2030	1,480(A)	
11:00	1850	1850	1900	1900	1,160	
12:00	1820	1820	1880	1880	780	
1:00 PM	1970	1970	1850	1850	460(A)	
4:30 PM	200	200	200	200	0	

* Gaging station records are accurate to within 2 to 5% for these figures. All figures rounded to the nearest ten.

** Assumed same as gage except (xxxx) from USCE log.

*** Gage read out corrected for probable digital printout time shift and less 80 cfs for bed load condition. (A)=Approximate flow from hydrograph.

**** Alternative 1 - MMD surge reaches P.P. Dam: 700-cfs overtops, 100 - cfs additional enters canal. Within 30 minutes P.P. Dam is breached. Canal shut down 9:15 a.m.+.

***** Alternative 2 - Canal shut down and P.P. Dam breached by 8:45 a.m. MMD surge flows through open P.P. Dam at approximately 9:00 a.m.

PRINCIPAL BIBLIOGRAPHY

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Schoklitsch, A., "Uber Dambruchwellen," Sitzungsberichte der k. Akademie der Wissenschaften, Vienna, Abt. Ha, Vol. 126,

J. H. Wilkinson: Translatory waves in natural channels, Transactions, American Society of Civil Engineers, Vol. 110, 1203-1225 pgs., 1945.

AERIAL RECONNAISSANCE WHITE RIVER

In order to investigate all possible contributing factors to the July 15 drowning incident, an aerial flight was made along the White River channel from the Eighth Street Bridge to the Puget Power intake works and return.

The helicopter flight was provided by the Washington National Guard with Duane Wegner and Walter Bergstrom as observers. The flight began at the Auburn Airport at approximately 1:20 p.m. and concluded at approximately 2:15 p.m., on August 2, 1976.

Particular attention was paid to the river sections from the intake works to the head of the ICRI dike near the center of Section 34, Twp. 21 North, Range 5 East, W.M.a section not easily accessible by overland means.

A summary of observations follows:

There was evidence that the river, flowing at 2,000 to 2,500 cubic feet per second, was eroding the toes of three small recent slides. The slide areas themselves were relatively dry and did not appear to be moving at all. Because of the undercutting at the toe, these slides will probably slough off considerable material after the fall rains begin.

There was no evidence of major slides that could have temporarily blocked the main flow of the river.

The debris on all of the bars appeared to be stable at present flows and only small longs, limbs, or twigs would have moved downstream with the flows released on July 13, 14, or 15.

Most of the coniferous trees on the bars retained their foilage, although they have well-browned, indicating that they have been on the bars probably since the last flood period. No deciduous trees

with leaves were present on the bars, indicating that were dislodged recently.

The only debris in the main braided channnels were large stumps or logs, usually singly or in pairs. There was no evidence from the air of any log jams that had formed and broken loose during this period, as was evident by the presence of debris on all bars.

INDEX

CORRESPONDENCE APPENDIX

1.	June 17, 1976	Letter from Corps of Engineers to Department of Ecology
2.	July 26, 1976	Letter from Department of Ecology to Corps of Engineers, Puget Sound Power and Light, and Federal Power Commission
3.	July 28, 1976	Letter from Corps of Engineers to Department of Ecology
4.	July 28, 1976	Letter from King County to Department of Ecology
5.	July 28, 1976	Letter from Department of Ecology to Corps of Engineers
6.	July 28, 1976	Letter from Puget Sound Power and Light to Department of Ecology
7.	July 29, 1976	Letter from Federal Power Commission to Department of Ecology
8.	July 30, 1976	Letter from Puget Sound Power and Light to Department of Ecology
9.	August 1, 1976	Letter from Corps of Engineers to Department of Ecology
10.	August 2, 1976	Letter to United States Geological Survey from Department of Ecology

11.	August 3, 1976	Letter from Department of Ecology to Corps of Engineers and Puget Sound Power and Light
12.	August 4, 1976	Letter from Department of Ecology to Mr. and Mrs. David B. Avila
13.	August 4, 1976	Letter from Department of Ecology to Mr. and Mrs. Robert H. Mason
14.	August 6, 1976	Letter from Corps of Engineers to Department of Ecology
15.	August 10, 1976	Letter from Corps of Engineers to Department of Ecology
16.	August 16, 1976	Letter from Department of Ecology to Corps of Engineers
17.	August 17, 1976	Letter from Department of Ecology to Corps of Engineers
18.	August 18, 1976	Letter from Department of Ecology to owners of river flow control structures

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

NPSEN-PL-MC

27 Jan 76

John A. Biggs, Director
Department of Ecology
State of Washington
Olympia, Washington 98504

Dear Mr. Biggs:

This letter is to inform you of a planned operation at Mud Mountain Dam. Normally, Mud Mountain Dam Reservoir is drawn down in the spring for early inspections to permit timely planning and mobilization for repair of the 9-foot tunnel; however, the December 1975 flood deposited an above normal amount of sediment upstream of Mud Mountain Dam. Because of the potential adverse effects of high turbidity during drawdown, we have decided to forego the benefits of early drawdown and delay lowering the reservoir until 1 July 1976, just after the spring fish migration has taken place.

If you have any questions or comments regarding this operation, please call Dick McLaughlin, telephone number 764-3599.

Similar letters have been sent to the Washington Departments of Fisheries and Game.

Sincerely yours,

RAYMOND J. EINEIGL
Colonel, Corps of Engineers
District Engineer

23

July 26, 1976

State of
Washington
Department
of Ecology

Colonel John A. Poteat, Jr.
District Engineer
U. S. Army Corps of Engineers

Mr. John W. Ellis, President
Puget Sound Power and Light Company

Mr. Frank Thomas, Regional Engineer
Federal Power Commission

Gentlemen:

The recent tragic death of two young girls who were swept away from a sandbar on the Stuck River by what appears to have been a suddenly accelerated flow of water has given rise to both serious official and public concern as to what were the factors and circumstances involved. The matter has raised questions as to what might be done to prevent such a happening in the future.

While the laws of the State of Washington do not specifically address themselves to a happening of this kind, as it relates to the authority of the state, and do not appear to require that any of the operators involved file with this department an operating plan or procedure for the purpose of review, the laws equally speak to the authority and responsibility of the state in managing the waters of the state in the best public interest. Responsibility for this has been placed in the Department of Ecology and includes conducting investigations involving unusual happenings or situations where the broad public interest and safety appears to be involved. This would certainly seem to be a situation of this kind.

I have issued instructions to undertake an investigation and examination of this kind, and a report on these findings will be made to the State Legislature.

You will, in the near future, be contacted by appropriate representatives of this department with whom I hope you will work constructively. I recognize that there are several jurisdictions and areas of responsibility involved, including but not limited to the Corps of Engineers, the operators of the Mud Mountain Dam; Puget Sound Power and Light Company, the operators

24

of the White River Project; and the Federal Power Commission, the federal agency having jurisdiction and authority over dams engaging in the production of hydro-electric power. There also exists the possibility that the interests of other elements of state and local governments might be involved.

I hope, and for the purpose of this examination, any conflict in these areas of responsibility can be set aside in order that the true facts may be ascertained and steps taken to avoid such a happening in the future. In this spirit, I would appreciate your fullest cooperation.

Sincerely,

John A. Biggs, Director

sp

cc: Governor Daniel J. Evans
Mr. Don Moos, Director
Department of Fisheries
Mr. Ralph Larson, Director
Department of Game
Mr. Donald H. Brazier, Chairman
Utilities and Transportation Commission
Mr. Dave Mooney, Chairman
King County Council
Mr. Pat Gallagher, Chairman
Pierce County Board of Commissioners

July 28, 1976

State of Washington
Department of Ecology

Lt. Col. John J. Terpstra, Jr.
Deputy District Engineer
Corps of Engineers
P. O. Box 6-3755
Seattle, WA 98124

Dear Col. Terpstra:

We thank you and Mr. Dick Selevold and Mr. Norm MacDonald for cooperating with the Department of Ecology in our investigation of the Stuck River incident of July 15, 1976.

We spent several hours with Mr. Selevold and Mr. MacDonald yesterday and will be wanting to talk witn them and other personnel during the next few days; however, as you requested we will always contact Mr. Selevold first.

Yesterday we asked if we could have copies of the operation logs which are kept at Mud Mountain Dam and at the Corps office, and Mr. Selevold asked that we make this request through you in writing.

Thank you again for the splendid cooperative attitude of all your personnel.

Sincerely yours,

Robert K. McCormick
Regional Manager

RKM:lmd

bcc: Bruce Cameron
Kris Kauffman
✓ Diane W

KING COUNTY COUNCIL
Dave J. Mooney, *Chairman*

Room 402, King County Courthouse
Seattle, Washington 98104
344-3465

JULY 28, 1976.

MR. JOHN A. BIGGS, DIRECTOR
DEPARTMENT OF ECOLOGY
OLYMPIA, WASHINGTON 98504.

DEAR JOHN:

THANK YOU FOR SENDING ME A COPY OF YOUR LETTER TO THE U.S. ARMY CORPS OF ENGINEERS, THE PUGET SOUND POWER AND LIGHT COMPANY, AND THE FEDERAL POWER COMMISSION.

I APPRECIATE THE FACT THAT YOUR DEPARTMENT IS TAKING THE INITIATIVE IN UNDERTAKING AN INVESTIGATION INTO THE NEED FOR BETTER CONTROL OF THE WATERS ON THE STUCK RIVER WHICH FLOWS THROUGH PARTS OF KING AND PIERCE COUNTIES.

IF OUR OFFICES MAY BE OF ANY ASSISTANCE TO YOU, WE STAND PREPARED TO RESPOND.

SINCERELY,

DAVE MOONEY, CHAIRMAN
KING COUNTY COUNCIL

DM:PD

PUGET SOUND POWER & LIGHT COMPANY

PUGET POWER BUILDING - (206) 454-6363
BELLEVUE, WASHINGTON 98009

OFFICE OF THE PRESIDENT

July 28, 1976

Mr. John A. Biggs, Director
State Department of Ecology
Olympia, Washington 98504

Dear Mr. Biggs:

We have your letter of July 26, concerning the accident on the Stuck River.

In response to your request, Puget Power will cooperate in every way possible with your agency in its efforts. As a matter of fact, it is my understanding that representatives of our company and your department have already met and that the work is underway. You can be further assured that I am giving my personal attention to this matter.

Sincerely,

John W. Ellis
President

cc: Governor Daniel J. Evans
Mr. Don Moos, Director
Department of Fisheries
Mr. Ralph Larson, Director
Department of Game
Mr. Donald H. Brazier, Chairman
Utilities & Transportation Comm.
Mr. Dave Mooney, Chairman
King County Council
Mr. Pat Gallagher, Chairman
Pierce County Board of Commissioners

28

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

28 JUL 1976

NPSOC

Mr. John A. Biggs, Director
State of Washington
Department of Ecology
Olympia, WA 98504

Dear Mr. Biggs:

I have your letter of 26 July, in which you announce your determination that the Department of Ecology does have some authority to investigate the recent tragic drownings in the White-Stuck River.

As I am sure you know, the Corps of Engineers began, immediately upon learning of the event, an investigation of the factors and circumstances involved, as well as of what measures might be taken to prevent such tragedies in the future. That investigation continues. We shall, of course, be happy to share our findings with the State on a reciprocating basis.

You speak of putting aside any conflicts in the areas of responsibility of the Federal, State and local governments in the river. I am not aware of any such conflicts. I believe our respective roles and authorities are well understood, and that acting within them we may take the steps necessary to adequately insure the safety of the public.

Sincerely,

JOHN J. TERPSTRA, JR.
Lt. Colonel, Corps of Engineers
Acting District Engineer

29

FEDERAL POWER COMMISSION
REGIONAL OFFICE
U. S. CUSTOM HOUSE
SAN FRANCISCO, CA. 94111

July 29, 1976

John A. Biggs, Director
Department of Ecology
State of Washington
Olympia, Washington 98504

Dear Mr. Biggs:

Your letter of July 26, 1976, advises that your department is undertaking an investigation to ascertain the factors and circumstances involved with the recent drownings of two young girls on the Stuck River.

I assume you are aware that Puget Sound Power & Light Company's White River Project No. 2494 is not currently licensed by the Federal Power Commission. The issue of Commission jurisdiction over this project has been the subject of recently concluded hearings, and the matter is pending before the Commission at this time. Subject only to the constraints which the issue of jurisdiction may pose, please be assured that this office will cooperate fully with your department in this investigation.

Very truly yours,

M. Frank Thomas

M. Frank Thomas
Regional Engineer

PUGET SOUND POWER & LIGHT COMPANY

PUGET POWER BUILDING · (206) 454-6363
BELLEVUE, WASHINGTON 98009

July 30, 1976

Mr. Robert McCormick, Regional Manager
Northwest Washington Regional Office
Department of Ecology
4350-150th Avenue Northeast
Redmond, Washington 98502

Dear Bob:

Enclosed are the data you and your investigative team requested related to the White River Project. Included are the following:

1. Federal Power Commission Application documents
   a) Exhibit J - Sheet 1
      Exhibit K - Sheets 1 - 9 (previously furnished)
      Exhibit L - Sheets 1 - 4
      Exhibit R - Sheets 1 and 2
   b) The Application for Determination as to Jurisdiction and in the Alternative for License dated November 18, 1964.
   c) Exhibit R and Addendum to Exhibit R.
2. Water Right Claim dated June 10, 1974.
3. Power Dispatcher's Log Sheets for July 14 and 15, with entries related to Mud Mountain Dam and the White River Project noted.
4. The installed capacity and firm energy capacity. The April 1976 "Blue Book" of the PNUCC lists the critical period peak and firm energy capability as 60 megawatts and 28 megawatts respectively--63 megawatts is considered the full pool peak capability for the Project.
5. The sequence of events at the Headworks on Thursday, July 15 were as noted on the attached Statement.

I want to emphasize one note of caution. The enclosed data and documents comprise a very small part of the necessary factual background that must be reviewed before any judgments can be made regarding either the cause of the incident on July 15 or what, if any, steps should be taken in the future to avoid such an incident occuring again. Therefore, to base conclusions on these limited facts would be grossly premature. Our investigation of the facts is continuing and we will be coordinating our findings with you and the Corps of Engineers.

PUGET SOUND POWER & LIGHT COMPANY

As we discussed on Wednesday, July 28, I have been designated the Company representative responsible for the coordination of our studies with your Department's investigation, and I would appreciate it if all your contacts with the Company in your investigation came through me.

If you require additional information, or have any questions related to the above data, please let me know.

Very truly yours,

W. J. Finnegan, Manager
Environmental Affairs

Enclosures

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
PO BOX C-3755
SEATTLE, WASHINGTON 98124

NPSDE

Mr. Robert K. McCormick
Regional Manager
Northwest Regional Office
4350 150th Avenue N.E.
Redmond, Washington 98052

Dear Mr. McCormick:

Inclosed per your letter request of 28 July 1976, are copies of the log books from the Seattle District office (inclosure 1) and from Mud Mountain Dam (inclosure 2).

We trust this information will satisfy your needs.

Sincerely yours,

JOHN J. TERPSTRA, JR.
Lt. Colonel, Corps of Engineers
Acting District Engineer

2 Incl
As stated

August 2, 1976

State of Washington
Department of Ecology

Mr. John McCall
USGS
1305 Tacoma Avenue South
Tacoma, Washington 98402

Dear Mr. McCall:

We desire to have information previously requested, and that requested by this letter certified as to their status and authenticity. Any charges involved may be billed to the department.

Mr. Al Hanson will be reviewing the following records for that selected information, under our additional request, we are interested in. I realize that portions of these records may have to be retrieved from archives and request that this be done at your earliest possible convenience.

Existing Request:

July 1-20 record of the following:

1. White River near Buckly (12-0985) - 15 minute read out.
2. White River Canal near Buckly (No.?).
3. Puyallup River at Puyallup (12-1015) - hourly.

Additional Request:

1. White River Canal near Buckly (No.?) - period of record.
2. White River near Buckly (12-0985) - 1930-present as available.
3. White River near Sumner (12-1005) - period of record.
4. Puyallup River at Puyallup (12-1015) - 1945-1971.

Certified copies of the selected strip charts involved plus the flow data sheets should be adequate for Items 1 through 4 of the additional request.

5. Current rating tables for the river stations. In the case of 12-1005 (White River near Sumner - Discontinued), a copy of the last rating table.

6. General cost and timing information for possible cross-sections by the USGS as follows:

   a. Eighth Street bridge - one X-section from bridge, about 400 feet.

   b. Four - X-sections immediately upstream of Eighth Street bridge.

Your assistance in this matter is appreciated.

Sincerely,

John F. Spencer

John F. Spencer
Assistant Director
Office of Water Programs

JFS:grp

August 3, 1976

State of Washington
Department of Ecology

Colonel John A. Poteat, Jr.
District Engineer
U. S. Army Corps of Engineers

Mr. John W. Ellis, President
Puget Sound Power and Light Company

Gentlemen:

As I have previously advised you, the Department of Ecology in keeping with its responsibility for the management of the state's water resources, has undertaken a professional examination of the water management factors involved in the recent death of two children in the White River.

In the process of making this examination, Mr. Robert McCormick, the Manager of the Department of Ecology's Regional Office in Redmond, who is directly responsible for conducting this study, has informed me that your representatives have indicated an unwillingness to permit our people to discuss directly with the operating personnel involved at your facilities the general operating procedures authorized and the circumstances which occurred on the day of the tragedy.

Obviously, our examination cannot be complete without interviewing these people. I, therefore, officially request of you the opportunity for our people to ask appropriate questions of the operating personnel involved in the form of a deposition-type proceeding. Your legal council may well desire to participate in the proceeding and this, of course, would be most satisfactory. I do feel that the opportunity to discuss thoroughly these factors and circumstances with your people is vital to our examination.

I would appreciate your cooperation. Mr. McCormick will be in contact with you.

Sincerely,

John A. Biggs, Director

sp

36

August 4, 1976

State of
Washington
Department
of Ecology

Mr. and Mrs. David B. Avila
215 Milwaukee Street
Pacific, Washington 98047

Dear Mr. and Mrs. Avila:

The Department of Ecology, at my direction, is conducting an impartial review of the circumstances surrounding the tragic drowning of your daughter, Catherine, and Karen Mason in the White River on July 15.

I offer my sympathy at the loss of your daughter and my pledge to keep you informed of our activity in this regard. Should you have any information you deem important to my department's review, please contact Mr. Bob McCormick or Mr. Duane Wegner (885-1900, Redmond).

Very truly yours,

John A. Biggs, Director

JAB:bj

cc: Bob McCormick
Duane Wegner

August 4, 1976

State of Washington
Department of Ecology

Mr. and Mrs. Robert H. Mason
Route 1, Box 249
Sumner, Washington 98390

Dear Mr. and Mrs. Mason:

My department has, for this past week, been carrying out a detailed review of the circumstances surrounding the tragic death of your daughter, Karen, and Catherine Avila in the White River on July 15.

I offer my sympathy at the loss of your daughter and my pledge to keep you informed of our activity in this regard. Should you have any information you deem important to my department's review, please contact Mr. Bob McCormick or Mr. Duane Wegner (885-1900, Redmond).

Very truly yours,

John A. Biggs, Director

JAB:bj

cc: Bob McCormick
Duane Wegner

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

NPSEN-PL-WC

6 August 1976

Mr. Duane Wegener
Washington State Department of Ecology
4350 150th N.E.
Redmond, Washington 98052

Dear Mr. Wegener:

The inclosed plan and profile sheets for White (Stuck) River, Washington, are provided in response to your verbal request to Mr. Sellevold on 29 July 1976.

Sincerely yours,

NORMAN J. MacDONALD
Chief, Water Control Section

1 Incl (8 sheets)
As stated

39

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT. CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE. WASHINGTON 98124

NPSEN-PL-WC

6 August 1976

Mr. Walt Bergstrom
Washington Regional Office
Department of Ecology
Olympia Airport 7272 Cleanwater Lane
Olympia, Washington 98504

Dear Mr. Bergstrom:

The following prints for the White (Stuck) River are provided per your telephone request of 3 August 1976:

a. Plan and Profile Sheets (eight sheets)
b. Cross-sections for river miles 4.92, 5.36, 5.52, and 5.70

Confirming my telephone discussion with you, there was no letter from State Department of Fisheries in April 1976. Based upon discussions of prior years, we have voluntarily scheduled our operation for trash-rack debris removal for July 1976 and so informed Mr. Biggs by letter dated 17 June 1976, copy inclosed for ready reference.

If you have any further questions or need for information, please call.

Sincerely yours,

NORMAN J. MacDONALD
Chief, Water Control Section

3 Incl
As stated
1. P&P sheets (3 sets)
2. Cross-sections
3. Ref letter

40

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX C-3755
SEATTLE, WASHINGTON 98124

NPSDE

DEPT. OF ECOLOGY
AUG 12 1 52 PM '76

10 AUG 1976

John A. Biggs, Director
Department of Ecology
State of Washington
Olympia, Washington 98504

Dear Mr. Biggs:

I appreciate your letter of 3 August 1976 concerning the investigation of the recent unfortunate incident on the White River. We can certainly understand your concern and will cooperate in every way with an independent investigation by the Department of Ecology.

The Seattle District is prepared to respond fully to any requests for information or personal interviews. In this regard, your representatives should contact Mr. Sellevold, Chief of the Engineering Division, at telephone number 764-3776 to arrange further discussions with our personnel.

Your letter indicates there may be a misunderstanding over our position regarding the accident. It suggests that we have been unwilling to permit your investigators to discuss operating procedures and the circumstances surrounding the tragedy with our personnel at Mud Mountain Dam.

I have looked into the matter myself. My information shows that in response to your earlier request, Messrs. Sellevold and MacDonald of my staff briefed Messrs. McCormick, Wegener and Bergstrom on the afternoon of 27 July 1976 on our standard operating procedures as well as the circumstances surrounding the incident. Subsequently, we furnished your team copies of the operating logs at both Mud Mountain Dam and the Seattle District office and a report covering the chronology of events. A tour and meeting with operating personnel at Mud Mountain Dam was arranged on 29 July 1976. Mr. Dan Fryberger, our Project Engineer at Mud Mountain Dam, provided a slide briefing on dam operations including those associated with debris removal as well as a tour of the facility. To our knowledge, we have not refused information, nor have we denied access to any of your personnel.

NPSDE
John A. Biggs, Director

I trust that our continued cooperation will bring this matter to an early and appropriate conclusion.

Sincerely yours,

John A. Poteat

JOHN A. POTEAT
Colonel, Corps of Engineers
District Engineer

State of Washington
Department of Ecology

August 16, 1976

Mr. Dick Sellevold, Chief
Engineering Division
U. S. Corps of Engineers
P. O. Box C 3755
Seattle, Washington 98124

Dear Mr. Sellevold:

Recently, the Corps of Engineers and the Puget Sound Power and Light Company have entered into an agreement concerning mutually acceptable operating procedures on the White River. As you know, the Department of Ecology is conducting an independent in-depth investigation concerning the instances that happened on July 15 and, as a part of that investigation, we would like to be furnished a copy of the newly adopted operating agreement between your agency and the Puget Sound Power and Light Company.

We would also like to borrow, for our staff examination in Olympia, a copy of your operating manual for the operation of Mud Mountain Dam. If this is possible, please notify Mr. Robert McCormick of the Northwest Regional Office and arrangements will be made to pick it up.

Thank you for your cooperation in this matter.

Sincerely,

Robert K. McCormick
Regional Manager
Northwest Regional Office

RKM:ja

Daniel J. Evans, Governor · John A. Biggs, Director · Olympia, Washington 98504 · Telephone (206) 753-2800

August 17, 1976

State of Washington
Department of Ecology

Colonel John A. Poteat
District Engineer
U.S. Corps of Engineers
Post Office Box C-3755
Seattle, Washington 98124

Dear Colonel Poteat:

We certainly appreciate the opportunity to discuss in detail with your Mud Mountain Dam operating personnel the events related to the July 15, 1976 accident on the White River.

The information received from those whom we did not see in our original interviews with your staff has provided additional facts which are of value to the investigation.

Thank you for your cooperation in this matter.

Very truly yours,

John A. Biggs, Director

JAB:cs

cc: Robt. McCormick
Duane Wegner

State of
Washington
Department
of Ecology

August 18, 1976

Gentlemen:

I am sure your organization is well aware of the tragic event that occurred on the Stuck River in mid-July of this year in which two young girls were drowned. Obviously, such events are extremely regrettable and many no doubt could be avoided with better coordination and appropriate control of river management activities. Therefore, with the feeling that every effort should be made to prevent the future occurrence of similar incidents, I am pursuing an inventory and examination of river operating procedures throughout the state.

In order to accomplish such an inventory, I would be pleased if you would provide our agency with general information about the location, operation, and safeguards of your facilities as indicated on the attached questionnaire. The results of this inventory of existing conditions will be used in a general way to assess the need for developing new operating criteria which would minimize all future man-caused hazardous river fluctuations. Please use a separate form for each project operated by your organization.

Your cooperation in this endeavor would be most appreciated.

Sincerely,

John A. Biggs, Director

JAB:sw

State of Washington
Project Operation Questionnaire

1. Project Name _____

2. Stream _____

3. Location

   a. County _____
   b. Section, Township, Range _____
   c. River mile _____

4. Is a documented operating manual or procedure, including safety measures, now in existence for this project? (Yes, No) (If not excessively large, a copy would be appreciated.)

5. Briefly describe normal operating procedures for releasing or diverting water.

_____

_____

_____

_____

_____

_____

6. Are signs or other appropriate warning devices installed below the project? (Yes, No) _____
If yes, briefly describe signs (wording, size, number, location, etc.) and/or device.

_____

_____

_____

_____

_____

_____

7. Describe briefly any other forms of notification employed to warn the public of impending downstream surging (i.e., news releases, radio, T.V., personal contact, etc.).

_____

_____

INTERCOUNTY RIVER IMPROVEMENT

December 13, 1915

SYNOPSIS OF AN AGREEMENT
BETWEEN KING AND PIERCE COUNTIES, WASHINGTON

This agreement was entered into January 19th, 1914.

It recites that, whereas White River, forming a part of the boundary line between King and Pierce Counties, formerly flowed partly into the Duwamish River and Elliot Bay and partly through the Stuck River channel into the Puyallup River and Commencement Bay, it is hereafter provided that all of the water shall flow into the Puyallup River and Commencement Bay.

The contract provides for certain units of the structure such as the Auburn Dam, now completed, the Drift Barrier, completed, and the further straightening, changing and deepening of the channel of the River between the Auburn Dam and Tacoma, its protection by dykes, bank protection; the removal of logs, drift and debris from the river channel, the removal of standing timber near the bank of the river which is likely to be washed into the river.

The agreement provides $250,000 annually for six years, of which King County pays 60% and Pierce County, 40%. (The River Improvement has been carried on for two years already.)

An upkeep fund for a period of ninety-nine years has been provided in a maximum amount of $50,000 per annum.

Provision is made for the election of a seventh commissioner, there being three regular County Commissioners in each County.

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

15 JAN 1975

NPSEN-DB

John A. Biggs, Director
Department of Ecology
State of Washington
Olympia, Washington 98504

Dear Mr. Biggs:

On 5 December 1974, a meeting was held in our office with your Mr. Walter Bergstrom to discuss the reduced channel capacity of White River downstream of Mud Mountain Project, and the resulting increased possibility of adverse flooding effects that could occur because of the reduced channel capacity. Representatives of Pierce and King Counties and Washington Departments of Fisheries and Game also attended the meeting. A synopsis of minutes of the meeting is attached for your use.

The purpose of the meeting was to formally advise local officials of results of our recent studies regarding potential flooding that could be caused by the reduced channel capacity of White River.

We have forwarded a report of our findings, discussed in the 5 December meeting, to our higher authority for review. Following review of this report, we will advise other Federal agencies, hold public meetings and issue news releases to assure the public is aware of the risks of building and living in the affected areas. We are required by regulation to advise the public of potentially hazardous conditions downstream of our projects and of degree of protection that can be expected from operation of our projects.

Pierce and King Counties entered into an intercounty agreement in 1914 to maintain a design channel capacity of 25,000 c.f.s. for the White River. The design and operating plans of our Mud Mountain Project were based on this design capacity. We understand Pierce County has been unable to obtain permits, from the appropriate State agencies, that will allow sufficient maintenance to assure the river channel design capacity. The capacity of White River Channel is expected to continue to diminish if maintenance is not accomplished in accordance with the agreement.

NPSEN-DB
John A. Biggs, Director

We request your comments regarding information presented at the meeting and summarized in the attached minutes of the meeting (inclosure 1).

Similar correspondence has been sent to the agencies listed in inclosure 2.

Sincerely yours,

Raymond J. Eineigd

RAYMOND J. EINEIGD
Colonel, Corps of Engineers
District Engineer

2 Incl
As stated

50

SIMILAR CORRESPONDENCE SENT TO:

John A. Biggs, Director
Department of Ecology
State of Washington
Olympia, Washington 98504

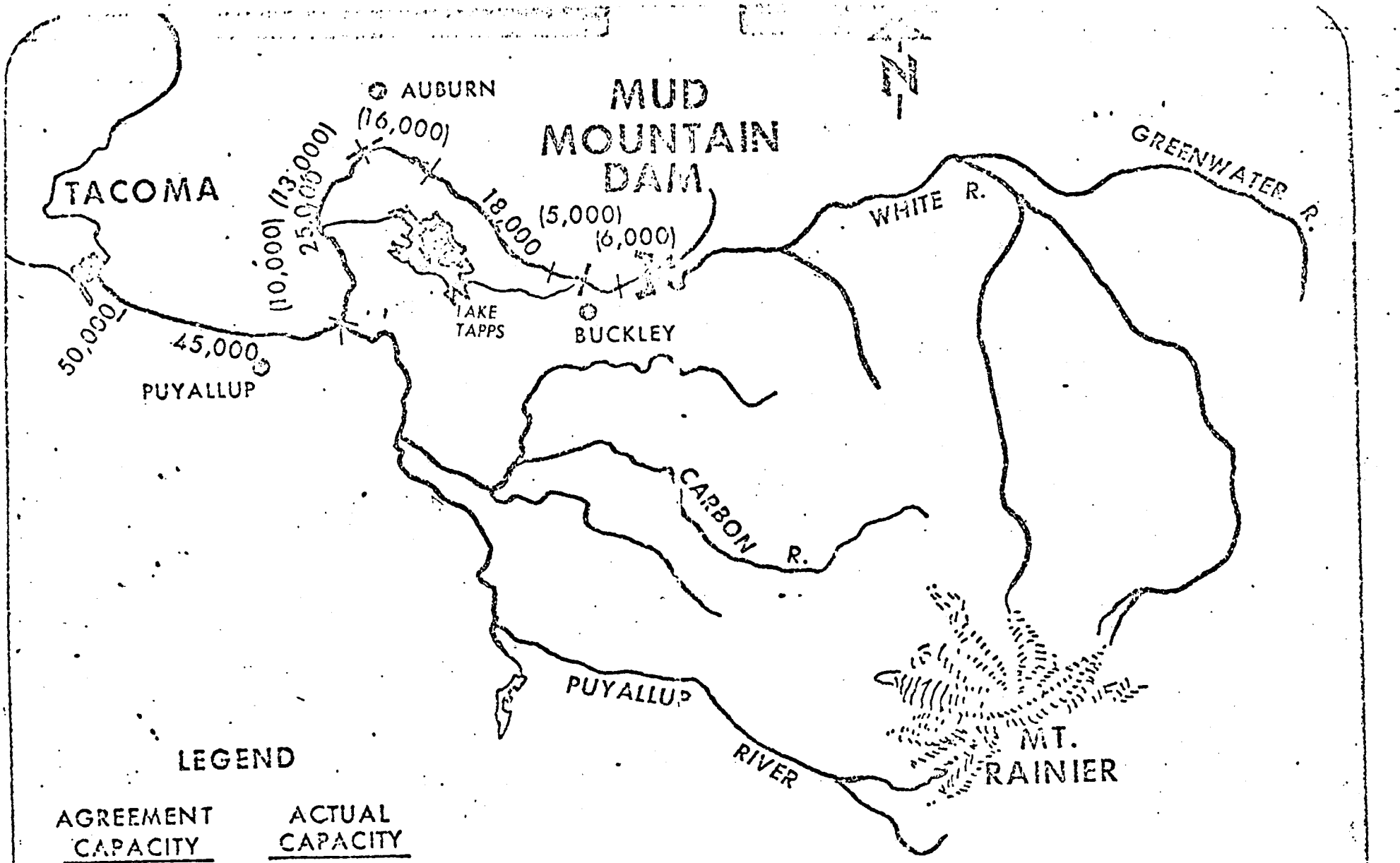
Carl N. Crouse, Director
Department of Game
State of Washington
600 North Capitol Way
Olympia, Washington 98501

Clay Huntington, Chairman
Pierce County Commissioners
County-City Building, Room 1046
Tacoma, Washington 98402

Mr. John D. Spellman
County Executive
King County Courthouse
Seattle, Washington 98104

Thor Tollefson, Director
Department of Fisheries
State of Washington
General Administration Building, Room 115
Olympia, Washington 98504

Incl 2



PUYALLUP RIVER BASIN CHANNEL CAPACITIES

SYNOPSIS OF MINUTES OF MEETING, 1300 HOURS, 5 DECEMBER 1974
AT
SEATTLE DISTRICT OFFICE, SUBJECT, WHITE RIVER, WASHINGTON

1. Mr. Weber called the meeting to order and greeted the attendees:

Bill Thornton	Pierce County Department of Public Works
Randy Anderson	Pierce County Department of Public Works
Brad Gillespie	King County Flood Control
R. Gary Engman	Washington Department of Game
Walter Bergstrom	Washington Department of Ecology
Fay Conroy	Washington Department of Fisheries
Fred Weber	Corps of Engineers
Norman MacDonald	Corps of Engineers
William Spurlock	Corps of Engineers
Douglas Gray	Corps of Engineers
Vernon Cook	Corps of Engineers

2. Mr. Weber stated the purpose of the meeting was to review recent study findings of channel capacities along various reaches of White River, Washington and formally advise local officials of potential flooding problems due to restricted channels. Mr. Weber said that the Corps is required by regulation to advise local officials and the public of any potentially hazardous conditions downstream of any of our projects.

3. Messrs. Weber and MacDonald discussed Corps of Engineers' regulations and our present directive for conducting studies regarding all Corps projects.

4. The Corps is involved in Phase I of a program to identify and assess the nature and magnitude of constraints on application of water control plans for Corps projects. Education of the general public to discourage future infringements on water channels is a part of our Phase I activities. This educational program is intended to operate on a continuing basis and educate local officials and individuals that could be affected by the water control functions of the project.

Snell

5. The Corps will provide brochures, hold public meetings and show slides and maps that depict general information on the functions of water control.

6. Phase II of this program will be to develop plans to alleviate problems resulting from project operations.

7. Prior to receiving the directive for studies, discussed above, the Corps had proceeded with an investigation of White River because a problem with restricted channel capacities was evident. A meeting with representatives of both King and Pierce County officials was held on this subject on 3 January 1974. Earlier in 1974, a release of a steady flow of about 10,300 c.f.s. on White River permitted teams of observers to set high water marks. With new surveys, stream cross sections and high water marks a backwater profile was established for flows up about 10,000 c.f.s. Also, backwater profiles were established for releases from Mud Mountain Dam of about 14,500 c.f.s. and 17,700 c.f.s. plus applicable local inflows.

8. Copies of a sketch of Puyallup River Basin showing the present channel capacity of various reaches of White River were handed to all attendees, copy attached. The sketch also shows the channel capacity that is to be maintained under terms of the 1914 King and Pierce Counties Intercounty Agreement. As shown on the sketch, existing channel capacities have been reduced to 5,000 and 6,000 c.f.s. in reaches near Buckley and 16,000 c.f.s. near Auburn, rather than the 18,000 c.f.s. capacity provided for in the agreement. The channel capacity downstream from Auburn to the confluence of White River with Puyallup River is 10,000 to 13,000 c.f.s. rather than the 25,000 c.f.s. capacity provided for in the agreement. Using information obtained on channel capacities, backwater profiles and topographic maps, the overbank

flooding was determined for a flow release of 17,700 c.f.s., plus local inflow, was plotted on a map. A copy of this map with overbank flooding was provided to all attendees. The map used in the meeting was marked in red and showed overbank flooding was extensive starting just below Auburn and running to the mouth of White River.

9. A general discussion among attendees followed on Flood Plain Management, flood plain insurance, flood frequencies, master planning and shoreline permits. A copy of a section from the Reservoir Operation Manual for Mud Mountain Dam Project was given to each attendee. The handout provides information on Puyallup River Basin regarding general description of the basin, history of channel shift and name change, flood control features and discussion of 1914 Intercounty Agreement along with activities related to the Agreement.

10. The channel maintenance accomplished during past years and current channel maintenance activities were discussed. The inability of Pierce County to obtain permits from State Agencies for sufficient channel maintenance to maintain agreement channel capacities was discussed. Apparently, some channel maintenance is being accomplished under the rules established by Washington Department of Fisheries, but permits have been denied for moving large amounts of material below the water surface to remove restrictions.

11. A discussion of possible methods of improving channel maintenance and obtaining permits for the needed work indicated both County and State representatives would need to do some research and determine what permits had been requested, what permits were approved and denied, and what procedures might be used to obtain the type of permits needed now.

12. Local pressures to retain agricultural use of the land was discussed. Permitting flooding to continue is one way some special interest groups believe this end could be accomplished.

13. Agreement was reached that in addition to researching permits on channel maintenance, there would be a review of land use alternatives and flood plain zoning. When the Corps' letter with minutes of meeting is sent to attendees, the letter will ask for comments on meeting and minutes of meeting. Response to Corps' letter by agencies would be broad and possibly contain alternative ways of completing channel maintenance or preventing damage from flooding by other means.

1 Incl
as

White River

DEPARTMENT OF GAME
600 Capitol Way North
Olympia, Washington 98504

FISHERIES AND GAME
HYDRAULICS PROJECT APPROVAL

DEPARTMENT OF FISHERIES
General Admin. Bldg.
Olympia, Washington 98504

March 12, 1975
(Applicant should refer to this date in all correspondence)

Gravel Removal (Type of Project) | White River (Stream) | Puyallup River (Drainage System) | 10 (WRIA)

This approval (pages 1 through 5) is given to Inter County River Improvement
Post Office Box 367
219 North Levee Road
Puyallup, Washington 98371, to perform the requested project work which is covered by the laws of the State of Washington, Chapters 75.08, 75.12, 75.20, 77.16, 46.61 and 966. All work associated with this project shall comply with the following General, Technical, and Special provisions.

GENERAL PROVISIONS

1. Project Location: NW¼ of Section 1, Township 20 North, Range 4 East, W.M., in King County. (Station #68 R. B. - Butte Pit)

2. Time Limitation: Immediately to October 1, 1975 (See Special Provision "a")

3. Water quality is not to be degraded to the detriment of fish life as a result of this project. Compliance with the quality limits set forth in the Washington State Water Quality Regulations shall be maintained throughout the life of the project.

4. Siltation of the bed or bottom of any state waters to the detriment of fish life shall not occur as a result of this project.

5. At no time and under no circumstances is there to be created a block to stream or tidal flow or fish passage as a result of this project.

6. No equipment is to enter or operate in any flowing stream or other state waters except as provided in the Technical and Special Provisions of this approval.

7. Any fish stranded as a result of this project shall be safely released to the flowing stream or open water.

8. Any stream bank or shoreline area on which vegetative cover is disturbed shall be replanted with trees, brush and grasses of similar type and concentration as exists along the stream banks or shoreline in the general vicinity of the project.

9. No gravel or other bottom material shall be removed from within the high water flow channel bed of any stream or from the bottom of any other state waters, except as provided in the Technical and Special Provisions of this approval.

10. Any debris resulting from this project is to be disposed of by placing beyond high tide and/or high water flows.

S. F. No. 9066—(Rev. 3-72)—4-73—1-92
STATE PRINTING PLANT OLYMPIA, WASHINGTON

Station #68 R.B.
Butte Pit

SPECIAL PROVISIONS

Name Inter County River Improvement
Date March 12, 1975

a. Technical Provision #1 for Gravel Removal - In Spawning Areas shall be changed to read as follows: No gravel is to be removed from the stream side of the "Excavation Line" shown on the attached map. Until May 1, 1975 the "Excavation Line" is a line on the ground surface which is roughly parallel to the water's edge and is 3 feet in elevation above the water surface which exists at the time of operation. After May 1, 1975 and before October 1, 1975 the "Excavation Line" is a line on the ground surface which is roughly parallel to the water's edge and is 1 foot in elevation above the water surface which exists at the time of operation.

b. No petroleum products or other deleterious materials shall fall, be wasted into or otherwise enter state waters as a result of this project.

ENCLOSURES: Gravel Removal - In Spawning Areas
Typical Plan View
Typical Cross-Section (3 feet until May 1, 1975)
(1 foot from May 1, 1975 to October 1, 1975)

THIS APPROVAL IS TO BE AVAILABLE ON THE JOB SITE AT ALL TIMES AND THE PROVISIONS CLOSELY FOLLOWED BY THE OPERATOR CONDUCTING THE WORK.

The Department of Fisheries and the Department of Game reserve the right to make further restrictions if deemed necessary for the protection of fish life.

This approval is granted in the interest of fishery protection only, and these departments cannot be held liable for any property damage which might occur as a result of this project.

Failure to comply with the provisions of this approval is a gross misdemeanor punishable by fine and/or imprisonment.

The person(s) to whom this approval is issued may be held liable for any damage to fish life or habitat which results from failure to comply with the provisions or intent of this approval.

The use of explosives in or near state waters may require a separate approval from the Department of Fisheries and the Department of Game.

This approval pertains only to the provisions of the Fisheries and Games Codes, Additional authorization from the Department of Ecology, the U. S. Department of Army Corps of Engineers, Department of Natural Resources and/or other public agencies may be necessary for this work.

DEPARTMENT OF FISHERIES
Donald Moore, DIRECTOR
3-18-75 DATE SIGNED

DEPARTMENT OF GAME
[signature], DIRECTOR
3-19-75 DATE SIGNED

DEPARTMENT OF GAME
600 Capitol Way North
Olympia, Washington 98504

FISHERIES AND GAME
HYDRAULICS PROJECT APPROVAL

DEPARTMENT OF FISHERIES
General Admin. Bldg.
Olympia, Washington 98504

July 14, 1976
(Applicant should refer to this date in all correspondence)

Gravel Removal (Type of Project) | White River (Stream) | Puyallup River (Drainage System) | 10 (WRIA)

This approval (pages 1 through 3) is given to Inter County River Improvement, 219 North Levee Road, P.O. Box 367, Puyallup, Washington 98371, to perform the requested project work which is covered by the laws of the State of Washington, Chapters 75.08, 75.12, 75.20, 77.16, 46.61 and 966. All work associated with this project shall comply with the following General, Technical, and Special provisions.

GENERAL PROVISIONS

1. Project Location: See Attached

2. Time Limitation: Immediately to September 15, 1976

3. Water quality is not to be degraded to the detriment of fish life as a result of this project. Compliance with the quality limits set forth in the Washington State Water Quality Regulations shall be maintained throughout the life of the project.

4. Siltation of the bed or bottom of any state waters to the detriment of fish life shall not occur as a result of this project.

5. At no time and under no circumstances is there to be created a block to stream or tidal flow or fish passage as a result of this project.

6. No equipment is to enter or operate in any flowing stream or other state waters except as provided in the Technical and Special Provisions of this approval.

7. Any fish stranded as a result of this project shall be safely released to the flowing stream or open water.

8. Any stream bank or shoreline area on which vegetative cover is disturbed shall be replanted with trees, brush and grasses of similar type and concentration as exists along the stream banks or shoreline in the general vicinity of the project.

9. No gravel or other bottom material shall be removed from within the high water flow channel bed of any stream or from the bottom of any other state waters, except as provided in the Technical and Special Provisions of this approval.

10. Any debris resulting from this project is to be disposed of by placing beyond high tide and/or high water flows.

59

S. P. No. 9669—(Rev. 3-72)—4-7-72
STATE PRINTING PLANT OLYMPIA, WASHINGTON

SPECIAL PROVISIONS

Name Inter County River Improvement

Date July 14, 1976

a. Gravel may be removed to an elevation equal to the low point of the existing river bed adjacent to the excavated area.
b. The river shall be separated from the excavated area with a natural berm left in place during the entire operation.
c. The excavated area shall have a continuous gradient sloping downstream equal to or greater than the existing low flow channel of the river at this location. It shall also have a cross-section sloping upward from the streamward extent of excavation toward the bankline on a minimum grade of 2%.
d. The gravel berm shall be opened at the downstream end to prevent ponding of water.
e. If at any time the high water overtops the berm all work is to be stopped. Any fish trapped as a result of over toping are to be safely removed to the flowing stream before the gravel removal operation continues.
f. No excavated materials shall be stockpiled or spoiled within the high water flow channel of the stream.
g. No petroleum products, or other deleterious materials shall fall, be wasted into or otherwise enter state waters as a result of this project.

THIS APPROVAL IS TO BE AVAILABLE ON THE JOB SITE AT ALL TIMES AND THE PROVISIONS CLOSELY FOLLOWED BY THE OPERATOR CONDUCTING THE WORK.

The Department of Fisheries and the Department of Game reserve the right to make further restrictions if deemed necessary for the protection of fish life.

This approval is granted in the interest of fishery protection only, and these departments cannot be held liable for any property damage which might occur as a result of this project.

Failure to comply with the provisions of this approval is a gross misdemeanor punishable by fine and/or imprisonment.

The person(s) to whom this approval is issued may be held liable for any damage to fish life or habitat which results from failure to comply with the provisions or intent of this approval.

The use of explosives in or near state waters may require a separate approval from the Department of Fisheries and the Department of Game.

This approval pertains only to the provisions of the Fisheries and Games Codes, Additional authorization from the Department of Ecology, the U. S. Department of Army Corps of Engineers, Department of Natural Resources and/or other public agencies may be necessary for this work.

DEPARTMENT OF FISHERIES

Lloyd Rathbun for DIRECTOR

7/16/76 DATE SIGNED

DEPARTMENT OF GAME

John M. Ward for DIRECTOR

7-20-76 DATE SIGNED

60

MUCKLESHOOT
INDIAN TRIBE, INCORPORATED BOX 5-39100 172 AVENUE S.E.

March 2, 1976

Mr. William Thornton
Room 1033
City-County Building
Tacoma, Washington 98402

Subject: White River Flood Control Repair.

Dear Mr. Thornton:

This is to provide for you the official Muckleshoot Tribal position on On-Reservation repair activities on the flood control works for the White River. As you may be aware our position is that the fisheries resource of the White River has the highest priority in any use of the White River. In this letter we will describe what activities we think will be compatible with protecting the White River fish resource.

Our first recommendation is that there be no gravel removal from the bed of the river. This practice disturbs the eggs incubating in the river now and causes changes in rearing and adult returns. This position is consistent with the Washington State Game Department and we feel it is in the best interest of the resource. We realize that you have not suggested any large scale removals On-Reservation but we wanted to emphasize this point.

The next problem deals with the repair of the dike along the river bank. As you may know the presence of the dike has been a bad subject with the tribe because it must bear a large burden for the loss of fish runs from the White River system. We have considered your proposals for dike repair and are not totally opposed provided certain concessions can be made to re-open some of the spawning area to access by the fish. We will not outline our requests here but will be happy to meet with you to discuss the details.

61

AUBURN, WASHINGTON 98002 TE3-3920 TE3-5160

The third question deals with the removal of logs from the river bottom. It is felt that in many cases these logs provide cover for the fish and will create pool areas in the river. These logs also provide a supply of logs and wood for tribal people as well as the general public. From the number of logs that have already been cut they should not be a problem for long.

If you have any questions please feel free to contact our office. We would like to meet with you to discuss the repair of the dike in detail.

Sincerely,

Gilbert Kinggeorge
Executive Director
Muckleshoot Indian Tribe

UCKLESHO
NDIAN TRIBE, INCORPORATED BOX 5-39100 172

Traffic
Road
Planning
Perm. & Fran.
Res. Engr.
Mat. Insp.
E & R
Util Dept
Bridges
Safety
Sol. Wast.

William Thornton
Pierce County Public Works
City-County Building
Tacoma, Washington

Dear Mr Thornton:

The Muckleshoot Tribe has considered your request to come on-reservation for flood control work. We have consulted with our biological and legal staff in this matter and we are not convinced that any clear problem exists at this time that will adversely affect the tribe or the public. We therefore would not like the repair and clearing work to be done on the reservation. Discussions in this area are continuing and the Tribal Council will be hearing the matter further in the near future. We will pass along any changes in policy to you if and when they occur.

We would appreciate finding out what the original authorization was for Inter-county coming on the reservation at the start of the flood control work. This is part of our on-going discussions and we would appreciate a response as soon as possible.

Sincerely,

Gilbert KingG[illegible], [illegible]
Muckleshoot Indian Trib[illegible]

RECEIVED
APR 30 1976
Pierce County
Public Works Dept.

WASHINGTON 98002

Bergstrom

PIERCE COUNTY

1033 COUNTY-CITY BUILDING TACOMA, WASHINGTON 98402

WM. R. THORNTON
PUBLIC WORKS DIRECTOR
Telephone: (206) 593-4600

BOARD OF COUNTY COMMISSIONERS

PATRICK J. GALLAGHER, District 1
GEORGE P. SHERIDAN, District 2
CLAY HUNTINGTON, District 3

23 July 1976

District Engineer
Department of the Army, Corps of Engineers
4735 East Marginal Way South
Seattle, Washington 98134

Dear Sir:

On July 13, 1976, a meeting was held in the Pierce County Commissioners Chamber which included representatives from the Corps of Engineers, State Fisheries Department, State Natural Resources Department, Department of Game, several representatives from Indian Tribes, King County and the Department of Ecology.

The Fisheries Department proposed that a large pit be dug in the White River above Auburn and that a large pit be dug in the Puyallup River above Orting. The purpose of those pits would be to collect gravel and remove it from the rivers. Further they proposed that the river capacity be restored by allowing gravel to be removed in those areas where the existing capacity has been reduced by existing gravel bars.

We are aware that the Corps of Engineers has done considerable engineering surveys in both of those areas and has considerable knowledge on how to engineer this proposal. For that reason, we request your district to utilize your existing information and provide further information that is needed to accomplish this proposal from the Fisheries Department. Traditionally, the State Fisheries Department has had considerable reservations about any dredging in the streams. This is a major change in their attitude and needs to be pursued vigorously. Mr. Larry Merkel from your agency was present at this meeting and could perhaps give you an insight into the words that were spoken that day.

We request your early consideration of this matter.

Very truly yours,

W R Thornton

WM. R. THORNTON
Director

WRT/el
cc: members at attendance at meeting

FEDERAL POWER COMMISSION LITIGATION

July 23, 1976

TO: Wes Hunter
Charles Roe

FROM: Fred Hahn Fred

PSPL filed application for major license with FPC on November 20, 1964.

Supplemented in 1966 & 1967 for license for construction project.

Notice issued setting April 24, 1967 close of Protest/Intervention.

Intervention by Fisheries May 3, 1967 & Game May 4, 1967 - granted by FPC July 7, 1967.

PSPL filed for rehearing on order granting intervention on August 7, 1967.

FPC order issued September 5, 1967 for rehearing.

No settlement by negotiation of issues.

FPC order of October 23, 1973 denied application for rehearing.

Muckelshoot Indian Tribe also filed for intervenor status out of time, November 10, 1974 (subsequently granted).

PSPL filed application to withdraw original application on January 15, 1973 based on lack of FPC jurisdiction (see Farmington R. Power Co. v. FPC - 455 F 2d 86.

FPC order of April 20, 1973 ordered pre-hearing conferences to begin January 15, 1974 for purposes of isolating unresolved issues. Apparantly continued thru December 9, 1974.

Initial decision of Presiding Administration Law Judge issued March 31, 1976, ruling FPC had no jurisdiction over the project.

Filing of briefs on exceptions/replies set by extension order to June 14, 1976.

In all probability these are now being reviewed before final order is drafted for Commission member action. Petitions to reopen the the record have previously been denied & no action has been taken on recent petitions of similar motion.

FDH:ljb

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

Puget Sound Power and Light Company) Project No. 2494

PRESIDING ADMINISTRATIVE LAW JUDGE'S INITIAL DECISION FINDING NO JURISDICTION

(March 3, 1976)

APPEARANCES

Douglas P. Beighle, William S. Weaver and John C. Mason for Puget Sound Power and Light Company

Joseph L. Coniff, Jr., for Washington Department of Game and Washington Department of Fisheries

Charles E. O'Connell, Jr., for The Secretary of the Interior on behalf of the Muckleshoot Indian Tribe

L. Graeme Bell, III, Thomas L. Smithson and Alexandra Harmon for the Muckleshoot Indian Tribe

John Gossel and Linda L. Lee for the Staff of the Federal Power Commission

LITT, Presiding Administrative Law Judge:

I

PROCEDURAL BACKGROUND

By its order entered November 20, 1973, the Commission set for hearing the application of Puget Sound Power and Light Company (Puget) filed November 20, 1964, seeking either a disclaimer of jurisdiction or, in the alternative, for a license for its White River Project No. 2494. For 64 years Puget has steadfastly maintained that its project is not jurisdictional, but it filed its application in response to persistent Commission cajoling. Subsequent to its filing, the jurisdiction question appeared to be decided against Puget when the Supreme Court in F.P.C. v. Union Electric Company, 381 U.S. 90 (1965), also known as Taum Sauk, held that the Federal Power Commission has licensing authority over a project whose generated energy is transmitted in interstate commerce, even if the project is located on a non-navigable stream. However,

67

in The Farmington River Power Company v. F.P.C., 455 F. 2d 86 (2d Cir 1972) the Second Circuit concluded that a project located on a non-navigable stream which generates energy transmitted in interstate commerce and which has undergone no post-1935 construction -- such as this Project -- does not fall within the 1935 amendment of Section 23(b) of the Federal Power Act. Based on this last court action, Puget filed, on January 15, 1973, an application for withdrawal of its licensing application. The original question of jurisdiction, as focused by the application for withdrawal, was set by the Commission for hearing.

Hearings were held in Seattle, Washington, on July 30 and 31, 1974, at which Puget, the Washington Departments of Game and Fisheries (Fisheries), the Secretary of the Interior, the Muckleshoot Indian Tribe, 1/ and the Commission Staff participated. Initial and reply briefs were filed by each of the aforementioned parties.

II

GENERAL FACTS

Puget's White River Project is a hydroelectric generating facility located on the upper White River, in Pierce County, Washington (see map - Appendix A). The White River is a glacial stream fed by ice and snow on Mount Ranier. The project consists of a diversion facility at Buckley, Washington, which diverts a portion of the White River into a timber flume approximately 5,000 feet long, discharging in turn into a series of settling basins which cover approximately two miles. From the settling basins, the water enters an unlined canal and then a timber-lined canal until it enters Lake Tapps, approximately two miles distant. From Lake Tapps the water flows through a concrete-lined tunnel to six high-pressure penstocks which carry it to the power house at Dieringer, Washington. After passing through the turbine generator units in the power house,

---

1/ The "Muckleshoot Tribe" is a present-day tribal entity organized under the Indian Reorganization Act, 48 Stat. 988, 25 U.S.C. § 476 and 479. It is recognized by the United States as a currently-functioning Indian tribe maintaining tribal government on a reservation. The Tribe's present membership roll was approved by a representative of the Secretary of the Interior on December 15, 1969. The Tribe presently has approximately 386 members.

the water is returned to the White River through a half-mile long unlined tailrace channel.

The project design alters the flow of the river at a point approximately six miles upstream of the Muckleshoot Indian Reservation, and the diverting canals and flumes return the water to the natural course of the White River at a point four miles downstream of the reservation. This diverts water from a 16-mile segment of the river (between Buckley and the tailrace of the Dieringer Power Plant).

At the time of its construction in 1911 the project consisted of two turbine generator units with a name-plate rating of 15,000 kilowatts each. A third generator with a 16,000 kilowatt rating was added in 1918 and a fourth similarly-sized unit was installed in 1924. The basic design of the project has not changed since the fourth generating unit was installed in 1924; the rewinding of units three and four in the 1950's, while altering the name-plate ratings, did not alter the electro-magnetic characteristics of the generators. All parties agree that the construction and horsepower of the turbines and the general hydraulic design of the facility are the same as they were at the time the last unit was added in 1924.

III

APPLICABLE STATUTES

The following is a precis of those sections of the Federal Power Act (the Act) and the Federal Water Power Act (1920 Act) pertinent to this proceeding.

Section 3(8) - Defines the term "navigable waters" so as to include bodies of water over which Congress has jurisdiction through its commerce powers. 1/

1/ It cannot escape notice that the grant of authority to the Commission as to "navigable waters" is less than the whole of Congress' power to grant. The power entrusted to the Commission is based on Congress' "authority to regulate commerce with foreign nations and among the several States". (16 USC. 796(8)) The totality of Congress's authority is "to regulate Commerce with foreign nations, and among the several States, and with the Indian Tribes" (U.S. Constitution, Art. I, Sect. 8). This is not the first time the Act is construed that the Commission's authority is not as broad as that of Congress to grant. Conn. L & P v. F.P.C., 324 U.S. 515, 529-530 (1948). The arguments on brief generally overlook this distinction.

Section 3(2) - Defines the word "reservation" so as to include Indian reservations and land interests owned by the Government.

Section 4(e) - Authorizes the Commission to issue licenses for project works (a) on water over which Congress has commerce power jurisdiction (but see note 1 on p. 3, supra); (b) on public lands or reservations, or (c) where the project's purpose involves the utilization of surplus water from any Government dam.

Section 23(b) - Specifies that it is unlawful to operate a project on navigable waters, public lands or reservations or which utilizes surplus water from a Government dam without a license, unless such project was validly operating prior to the 1920 Act. Thus, pursuant to the Commission's investigation, any proposal which either affects commerce or public lands or reservations must be licensed by the Commission.

Section 4(d) - 1920 Act - Empowers the Commission to issue licenses for project works necessary for development or improvement of navigation, located upon public lands or reservations or which utilize surplus water from Government dams. A license may not interfere with a reservation or be inconsistent with the reservation's purposes.

IV

POSITIONS OF THE PARTIES

Briefly, the Muckleshoots and Staff argue that the White River is navigable water of the United States and as such, jurisdiction over the project arises through Section 4(e) and 23(b) set out above. Interior and the Muckleshoots specifically argue that although none of the physical structures of the White River Project is located within the geographic boundaries of the reservation, the project affects the reservation under the terms of the 1920 statute and, in particular, that the diversion of water from the reservation deprives the Muckleshoots of treaty-protected rights in certain natural resources. Additionally, the Muckleshoots, Interior and Fisheries assert that the project occasionally utilizes surplus water from the government dam at Mud Mountain -- a benefit from a Federal project assertedly causing jurisdiction to attach. The Muckleshoots individually claim the Commission has jurisdiction over the project because of the White River's effect on interstate commerce. It contends that even if the White River were to be considered non-navigable, it is so important to the downstream navigable capacity of other rivers that it has an overall effect on commerce.

Puget takes the position that the White River does not meet the most basic tests for navigability. Regarding its use as a navigable stream, Puget asserts that there is no evidence that these activities were regularly or very successfully accomplished. Puget further asserts that the Commission has no jurisdiction merely because the project has some effect on the Indian reservation. It strenuously avers that Section 4(d) of the 1920 Act clearly gave the Commission jurisdiction only where the project was located on navigable waters or upon any part of the public lands and reservations of the United States. Puget also emphatically denies the Commission's right to jurisdiction over the project based upon the use of surplus water from the Mud Mountain Dam. Mud Mountain, it asserts, is a single-purpose flood-control project; was developed 37 years after the construction of the project; has no contractual relationship with the project; and is not operated to purposefully benefit the project.

V

DISCUSSION AND FINDINGS

In a companion proceeding, (Project 2495) Puget reluctantly also asked the Commission to determine whether FPC jurisdiction had attached to one of its several Washington plants. In finding jurisdiction in that case, the Commission found that construction had occurred since the adoption of amendments to Section 23(b) of the Act and that the Congressional policy in enacting that statute favored finding jurisdiction, _____ FPC _____ 1975. Those amendments required Commission licensing of previously non-jurisdictional projects if they had undertaken subsequent "construction". Such is not here at issue. No party to this proceeding has argued that any construction has occurred which would make Project 2494 jurisdictional. Questions regarding jurisdiction arising out of this action, therefore, involve issues of:

(A) Whether the White River is navigable under Section 3(8) so as to confer jurisdiction under Section 4(e) of the Act.

(B) Whether the effect of the project upon the Muckleshoot Reservation under Section 3(2) is relevant under Section 4(e) of the Act.

(C) Whether the project utilizes surplus water from a government dam in such a way as to confer Commission jurisdiction under Section 4(e) of the Act.

A. Navigability

The question of the stream's navigability has been the key question throughout this phase of the proceeding. Evidence has been tendered to demonstrate numerous transportation and commercial uses of various segments of both the pre-1906 stream system 1/ and the present system. While the question of navigability is not based solely on an evaluation of that portion of the river affected by the project at the time of its construction, the examination of the portion of the river where navigability is claimed is the prime area to be investigated. Consequently, while all of the evidence on navigability has been weighed, the greater weight has been awarded that evidence given to the portion of the river directly impinged upon by the project.

1/ This "River" is a changing animal. Originally the White River flowed from its source at Mount Rainier in a northwesterly direction toward Puget Sound. Near Auburn, Washington, the White was joined by the Green River and continued as the White River. As the water continued to move downstream it was joined by the Black River and then by the Cedar to form the Duwamish which flows into Elliot Bay of Puget Sound at Seattle, Washington. In 1906 a flood altered the course of the White River, causing it to flow into the Stuck River at a point west of the Muckleshoot Indian Reservation. The river continues as the White-Stuck until it joins the Puyallup River and ends up in Commencement Bay of Puget Sound at Tacoma, Washington. Puget's diversion of a portion of the river between Buckley and Dieringer occurred between 1909 and 1911 as a part of the construction of the White River Project. As a flood control measure, King and Pierce Counties constructed a dyke in 1915 which made the river's post-1906, flood-altered course permanent. Since 1915 the course of the river has been literally "set-in-concrete." See Appendix A - Map of the White River System. Houses are built on the 19th Century river bed and the lower reaches of the Puyallup are used by small craft at Commencement Bay.

1. The River As a Transportation Mechanism

The record of this proceeding is replete with accounts, analyses, and conjecture regarding the feasibility and degree of use of the White River for transportation. A review of this testimony is necessary to ascertain the White River's navigability.

Thomas M. Statson, a licensed professional engineer in the State of California, testified on behalf of the Muckleshoots from historic records of water flows in the White River -- including those published by the U. S. Geological Survey. He concluded that the low flow of the White River in its natural state in that portion of the river at issue was approximately 300-400 cubic feet per second, which, in his opinion would support canoe traffic. Barbara Lane, an anthropologist, analyzed the studies of several early historians in order to ascertain the existence of traditional Indian villages along the White River. Through earlier studies (1917-1920) by T. T. Waterman, an anthropologist at the University of Washington, she determined that a village existed along the river near the present town of Enumclaw, Washington. This is an area within the 16-mile diversion of water from the stream bed. She further theorizes that, since villages were located near water so the villagers would be able to use river transportation, the relevant portion of the river was navigable.

Witnesses Starr, Barr and Williams, all Muckleshoot tribe members, testified of their rememberance of canoe travel along the river. Louis Starr, age 75 at the time of the hearing, paddled the river in large canoes at a time before diversion when the White was a "whole river", a river which "a man couldn't walk across . . ." (Tr. p. 253). Maggie Barr, a 79-year-old Muckleshoot Indian who has spent a lifetime on the reservation, remembers as a teenager that the river used to "rage" when "the White River flowed into the Green River" (Tr. p. 258). Presumably this is reference to the spring run-off prior to 1909 -- the date of the project.

Robert Paul Thomas, of the Department of Economics at the University of Washington, testified on behalf of Puget. He investigated reports by early historians and military officers dating back to 1854, and, based upon these reports, concludes that the reach diverted by the White River Project above Auburn was " . . . clearly unfit for navigation . . ." and that " . . . diligent research has revealed no evidence of any navigation ever occurring above Auburn" (Tr. p. 56).

2. The River As a Mechanism of Commerce

a. Log Floatation and Shingle Bolts

It is undisputed that shingle bolts were floated commercially on several of the rivers in the area of the White River Project. 1/ Statson believes that the pre-diverted White River could have handled these bolts:

> The shingle bolts would be of western red cedar and depending upon the percent of heartwood and percent of sapwood and the moisture content of such wood the displacement would vary. However, it is my opinion that squared off shingle bolts would float in the river with no more than half of their depth submerged. If western red cedar logs were floated in the river, that is logs still having their bark intact and being generally round, I would estimate that they would float with no more than about two-thirds of their diameters submerged. (Tr. p. 142)

Muckleshoot witnesses also sought to prove the use of the White River for shingle bolt floatation. Starr recalls shingle bolts being floated through that section of the river with which we are concerned here -- i.e., "down to Sumner from way up in the mountains." (Tr. p. 255). Starr also emphasizes that the cedar bolts were cut by non-Indians as well as Indians and were floated from a point upstream of both the Buckley Diversion Dam, and the present Mud Mountain Dam. Williams stated that " . . . the river was big before they changed it," (Tr. 262) and witness Lozier testified, "It used to have lots of water. Now you can walk across" (Tr. 267).

Puget witness Thomas testified otherwise. After reviewing historical material concerning the area, he found " . . . no evidence of any navigation ever occurring above Auburn, nor is there any evidence we could find of log drives on this section

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1/ Evidence of regular and commercially successful use of a river for transporting logs in commerce has been shown to justify the Commission's conclusion that the river was navigable and therefore jurisdictional. Wisconsin Public Service Corp. v. F.P.C., 147 F. 2d 743, 746-747 (7th Cir. 1945) and cases cited therein. A shingle bolt is a piece of wood normally cedar, suitable for making shingles and generally cut into pieces 18 inches in length from the log.

of the White River" (Tr. p. 56). That portion of the White River which is diverted by the project lies principally upstream of Auburn, Washington.

b. Traders, Trade and Other Commerce

Arthur Williams, who has lived in the area for over 60 years, recalls that trading fish, hides and berries occurred between Canadian Indians and the Muckleshoots. The traders, Williams asserts, were brought together by maneuvering their canoes along the river. Lane testified that her research indicated the use of steamers and barges on the White River upstream from Auburn -- a small portion of which is within the 16 miles of the stream's diversion. Lane's testimony, stemming from a booklet published in 1865, entitled, "Navigable Streams West of the Cascades." (Exh. 47), is that one Asa Mercer described the Duwamish River as being formed by the Black and White Rivers. Mercer concluded the Duwamish-White to be navigable for steamer use for a distance of some 32 miles; which apparently brought steamer navigation inland as far as Auburn. Lane concludes, therefore, that the Duwamish-White River system was used by shallow draft steamboats, barges and scows upstream as far as the confluence with the Green River.

3. Findings

Section 3(8) of the Federal Power Act vests the Commission with jurisdiction over only those hydroelectric projects which are located on waters which are or were navigable. This has been the law since 1920 - i.e., 9 years after the project was completed and 53 years before the pending application was filed. 1/ In U.S. v. Appalachian Electric Power Company, 311 U.S. 377 (1940), the Supreme Court established criteria for determining a river's navigability for FPC jurisdictional purposes. In Rochester Gas and Electric Corp. v. Federal Power Commission, 344 F. 2d 594, 596 (2d. Cir., 1965), the Second Circuit succinctly applied the Appalachian criteria to a subsequent Commission proceeding by stating a river to be navigable if (546):

> "(1) it presently is being used or is suitable for use, or (2) it has been used or was suitable for use in the past, or (3) it could be made suitable for use in the future by reasonable improvements."

Thus, if jurisdiction over the project is to be based on navigability, the affected portion of the White River must meet some

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1/ Laches does not apply. Clearly, however, time is not of the essence in disposing of this claim.

portion of the Appalachian test. No party argues that the White River is presently navigable in the area affected by the project. Nor does anyone suggest improving the river so as to make it navigable. We are, therefore, left only with the middle ground, whether or not the affected area was, in fact, navigable at some earlier time.

The evidence does not show navigability as that term is used in the statute. Prior to 1906 the White River was a portion of the White-Duwamish River System, a generally unstable glacially-fed river system. 1/ Staff elaborately and thoroughly cites a body of testimony picking up isolated uses on 75 miles of river, only 16 miles of which were directly affected (see Staff Brief, pp. 4-12). Giving full evidentiary weight to these isolated uses, however, does not make a case for navigability for that portion of the river primarily at issue here. To begin with, the fact of the matter is that not even

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1/ Final control of the flash flood aspects of this glacial stream was not possible until construction of the Mud Mountain Dam flood control project in 1948. While not fully discussed on the record, the White River, in fact, is a classic example of a glacier-fed stream. It is the principal recipient of water from melt-water channels fed by Emmons Glacier, a massive terminal moraine descending from Mount Ranier. Before construction of the Mud Mountain Dam, winter rains on Emmons and spring thaw from the Glacier resulted in a history of flooding throughout the lower Puyallup Valley. Mud Mountain has controlled these common glacial flooding conditions and has additionally lessened the threat of flooding due to glacial outwash, avalanche and burst out. The Geological Survey reports that outwash from Emmons has significantly altered melt-channel flow and course during the past 100 years. Additionally, the survey concludes that avalanches and landslides have occurred at Emmons since at least the 16th Century. There are no reported incidents of outburst flooding on Emmons Glacier but the survey holds such flooding to be unpredictable. Several outburst floods have been recorded on neighboring Mount Ranier glaciers in recent years. See, Sigafoos and Hendricks, "Recent Activity of Glaciers of Mount Ranier, Washington", Geological Survey Professional Paper 387-B (1972); Richardson, "Glacier Outburst Floods of the Northwest", Geological Survey Professional Paper 600-D (1968); Hodge, "The Movement and Basal Sliding of Nisqually Glacier of Mount Ranier", Naval Contract-N00014-67-A-0103-0007 NR307-252 (1972).

shingle bolt floatation could be accomplished on this stream in its natural state at a time contemporaneous with the project's construction. The Supreme Court of Washington so found in Sumner Lumber & Shingle Co. v. Pacific Coast Power Co., 131 p. 220 (1913). The Court states (p.222):

> . . . It is apparent that, if dependency was had upon the natural condition of these streams, few, if any, shingle bolts would ever reach respondent's mill. The river is a glacial stream, subject to material variation during each summer day on account of the glacial tide. A chart showing the flow is in the record. From this chart it appears that it is not an unusual thing for the flow to increase or diminish nearly 100 per cent. within a day or two. The result of this intermittent flow is that the bolts are lodged all over the bed of the river, which, on account of numerous past floods and erosions, averages nearly 100 feet, and require constant handling to keep them in the drive.

One cannot dismiss the impact and factual basis of this case on the hypertechnical legal grounds suggested by Staff. Ignoring a local court's evaluation in 1913 of almost the same facts urged 70 years later borders on the absurd. We are still faced with a lack of convincing evidence that the short stretch of river here supported a reasonable commercial enterprise on the basis of the stream's natural or ordinary navigability. As far as navigability was concerned even with aids, the court's decision shows the marginal aspects of the operation, the limited water available for any navigation, and the need for use of the stream banks as an auxiliary aid for even the marginal navigation attempted.

The Commission, in dealing with evidence of logging operations, a more usual index of commercial use of a waterway, has repeatedly required extensive showings of commercial operations before Commission jurisdiction will attach. In Central New York Power Corp., 8 FPC 390, 8 FPC 547 at 563 (1949), for example, the Commission based jurisdiction on logging activity where the party seeking jurisdiction showed that the river had been used for commercial logging for nearly 150 years. Similarly, in Wisconsin v. F.P.C., 214 F. 2d 334, 337 (7th Cir. 1954), the court affirmed the Commission jurisdiction on the basis of log drives when it was shown that such activities had been conducted regularly and involved millions of feet of lumber. Thus, Commission jurisdiction arising from logging operations consistently has been based upon substantial evidence of continuous and extensive use of the river for log-floating purposes. See also, New York Power & Light Corp., 8 FPC 231 (1949); Dairyland Power Cooperative,

8 FPC 1276 (1949). As stated by the court in U.S. v. Rio Grande Dam Irrigation Co., 174 U.S. 690, 698 (1898):

> ". . . The mere fact that logs, poles, and rafts were floated down a stream occasionally and in times of high water does not make it a navigable river. . . ."

We turn next to the only other evidence that supports a finding of navigability -- the testimony of the Muckleshoot witnesses about childhood remembrances. The evidence here of the size and use of the White River by those witnesses, however, is less than convincing. Witness Williams, for example, testified that "the river was big before they changed it," (Tr. 262) but as a matter of fact, this is not an eye-witness account since he was not born until after the project was completed. Witness Starr, in discussing the White River before it was diverted, testified that: "My dad hauled people across . . . these WPA people, white people. That was after Hoover lost his term as President and Roosevelt was President." (Tr. 254). Starr's testimony on its face appears inconsistent since the project was completed and the river diverted 22 years before Hoover left the Presidency. Witness Lozier testified that he fished on the White River. "The river was big then. It used to have lots of water. Now you can walk across." (Tr. 267). Again, this witness must be referring to another portion of the White River, as diversion by the project predates Lozier's birth. While there is a desire to accord the greatest weight to this testimony, it still weighs in light.

Nor is the case for a finding of navigability bolstered by any documented evidence of substantial traffic along the White River between Buckley and Dieringer. In fact, such evidence is non-existent within the four corners of this record. The best gloss that can be placed on witness Lane's testimony is that there is a strong possibility of the past existence of a traditional village upstream of the current project. She hypothesized the use of canoes along the White River as the primary means of travel to the probable village which generally were built along streams. Lane's own exhibit (Exh. M/L303), however, indicates that if this village did in fact exist, it was a considerable distance from the White River on a small creek which could not possibly support canoe traffic. Furthermore, maps kept by the White River Historical Society establish the existence of a road running through the location of the purported village, thereby negating much of the need for water as a transportation means. Neither the Commission nor the courts have found navigability on such weak, inconclusive, and sketchy evidence. The Supreme Court discussed evidence of

navigability similar to that offered in the instant case in The Montello, 87 U.S. 430 (1847), wherein the court stated (p. 442):

> . . . It is not, however, as Chief Justice Shaw said, /Rowe v. Granite Bridge Co., 21 Pick. 344/, 'every small creek in which a fishing skiff or gunning canoe can be made to float at high water which is deemed navigable, but, in order to give it the character of a navigable stream, it must be generally and commonly useful to some purpose of trade or agriculture.'

In Leovy v. United States, 177 U.S. 621, 632 (1900), the Court more narrowly defined the term "Navigable Waters of the United States" when it stated that such ". . . has reference to commerce of a substantial and permanent character to be conducted thereon." The waterway in question must be susceptible for use as a channel of useful commerce and not merely capable of exceptional transportation during periods of high water. See Brewer Oil Co. v. United States, 260 U.S. 77 (1922) and cases cited therein.

In light of the Court decisions, both State and Federal, the Commission decisions, and the record presented in this proceeding it is concluded that jurisdiction over the White River Project No. 2494 should not, and can not, be found on the grounds of the navigability of the White River in the area affected by the development.

B. Effect on the Muckleshoot Reservation

Section 4(e) of the Act grants the Commission the authority to license power projects located upon any part of a reservation (16 U.S.C. 797(e)). The Act defines "reservation" so as to encompass ". . . tribal lands embraced within Indian reservations, . . .". (16 U.S.C. 796 (2)). Relying on these provisions, the Muckleshoots' advance the proposition that jurisdiction over the project attaches by virtue that the development is located on their reservation. Alternatively the Muckleshoots, and here they are joined by the Department of the Interior, argue that even if the project is not physically located on reservation lands, jurisdiction still arises because of the effect of the project upon the Muckleshoots.

1. Location on Reservation Land

The Muckleshoot Indian Reservation, as defined and described by the aforementioned Indian Reorganization Act of 1935, lies within the area between Puget's diversion dam at Buckley and the Dieringer tailrace. While none of the physical

structures of the project is located within the confines of the reservation, it is argued that up to two-thirds of the White River's natural flow through the tribal lands during periods of the year has been diverted by the project. 1/ The Muckleshoots argue that the right to use certain waters may be a coextensive property right of a reservation. Winters v. United States, 207 U.S. 564 (1908); United States v. Powers, 305 U.S. 527 (1939); Arizona v. California, 373 U.S. 546 (1963). In support of this argument, the Muckleshoot witnesses discussed the use of the river for fishing purposes. All had recollections as previously discussed, of fishing for food and for trade in the waters of the White River. The Tribe contends, therefore, that where a river plays such an integral role in the existence of the riparian people, the river becomes a part of the reservation.

Secondly, the Muckleshoots contend that Section 3(2) of the Act (16 USC § 796(2)) defines "reservation" so as to include the bed of the White River and the water and fishing rights reserved by the Tribe. The Tribe asserts that the water and fishing rights and the White River bed constitute "tribal lands embraced within Indian reservations," or "interests in lands owned by the United States" in trust for the Muckleshoots. Citing, Choctaw Nation v. State of Oklahoma, 397 U.S. 620 (1970). Since the river bed is part of the reservation, the Muckleshoots aver that so is the water, citing United States v. Pollmann, 364 F. Supp. 995 (1973). The Muckleshoots' position, in final analysis, is that the effect of the project upon the Tribe is so great as to make the project jurisdictional even if the project is not physically on the reservation. See, e.g., Pacific Gas and Electric, 2 FPC 516 (1941). As mentioned, the Muckleshoots assert that the reduction of river flow through the reservation has been disasterous to their fishing.

1/ Low water at times other than glacial run off, in fact, may be a result of climatological changes over the past 60 years having nothing to do with any man-made or induced phenomena, but no party developed this possibility on the record.

The Department of the Interior presented James L. Heckman, a fishery biologist,who testified as to the effect of Project 2494 on fishing in the area of the Muckleshoot Reservation. Heckman testified, based upon his knowledge of the background of the White River fishery, that the affected area, ". . . has in the past supported substantial runs of spring and fall chinook, coho and chum salmon as well as steelhead trout." When questioned regarding the present White River condition he stated:

> Anadromous fish production in the White River between the Buckley and Dieringer diversion is low and has been for many years. While there are many complex and interacting factors which contribute to this low production, the primary cause for the low fish production of the White River is a lack of adequate stream flow for a significant portion of the year below Puget Sound Power and Light Company's diversion dam. This low flow adversely affects both upstream and downstream fish migrations and substantially reduces the spawning and rearing potential of the river.
>
> . . . In my estimation the critical problem confronting the anadromous fish is the White River Project No. 2494. (Tr. 100-101)

Interior therefore concludes that the loss to the Tribe of the beneficial use of the White River constitutes the destruction of one of the reservation's natural resources within the meaning of Sections 4(e) and 3(2) of the Federal Power Act (16 U.S.C. § 797(e)); (16 U.S.C. § 796(2)).

Puget draws no such conclusion and argues that the pertinent language from the 1920 Act gives the Commission licensing jurisdiction only if the project is located upon public lands or reservations. There is no mention of the word "affecting" within the relevant portions of the statute. Additionally, Puget argues, an investigation of the legislative history of both the 1920 Act and the 1935 amendments indicates that Congress intended any use of the term "affect" to mean "upon".

Puget also avers that the Commission has never required that a project be licensed where the development's effect on public lands or reservations was other than being located upon such property. It cites Re The Pigeon River Lumber Co., 12 P.U.R. (NS) 452 (FPC 1935) as directly in point. The Commission was there concerned with a number of proposed dam sites, some located on and some off the Grand Portage Indian Reservation.

Puget asserts that the Commission conclusion in Pigeon that the two dam sites off the reservation property did not affect government property, "clearly posits that a project must be constructed inside or upon government lands or reservations to affect them." (Puget Initial Brief p. 20).

2. Findings

We deal first with the Muckleshoots' argument that the water has been reserved for the Muckleshoots exclusive use. In Winter, supra, settlers in Montana had diverted a river's flow away from a reservation, thereby denying the Indians the ability to use the water. The court first found that the land within the reservation was arid and without irrigation and was practically valueless. It concluded that without the water the land was uninhabitable; and therefore, the treaty, despite no specific language reserving the water, must have intended that the tribe have a reserved right to use the river. The court was faced with a similar issue in both Powers, supra, and Arizona v. California, supra. In Powers, the court determined that the treaty which initially established the reservation had contemplated the Indians' utilization of the land for agricultural purposes. Since water is necessary for cultivation, the court concluded the treaty operated by implication to reserve the waters within the reservation for the benefit of the tribe. The 1963 decision in Arizona v. California, determined that water had been ceded by the government to the affected tribes at the time of the original treaty. The court again concluded that without the use of the water for irrigation purposes life on the reservation could not be sustained. The Indians' rights to the water again were upheld.

Clearly, these cases have a thread of commonality. The water right sought to be protected involved irrigation of tribal lands and absence of the water would render the land uninhabitable. This is not the case at bar. There is no evidence to indicate that the absence of the river renders the reservation lands "valueless" (Winters, supra, at 576) or " . . . that water from the river would be essential to the life of the Indian people and to the animals they hunted and the crops they raised." Arizona, supra, at 599.

Also, since the language of treaties between Indian tribes and the United States government are often styled in ambiguously broad terms, courts have found it necessary to interpret the inferences embodied within those agreements. The Muckleshoots analogize their situation with that of the Choctaw and Cherokee in Choctaw Nation v. Oklahoma, 397 U.S. 620 (1976). There, the court interpreted the treaty agreements of Dancing Rabbit Creek, Sept. 7, 1830. 7 Stat. 333-334; and New Echota, Dec. 29, 1835, 7 Stat. 478, as giving the tribes ownership of certain portions

of the bed of the Arkansas River. In making such a decision the court examined the language of the agreements and the contemporaneous facts surrounding their development. It is at this point of the examination that Choctaw becomes readily distinguishable from the instant case. The language of the Choctaw treaties provides for the land reserved for Indian use to be given to the tribe in "fee simple" and never be ". . . embraced in any Territory or State." Dancing Rabbit Creek, (p. 625). Such language of sovereignty was authorized in order that the affected tribes be made to understand the permanence of this reservation. Both the Choctaw and the Cherokee were scarred from governmentally-ordered "resettlement" to escape the onslaught of white migration and violation of prior treaties. It is clear that Congress intended to in some way ameliorate the tragedy that had befallen these people in "The Trail of Tears". See the concurring opinion of Justice Douglas, 397 U.S. at 636.

The Muckleshoots offer no evidence of Congressional intent to deed the White River, either its bed or its water, to the Tribe. The treaty of Point Elliot ultimately affirmed by executive order of President Grant, established the Muckleshoot Reservation, " . . . for the exclusive use of the Indians in that locality,". There is no mention of land being conveyed in fee, of the Indians' power to govern the land, or any pledge that said land should be exempt from territory or state control. In order that an inference may be drawn regarding the intent of Congress that an Indian tribe have title to a river bed, the intention must be clear and is not lightly to be inferred. United States v. Holt Bank, 270 U.S. 49, 55 (1926). If there, in fact, were an intent on the part of Congress to cede the river bed and water of the White River to the Muckleshoot Tribe, such has not been presented by the record of this proceeding.

As stated earlier, the Commission's licensing jurisdiction may not go beyond the Federal Water Power Act of 1920, (16 USC 791-823). Section 4(d) of the 1920 Act limited the Commission's licensing jurisdiction to projects located ". . . upon public lands or reservations."

The case offered as precedent for finding that the project need only affect public land is In the Matter of Pacific Gas and Electric, 2 FPC 516 (1941). The project under consideration there was a post-1935 development which was an "integral part of a comprehensive development of the water resources of the region." (at 529). As such, the fact that the element of the total project under consideration was not on public land was immaterial to the scope of the entire construction. The rest of the operation was on public land, and this segment of the

whole, therefore, fell within the ambit of Federal licensing authority. Such is not the case here. To require licensing of a project located totally on non-public land because it may have some effect on public land is beyond the scope of the 1920 Act. See Pigeon River Lumber, supra.

C. Use of Surplus Water From a Government Dam

Licensing jurisdiction may be predicated on Section 4(e) of the Act which grants the Commission jurisdiction if a project utilizes "the surplus water or water power from any Government dam," (16 U.S.C. § 817). As stated, supra, the Mud Mountain Dam is a flood control project located upstream from Puget's Buckley Diversion Dam. The dam regulates the flow of water down the White River and thereby controls flooding in the lower Puyallup Valley. When the river is in a non-flood condition the Corps of Engineers regulates that flow at the request of interested parties, including Puget. When storage water is released at rates different than run-of-river flow, Project 2494 is provided with either an increase or decrease in water for power production.

1. Evidence

The Muckleshoots argue that flow manipulations of water coming from Mud Mountain inure to the benefit of Puget. When more water flows, more power can be produced. When less water flows, Puget can maintain and repair its flash boards. The Muckleshoots contend that Mud Mountain's accommodation of Puget's needs for greater or diminished flow makes the project jurisdictional under the surplus flow clause of the Act.

The Commission, the Muckleshoots advance, settled the issue regarding surplus water use in The California Oregon Power Company, 13 FPC 1 (1954), wherein it stated (p. 41):

> . . . Where there is available stored water . . . above that needed for irrigation and which would otherwise flow unused down the main channel of the stream, that water is surplus water, and if used for power development, would require a license from this Commission. . . .

Fisheries offered witness Lloyd Phinny who testified of numerous occasions in which the flow from the Mud Mountain Dam had been regulated for Puget's benefit (Tr. 93-94). Additionally, Fisheries looks to the Mud Mountain Reservoir Regulation Manual which contains provisions allegedly designed to coordinate Mud Mountain operations with those of Puget. The Department believes such actions are not in keeping with

those of a single-purpose flood-control project. Such conjunctive operations between Project 2494 and a government dam, it argues, gives the Commission licensing jurisdiction.

Puget offered the testimony of Norman MacDonald of the Corps of Engineers. MacDonald, who directs operations at Mud Mountain testified that the Corps had no contracts or agreements to coordinate operations with any group or entity downstream of the Mud Mountain Dam (Tr. 63). He admitted that the Mud Mountain project coordinates with downstream water users, including Puget, whenever possible. However, a study conducted in the late 1950's to determine whether Mud Mountain could be operated to provide power for the White River resulted in a conclusion of total infeasibility. MacDonald asserts the dam is a single-purpose flood-control project and any benefits which accrue to Puget are incidental.

2. Findings

The Mud Mountain Project is operated by the Corps of Engineers as a flood-control project to protect the lower Puyallup Valley. Mud Mountain was not constructed in cooperation with Project 2494, but was built 37 years later. Benefits which fall to Puget as a result of Mud Mountain's regulation of water flow do, in fact, improve the effectiveness of Project 2494. Such improvements do not inure to the benefit of Puget at any burden or cost to Mud Mountain and are totally incidental and unpredictable. There is no contract, as in California Oregon Power, supra, or corresponding agreement between the two entities. The use of surplus water from the Mud Mountain Dam by Puget does not give the Commission licensing jurisdiction over Project 2494.

VI

CONCLUSION

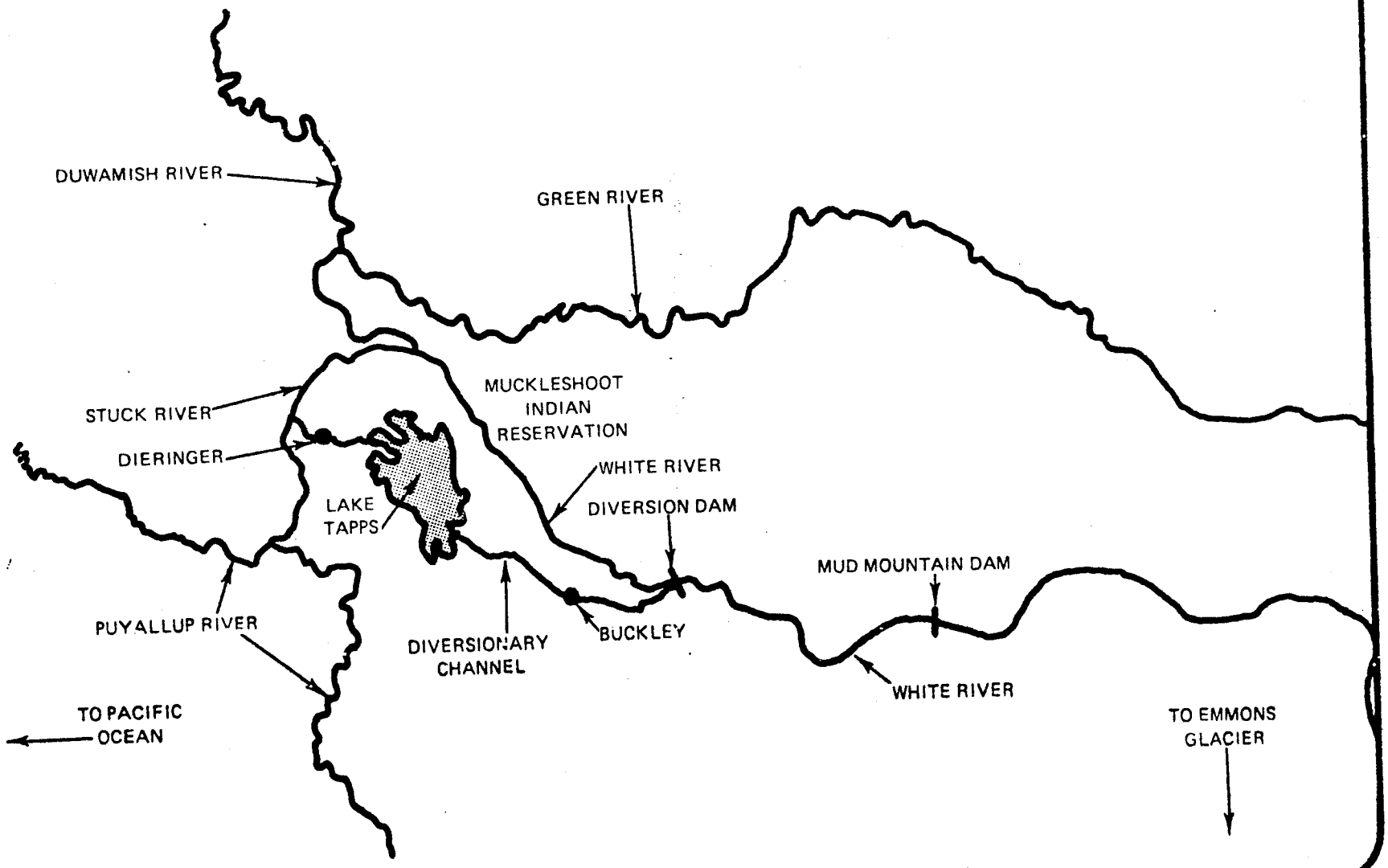
The affected reach of the White River does not constitute a navigable river as defined by Section 3(8) of the Federal Power Act (16 U.S.C. § 796(8)). The effect of this pre-1935 Project 2494 upon the reservation does not confer licensing jurisdiction upon the Commission. Additionally, Puget's use of surplus water from the governmentally operated Mud Mountain Dam does not advance Commission jurisdiction based upon Section 4(e) of the Act. Project 2494 therefore is not subject to the jurisdiction of the Federal Power Commission under Section 4(e) of the Federal Power Act (16 U.S.C. § 797(e)).

For all of the reasons stated above, the application is denied for want of jurisdiction.

Nahum Litt

Nahum Litt
Presiding Administrative Law Judge

APPENDIX A - PROJECT 2494



ERRATA SHEET
August 30, 1976

Main Report

Page 10, Line 9, Paragraph 3 - Change (See Photo Appendix A) to (See Photo Appendix).

Page 29, Line 3, under Landsburg Dam - Change Gaging Station No. from 12.0090.00 to 12.1190.00.

Page 32, Line 2, under Lower and Upper Baker Dams - Change station No. 12.1935.00 to 12.1936.00.

Page 36a - Change Gage No. 12.1935.00 under Lower Baker Dam to 12.1936.00.

Page 37 - Change Gage No. 12.1935.00 under Upper Baker Dam to 12.1936.00.

Appendix

Page 6, left hand margin - "travel time 6-8 hours" should be read "travel time 4-8 hours."

Page 7, left hand margin - "travel time 6-8 hours" should read "travel time 4-8 hours."

Page 9, Paragraph 1, Line 6 - ". . . flow at Sumner was about 400 cfs," should be changed to "flow at Sumner was about 300 cfs.

Page 9, Paragraph 2, Lines 5 and 6 - ". . . 10 and 25% of August 17, 1972, flow (case 3) i.e., 30 to 100 cfs instead of 400 cfs." Should be changed to ". . . 10 and 30% of August 17, 1972, flow (case 3) i.e., 30 to 100 cfs instead of 300 cfs."

Page 11, left hand margin - "travel time 6-8 hours" should read "travel time 4-8 hours."

Page 12, left hand margin - "travel time 6-8 hours" should read "travel time 4-8 hours."