12-5-83

R. Ballard P-314

M. Fliegel P-314

R. Gonzales P-314

SPIRIT LAKE — TAC # 49636
TROJAN

Attached is summary of COE's action to solve the Spirit Lake problem. Ray says he'll be getting full report soon.

C Trammell
12-5-83
X 73789

A-135

Telcon 11/30/83: TEB to L. Maguire, Chief EMS
COE Portland District

COE has issued "Comprehensive Plan"
re: Spirit Lk. long term solution
(TEB will obtain copy 11/30)

Public hearings on the plan 12/5-12/8
@ 7:30 PM as follows:

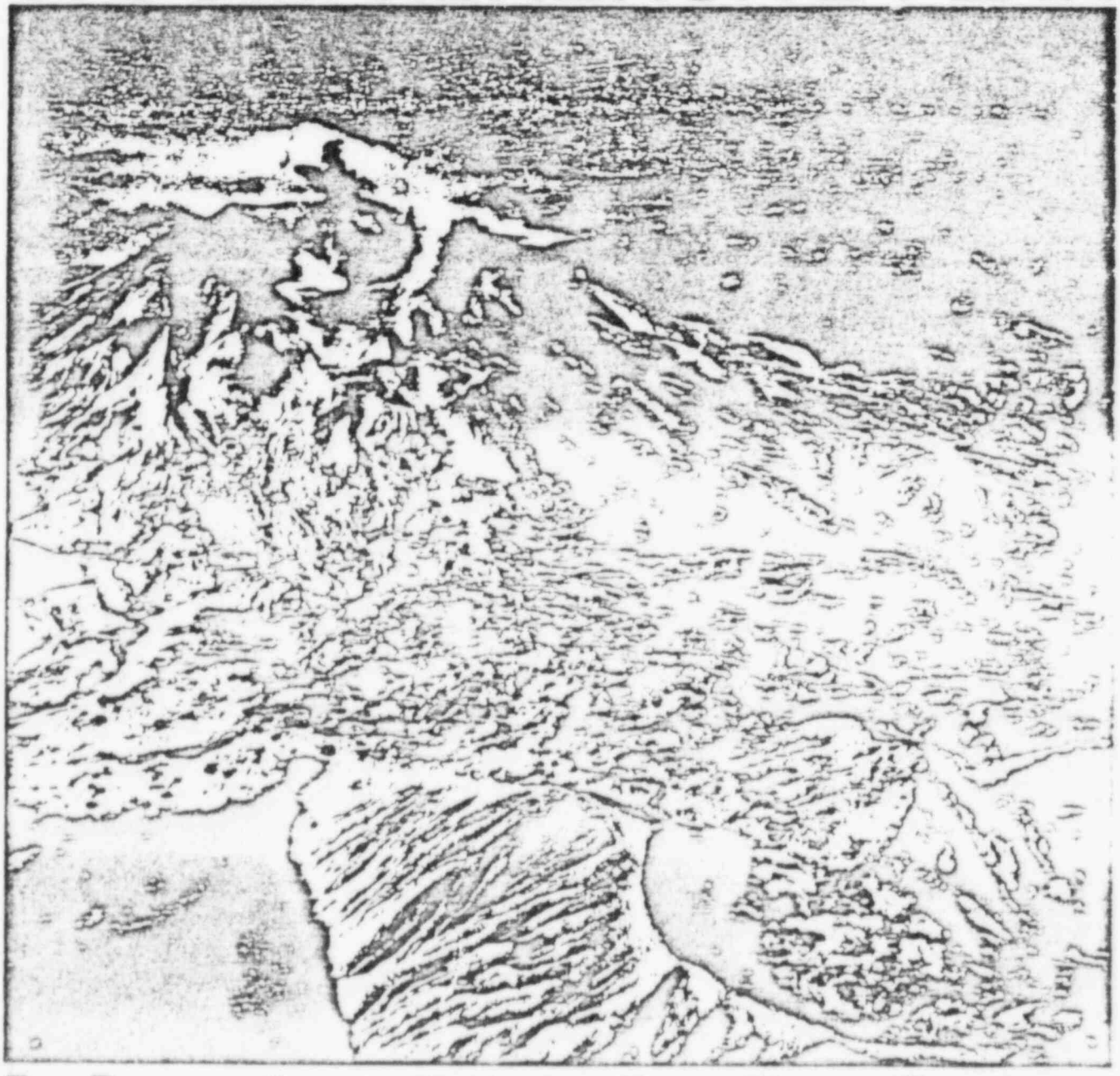
- 12/5 Tourte - Tourte High School Gym
- 12/6 Castle Rock - Jr. High School, 1107 Front
- 12/7 Longview/Kelso - Kelso H.S., 1909 Allen St.
- 12/8 Woodland - Woodland H.S., 757 Park St.

All sessions are the same;
- C.O.E presentation of plan
- Oral & written testimony
- question/answer period
- sessions can be recorded
- Formal hearing record will be obtained & will be appended to the plan

Plan recommends (Glorville, sp?) 7'ϕ culvert ~ same alignment thru dikes plug as pumping system culvert but deeper, inlet works, etc. to touch Spirit Lk ~20' (COE Portland District prefers hard rock found to NE & touch Lk. else)

Department of The Army

A COMPREHENSIVE PLAN



For Responding to the Long-Term Threat Created by the Eruption of Mount St. Helens, Washington

Part I

Recommendations of The Department of The Army

DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20310

November 3, 1983

MEMORANDUM THRU ~~THE SECRETARY OF THE ARMY~~ John 3 Nov '83

THE SECRETARY OF DEFENSE 7 NOV 1983

FOR THE PRESIDENT

SUBJECT: Mount St. Helens - Solutions to Long-Term Problems

Pursuant to the request contained in your May 18, 1982, memorandum, this report presents a comprehensive plan for responding to the long-term threat created by the 1980 eruption of Mount St. Helens. This report consists of two parts: (1) This memorandum, which discusses the alternatives and indicates a course for implementation, and (2) a Corps of Engineers analysis of alternatives.

The problems presented as the result of the 1980 eruption of Mount St. Helens are unlike any others experienced in the United States. In the three and one-half years since the eruption, the Federal Government has expended in excess of one-third of a billion dollars in order to minimize damage and property losses in those areas adversely affected by extraordinary conditions created as a result of the eruption. We believe the time has arrived to program long-term strategies to minimize the continued threats to people and property presented by the conditions created by the eruption. It must be recognized that it is impossible to predict accurately what natural phenomena may still occur at Mount St. Helens. Nonetheless, every reasonable effort has to be made to provide protection against such unknowns. Further, the amount of sediment movement and the timing of that movement are critical in evaluating long-term solutions. Our state of knowledge does not permit exact determinations concerning these items, and it is therefore important that a range of assumptions be evaluated. Continued close cooperation among Federal, State and local agencies as well as continued close professional monitoring of the erosion process will be necessary so that adjustments can be made to any solutions which will be programmed.

The long-range problems resulting from the Mount St. Helens eruption may be separated into two general categories: First, those associated with a debris dam blocking the outlet for Spirit Lake in the upper reaches of the Toutle River. If the debris dam were to give way, a disastrous flood could result in the areas below. The United States Geological Survey has estimated, under a worst case scenario, that failure of the debris dam could cause as much as $2.5 billion in loss of property in the areas below, to say nothing of the potential loss of life.

The second long-range problem is concerned with the very large amount of sediment deposited in the Toutle River watershed. This sediment has not stabilized and continues to be transported downstream creating flood threats along the lower reaches of the Toutle and Cowlitz Rivers. Continuing deposition of a portion of this sediment in the Columbia River also adds to the cost of the maintenance of the necessary navigation channels of the Columbia River.

Spirit Lake Alternatives

Since the declaration of an emergency by the President last year, temporary pumps and pipelines have been installed and operated at Spirit Lake in order to keep the lake level from rising and thereby posing an overtopping threat. A permanent solution to this threat should have top priority -- not only to reduce the hazard of overtopping but to eliminate the costly temporary pumping operation currently in place. The Army Engineers examined six alternatives to permanently stabilize the lake level and to minimize future threats of dam overtopping and failure. Two alternatives envisioned retaining the Spirit Lake waters within the Toutle River watershed by means of a pipeline or surface channel through the debris dam to a safe distance downstream. Three alternatives envisioned the construction of a tunnel from Spirit Lake into an adjacent watershed or into the North Toutle drainage some distance below the debris dam. A sixth alternative envisioned a permanent pumping facility.

Under any of the alternatives, the level of the lake to be maintained is a critical determination. The Army Engineers believe an appropriate level is elevation 3,440 feet or approximately 20 feet below the level currently being maintained. Based upon the data available it appears that this is a safe level. However, development of additional information as a result of the public hearing process and interagency review, which will follow in the near future, could lead to a different determination.

Diversion of Spirit Lake water out of the Toutle River watershed should be avoided unless there are compelling reasons for it. Reasons for avoiding such diversions include (1) the required construction time, (2) resultant diminution of low flows within the Toutle River stream system, (3) unknown effect on the fisheries within the Toutle and adjacent watersheds, (4) impact on downstream environmental conditions and water rights within the Toutle and Cowlitz watersheds, and (5) uncertainty of tunnel construction through areas for which there is not detailed geological information.

It is believed a safe diversion structure through the debris embankment can be constructed. While some concern has been expressed regarding safety of the conveyance alternatives through the debris embankment in the event of potential future eruptions of Mount St. Helens or other unforeseen events, we believe that emergencies can be accommodated if the need arises. A good example is placement of the present temporary pumping installation into operation in less than 60 days during the late fall of 1982.

In summary, with respect to a long-term solution to the Spirit Lake problem, the Corps of Engineers should proceed with public hearings, interagency reviews, and the further planning necessary to implement one of the alternatives as expeditiously as possible. Preference should be given to the underground conduit through the debris embankment. Although the construction cost of the conduit is greater than that of

another alternative, it can be constructed in one season and eliminate the need to continue the interim pumping arrangement as soon as possible. Like an open channel through the debris embankment, it would approximate natural conditions, but it would have less of a visual impact on the National Volcanic Monument.

Sediment Control Alternatives

The long-term solution to the control of sediment deposition along the Toutle and Cowlitz Rivers is a most difficult one. Compounding the difficulties is the uncertainty concerning the amount of sediment which must be provided for and the timing of any movement that will occur. The Corps has made its best estimate of both the amount and timing of this sediment movement. However, notwithstanding these estimates, any programmed solution should provide flexibility to adjust to actual conditions. The greatest uncertainty influencing the movement of sediment in the short run is the intensity of future precipitation and the characteristics of resultant runoff. Over time, stabilization will occur as a result of the cumulative effects of many natural processes.

Excessive precipitation with attendant flood runoff before stabilization takes place causes movement of large amounts of material which must be controlled in order to avoid downstream flooding and navigational hazards. Temporary solutions involving the dredging of reaches of the Toutle and Cowlitz Rivers, and the construction of levees and small retention basins have prevented flooding and interference with navigation during the last three years. These temporary solutions, while providing protection on an interim basis, are expensive to maintain and do not provide the long-term security necessary to the 50,000 to 60,000 residents of the Longview, Kelso and adjacent areas.

The Army Engineers have evaluated five alternatives for sediment control. The two alternatives which appear most feasible involve construction of

either one large sediment retention structure at the Green Valley site on the Toutle River or the construction of three or more smaller structures at sites at and below the Green Valley site.

The Corps' preliminary estimates show the single large retention structure to be of a lesser total cost under a range of erosion assumptions. However, it does not necessarily follow that a single large structure would turn out to be the least costly in the long run or provide the desired flexibility. More flexibility would be obtained by the construction of several smaller retention dams which would be constructed as the need arises. In addition, construction of a retention structure downstream from the Green Valley site would have the added advantage of intercepting those sediments which have been deposited to date below that site.

With respect to a comparison between the single large retention structure and the multiple retention structures, the multiple structures ultimately may be preferable for several reasons. First, if the amount of material to be controlled is overestimated for the single retention structure, the result would be an overdesigned foundation structure with its attendant higher costs compared to that of a smaller structure which would be the first element of a multiple structure plan. Also, if the movement of the sediment is spread out over a longer period of time, the present value of funds required for a series of smaller structures would be considerably less than projected by the Corps. This is an important consideration given today's high real interest rates.

In addition, estimates of the available capacity at LT-3 have varied widely from 64 million cubic yards to 150 million cubic yards during the course of the Corps' study. The available storage at LT-3 has a direct bearing on which alternative might be the most desirable and the Corps should give this matter additional careful review and study. An enlarged LT-3 storage site might also lend itself to staging. On the other hand, if actual deposition turns out to be in the one-billion-cubic-yard range and essentially at

rates projected by the Corps, it might be advantageous to construct a single retention structure at the Green Valley site.

Other factors involve fishery and safety concerns. Further consultation is needed with State and Federal fishery agencies in order to assess the fishery impact of the two alternatives. While the multiple retention structures might interfere with more miles of stream channel, it might be that the heights of the structures in the multiple structure plan could allow fish ladders or other bypass structures. With regard to safety provisions, the Corps could undoubtedly design and construct a safe structure under either alternative. However, people fear large dams because of the actual or perceived consequences of failure, and considerable opposition was expressed by local interests when a single large structure was proposed in December of 1982.

In summary, there are compelling reasons favoring construction of retention structures to contain the eroded material from the debris avalanche. Multiple structures have an inherent flexibility which is not afforded by a single structure. Follow-on studies should fully develop the multiple structure alternative along with the single retention structure approach.

Recommendations

The Corps will begin to hold hearings on this report within the next 45 days. The Department's recommendations presented below are based on the investigations to date. They will be presented to the public together with the analysis of alternatives. Further planning of solutions to both long-term problems will be based upon public input, the views from State, Federal and other public agencies and the Corps' further investigations and coordination necessary to comply with all applicable laws and Executive Branch procedures.

With regard to Spirit Lake, the Corps should proceed to construct a permanent outlet. In the absence of compelling reasons why some other alternative should be used, the Corps should complete the design for a buried conduit through the present debris embankment in order to insure the maintenance of Spirit Lake at a safe level. A permanent outlet can be constructed without further congressional authorization. Working with the Office of Management and Budget and the Congress, we believe the necessary funds can be made available.

With respect to the control of sediment, the Corps should complete the planning necessary to recommend congressional authorization and funding of a permanent solution. Planning and design should concentrate on the retention structure alternatives with the goal of early construction of a retention structure (staged or otherwise) at the lowest feasible site. Other stages or upstream structures should be planned for subsequent construction if and when needed. These feasibility plans will be reviewed at the Division and Office of the Chief of Engineers level, as well as the Board of Engineers for Rivers and Harbors, before being submitted to the Secretary of the Army for approval and transmittal to the Congress.

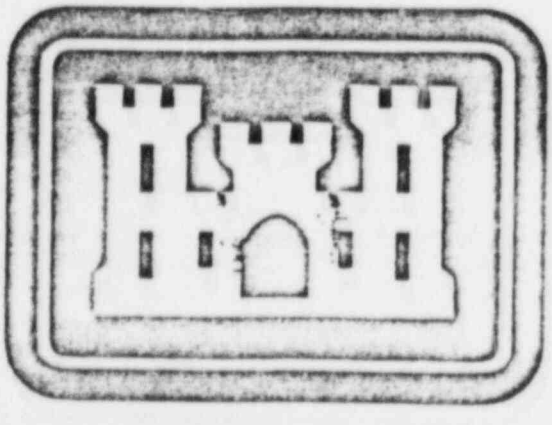
Pending the completion and implementation of structures to provide for long-term control of the level of Spirit Lake and movement of sediment downstream, the Corps, in full coordination with the Secretary's office, the Office of Management and Budget and local interests should provide such interim measures as are necessary to continue the protection afforded during the last three years.

William R. Gianelli

William R. Gianelli
Assistant Secretary of the Army
(Civil Works)

Part 2

Alternative Management Strategies



Department of The Army

Appendix

A COMPREHENSIVE PLAN

For Responding to the Long-Term Threat Created by the Eruption of Mount St. Helens, Washington

APPENDIX A
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