MOUNT ST. HELENS IMPACT

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

NINETY-SIXTH CONGRESS

SECOND SESSION

ON

STATUS OF VOLCANIC ACTIVITY ON MT. ST. HELENS AND THE EFFECTS OF THE ERUPTIONS

JUNE 13, 1980

Serial No. 96–108

Printed for the use of the
Committee on Commerce, Science, and Transportation

U.S. GOVERNMENT PRINTING OFFICE
66-914 O WASHINGTON : 1980

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MOUNT ST. HELENS IMPACT

FRIDAY, JUNE 13, 1980

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Portland, Oreg.

The committee met, pursuant to call, at 9 a.m., in the board room, Port of Portland Offices, Hon. Bob Packwood presiding.

OPENING STATEMENT BY SENATOR PACKWOOD

Senator PACKWOOD. Good morning.

Let me say before we start that this is obviously a propitious day to be holding these hearings, considering the activity of last night. Two or three people that were going to be here have not made it. I feel lucky to be here at all. I got in just before they closed the airport.

Let me ask, as you are talking today, that you think not just about the damage that has happened, even though this itself is hard to assess. We know how many people are dead and we have a rough idea of how many are presumed dead. We also have some idea about the silting in the rivers and the fisheries. But I think equally important is some discussion of what is going to happen in the future as best as you can predict or anticipate.

The people that settled this country and settled the Northwest were reasonably hardy and resilient people and their descendants have not lost any of their capacity to cope with problems. If this volcano is going to erupt for the next 5 years or the next 25 years, or if Mount Hood or Mount Baker are going to erupt, we will learn, if we have to, to live with that. If that means we are going to have perpetual dredges on the Columbia River so that we can have shipping going in and out, we will live with that too. And if we have to find a way to protect the Bull Run watershed, we will do that. We are an innovative people, but we must know what to expect. We will learn to cope and surmount these problems if you can help us identify what they are going to be and what needs to be done.

I appreciate your coming this morning. I think we are ready to start off with Governor Atiyeh.

Vic.

STATEMENT OF HON. VICTOR ATIYEH, GOVERNOR OF OREGON

Governor ATIYEH. Senator Packwood, I welcome the opportunity to at least give you my view of the ongoing role of the event at Mount St. Helens. I appreciate your presence here representing the Senate Committee on Commerce, Science, and Transportation.

I have drafted a statement, which you have. I will only touch on it briefly. I will try maybe to give you my view as to the future.

I did declare an emergency on June 7 of this year, an executive order, affecting Clatsop, Columbia, Washington, Multnomah, and Clackamas Counties. I did that in regard to the potential for the future to have at least those areas of our State in a position to receive help in the event requests are made for low-cost loans.

I am especially appreciative, and I do want to pass quickly over the great efforts, exceptional efforts and teamwork of the Corps of Engineers, the U.S. Coast Guard, the affected ports, the river and bar pilots, labor organizations, and other public and private entities. I want to make special mention of one of those ports that we hear so little of and that is the Port of Astoria, which has responded. I think, well and tried to at least assist in this time when there needed to be assistance in offloading. They were really ready and tried to do a good job.

Dredging is continuing and I think it is important.

Let me now disgress briefly from the material which you have in front of you. You know about the dredging required and the amount of soil. We even will need to be talking about where to put it. That is something that will be developed. Let me talk about some of the long-range ones.

One of the things that I think is important to mention at this point, Senator, are some of the things that are damaging economically to this area, not the least of which is the recent announcement by National Semiconductor, that they were not going to build in Vancouver because of Mount St. Helens. You say, well, that's Washington. Well it really isn't Washington. What we have is a statement by a company that says they can't build a plant because of Mount St. Helens. That ripple effect is going to be terrible for us. We recognize already some concern. Honestly, it is unnecessary concern on the part of many people. I want to challenge National Semiconductor in their statement, then, that their employees fear the volcano. I only want to mention that down in the area of Santa Clara is the San Andreas Fault. I would think someone might be concerned about that. In every area of our Nation there are other tremendous things, tornadoes, hurricanes, blizzards. Yet people do survive and they live. I am sure the intent of their statement was meant well, but I am not sure they realize how terribly damaging it was.

What we need, really, is the support of you and others to indicate that the State of Oregon and the State of Washington are going to be conducting their business and will continue to do so and will be able to handle it and handle it well.

I want to mention other things that will occur. Let me just tell you what happened last evening in terms of State government. The same thing is going to be repeated in terms of city and county governments. Last evening I did get a phone call. We did open up our emergency office. We had personnel there until around 3:30 this morning. At the same time, my executive assistant went to the Kelly Butte in the city of Portland. Our State police were there; the highway division, the National Guard, they were there and ready to respond. The National Guard was ready in the event we needed to sweep and dump and they had the equipment necessary. The highway division would be of some

assistance. The State police were obviously not required, but yet they were very good in terms of settling rumors. In the event something more serious occurs they would need to be ready.

That, Senator, is going to be repeated. Although the State of Oregon might be able to manage this quite well, it could quickly drain city and county governments because you know and I know that budgets are tighter. This is an extra thing in which government is going to respond and they do it, I might say, exceedingly well. Yet that will be a long-term added cost that it is necessary, I think, for the Federal Government to recognize.

I am not necessarily asking the Federal Government for assistance for the State government, although that may eventually occur. Certainly we need to recognize that is something that is going to be required for the city and county governments.

I won't speak to the sewer systems. You already know about the damage to them in Spokane and Yakima, the tremendous costs. That could also occur in the State of Oregon. There is the matter of motor vehicles and on and on you will hear more of it. I agree that we will adapt. I agree that we will continue to live with the mountain, but I think that humans are a very adaptable species of animal, yet it is an added expense and added chore that we are going to have to face.

You mentioned the fish. We don't know what the effect is going to be. We guess that the fish coming up are mature and they can survive the mud through the Columbia River and through that system. Our concern is about the small fish going down and whether or not they can survive that.

In that light, I do want to commend you, although I have written a letter to you, for your efforts on behalf of S. 2163, the $30 million for salmon enhancement along the Columbia River and $5 million for fishery development in Oregon. It was important and it is even more important now. I do hope that assistance will come to fruition in that respect. Although we both were thinking of enhancement, that becomes even more critical. I commend you on your foresight.

I know there are others to speak to you on this, but I would like to have my statement entered in addition to what you asked us to do in trying to perceive the future.

With that, I will quit because you have a lot of others that wish to talk.

I believe that we are going to face this for quite a period of time. I don't think we are going to have the trauma of the big explosion we did have, which was very devastating, but we are going to have to live with it. We will do it and we will do it the best way we know how.

Senator PACKWOOD. Governor, thank you.

All of the statements will be put into the record.

I might say that your attitude is very helpful because the last thing I want to see is a quick solution that we will have to fix again in a few years. The Federal Government is going to respond to this emergency and if that means extra money is needed by the Corps beyond their normal contingency, it will be there. I don't want us to spend $200, $300, $400, $500 million for what appears to be a solution but is not because we didn't know the problems we were facing in the first place. That is why I am hoping the witnesses today can be of some help to this committee.

This Commerce Committee has jurisdiction over all the maritime activities that go on and over all the fishing, so we have a fair portion of the jurisdiction that relates to the problems that appear to have been caused so far.

Governor ATIYEH. Senator, some of the things we have to guess at. I don't know what is going to follow. Certainly we are going to give you any information as it is refined and matured. I know of no written history of what you do in the event of a volcano. So we are all feeling our way into this. I would agree with you, I am not interested in a quick-buck short-fix deal because that is not going to occur. I am not sure anyone can tell us how long the mountain is going to do what it is doing, but it is doing it in terms of the ash. You can see it right now on the streets outside. I might add that I couldn't observe any until I really got into Portland. There wasn't too much to the south. That is why I hope everyone gives you as complete information as possible. Let me assure you that as Governor and as we get refined information, I mean, knowledge as to what it does to machinery, which, I think, is going to be very important, what it does to sewer systems, what it does to drinking water and to what degree and how much ash you get before it reaches the critical point, you will get all of that from us and we will continue to do that. We will be glad to give you that kind of information.

Senator PACKWOOD. Governor, thank you very much.

[The statement follows:]

STATEMENT OF HON. VICTOR ATIYEH, GOVERNOR OF OREGON

My name is Victor Atiyeh, Governor of Oregon.

Senator Packwood, although you need no welcome in this, your home state, I nevertheless would like to welcome you in your role as chairman of this hearing for the Senate Committee on Commerce, Science and Transportation.

On May 18, Mount St. Helens erupted with great violence, although the citizens of Oregon avoided the catastrophic effects that the initial blast inflicted upon those in our sister state of Washington, Oregonians have been adversely effected by the debris and silt carried by the Cowlitz River and deposited in the Columbia River.

Accordingly, on June 7, 1980, I issued an executive order declaring a state of emergency disaster to exist for the affected areas of Clatsop, Columbia, Washington, Multnomah, and Clackamas counties. The concerns that prompted this declaration are the same concerns that prompted me to personally appear before your committee this morning.

The Columbia River unifies this region, and the problems engendered by the volcanic eruption transcend state lines. When the navigational channels of the Columbia River were temporarily blocked, the constraints on the Port of Portland assumed national importance. Although the problem is not totally resolved, navigational concerns have been greatly alleviated by the exceptional efforts and teamwork of the Corps of Engineers, the United States Coast Guard, the affected ports, the river and bar pilots, labor organizations and other public and private entities. Special mention should also be made of Oregon's other deep water port—The Port of Astoria, which has admirably proved that it has the officers, employees and facilities to meet the needs of international trade.

However, much is yet to be done with respect to navigation in this river, and it is imperative that federal resources continue to be made available as necessary. Dredging is far from complete and must continue. However, the hopper dredges soon must return to coastal ports to resume bar dredging operations that have been held in abeyance during these channel reopening efforts in the Columbia.

We must openly challenge spurious statements, such as were made this week by National Semiconductor, that it cannot locate in Vancouver because employes

fear the volcano. Whether it be tornado, hurricane or blizzard—all yearly seasonal hazards—every area of this nation has its isolated natural events, disruptive for short periods, and both employers and employees know this. Perhaps this Santa Clara firm's employes prefer the San Andreas fault. However, I strongly doubt this rationale.

Further, it is equally imperative that the federal government uses its resources and efforts to inform the world that the Port of Portland can do the job for its national and international customers. The channel is open, the river and bar pilots are operating with their usual exceptional competence, and the world must be told that it is "business as usual" on the Columbia River.

Finally, with respect to the opening of the channel, federal financial, legal and intellectual resources must be used to address the many problems surrounding the location of the dredge spoils. I know that discussions are beginning, and that the building of an island does not initially appear feasible. Creation of new land by filling in at either or both shores of the river brings its own problem of ownership, use, and access to the river by present property owners, to name but a few problems. Indeed, I have been informed that debris would create a mound approximately 800 feet high and 9 miles long. Federal assistance is necessary to deal with a disposal problem of this magnitude.

In addition to the problems of commerce and navigation, Mount St. Helens has created a pollution problem of mounmental proportions. There may be long-term damages as far west as the Columbia River Estuary, where the settling of the sediment could well be destroying the plants and animals living and feeding on the bottom.

Further, although it is too early to tell what the effects would be on the salmon and steelhead runs (with the exception of the catastrophic losses on the Toutle/Cowlitz Systems), federal resources availalbe for fish production should not be reduced at this time by Congress.

Before concluding, I want to publicly commend you, Senator Packwood, for your efforts in behalf of Senate Bill 2163. The $30 million for salmon enhancement along the Columbia River and the $5 million for fishery development in Oregon are even more important now. If I can be of assistance to you in your efforts to secure passage of this bill, please let me know.

In these few minutes I have attempted only to highlight certain areas of concern. During the remainder of this hearing you will receive detailed information from a wide spectrum of interests. Much has been done and much remains to be done. I declared a state of emergency, and I appear here today, to insure that the federal government remains a partner in the fullest possible sense.

Senator PACKWOOD. We will next hear from Lloyd Anderson, executive director, Port of Portland.

Lloyd.

STATEMENT OF LLOYD ANDERSON, EXECUTIVE DIRECTOR, PORT OF PORTLAND

Mr. ANDERSON. Bob, sorry you couldn't take a trip to the mountain yesterday.

Senator PACKWOOD. So was I, although you did frighten some of my staff when after landing you couldn't take off again for 40 minutes.

Mr. ANDERSON. I can only say that from a call from my daughter in Seattle this morning and from other calls we have received in our office, that I would like to publicly report that the port is still open, the streets are not awash with ash, that the port is operating. Frankly, while they may be said with a little bit of humor, the fact is that the rumors all over the country get to be a little distorted. As a result, I would say one of the overriding issues we have is to get factual information out and get it out as rapidly as we can.

Senator PACKWOOD. You remember 30 years ago when we had the Vandport flood, and it was a bad flood. I can recall then that people all

over the country were writing and calling and thinking that the entire city of Portland was under water and the town had been wiped out. I sense the same thing with this volcano when I am in Washington. There the people are convinced that it is not only a great natural disaster, but that it has made the port inoperable and the cities immobile. That view has got to be disabused. I think the Governor is absolutely right. I think you and the Port of Astoria and the corps and everybody else that has been involved in keeping that channel open, or at least giving us alternative sites when it wasn't quite open, have done an incredible job in a short period of time with limited equipment. I congraulate you.

Mr. ANDERSON. I think there has been a fairly high level of apprehension about it, even last night. As I said, we have had reports of floods coming in and a variety of things. I think I would like to go back to square one and say we are open for business, the business is there, and I think the situation is radically improving and improving very quickly.

I would just like to kind of open my remarks, and they have all been given to you and I am not going to go into the details of them, but I just want to quickly touch on a couple or three points.

First, as far as the Feds are concerned, we have had only favorable response out of the people that have responsibility. The Coast Guard, the Corps of Engineers, all the other people. We talk about the bureaucracy moving slowly, it didn't move slowly in this situation, but very quickly. The corps, Adam Heineman, the other people in the corps have been very responsive, quick to make decisions and get moving, getting the dredges in over and above the ones that moved in quickly, the Federal and the port dredges, getting contracts worked out with people in the business, and getting things going. It has been a rewarding experience for us to see them move quickly. Admittedly, the bureaucracy moves slowly sometimes, but it didn't here, it moved very quickly.

We have customers all over the world. In communicating with them, and we do this on a daily basis, some 50 telex's going out every day, letting people know what the situation is in the channel, how things are opening up. We do that quickly to try and avoid rumors and get things moving. We have had a good response. The situation has been one where cargo has been diverted. We lost a fair amount of business during that time, but you can't easily move the amount of cargo moving in and out of this port without congestion elsewhere. So while that congestion has been unfortunate to the customers, it has been a blessing to us since the customers are interested in coming back and doing business with us again.

The Feds, as you are aware, have put a fair amount of investment into the channel, some $20 million to get it from 35 to 40 feet. That investment now, of course, is far more than that in an effort to get it back into condition again, but we would visualize, if you would look at the economy of this area and my written testimony will show this, it is well worth that kind of investment.

Our loss as far as the port is concerned in terms of business lost, between May 18 and July 1, is expected to be about $3.25 million, and

probably in the neighborhood of $5 million of actual lost revenue to us and there is no way we can see picking this back up.

Senator PACKWOOD. How much is your total annual revenue?

Mr. ANDERSON. In the neighborhood of $40 million. You are looking at a sizable share of money. It is one which basically means we have to reduce capital expenditures, make some effort to reduce operating costs to the extent we are able, but I am talking about a net operating loss when I gave you the number I just gave you. Not big by Federal standards, but for a small port it is quite a bit.

The grain business has been curtailed to some extent because you have grain ships sometimes needing to have the full 40-foot channel. We have had some reduction in grain movement. That, of course, is a situation that is improving rapidly as the channel depth gets bigger.

I want to go back to a point I made at the very beginning, that is the need to continually get information out that is more than rumors. Rumors have an extremely negative effect on our capability to do business. We need a continuous flow of factual information and that is all we are asking. We don't need wild speculation and everything is wonderful now, everything is back to normal, but the situation is improving and we expect to be able to get back into full business by a certain date, that kind of information which the Coast Guard and others are giving out is very useful. They can predict a little bit so our customers know when they can bring their ships in and that is quite useful.

I think your opening remark that there is no need to panic, no need to say we are closed up for business, that is a useful thing to deal with. We can deal with the problems and we have the capability and talent to do it here and this is extremely important to us. I think it allays a lot of fears. We have the talent and we have the capability and we can get the job done without having fear sweep through the whole community.

The press is more and more beginning to look at this and recognizing if the fear gets too widespread it can seriously hurt us. We can overcome that if we are confident that we have the capability of dealing with this material, dealing with the job that comes in front of us, and that is very important right now.

I think as far as Federal assistance is concerned that there is a variety of suggestions in the material that I have given you. I would emphasize that if there is a flexibility and willingness on the part of the Federal agencies and Federal aid becomes available we need to move as rapidly with that as we did in solving the immediate problems. That would be an enormous help to us. We need to avoid too much redtape that requires us to give the factual information necessary for aid to become available, but not overwhelm us with more paperwork. We haven't seen this in the activities of the Federal agencies so far and it has been a welcome relief.

Again, getting factual information out, getting it out quickly, getting the market information out to our customers, getting all the help that we can from you people, which I have outlined in my remarks, would be very useful.

The Mark Twain reports of the death of the Columbia River are greatly exaggerated. It is just not true. We are in business.

To speculate a little bit on the future, obviously the ash situation is the most likely one that can do us some harm in looking at our own internal operations. The city, the State and others all have a role to play. Our equipment sometimes can be curtailed. We had to stop the dredge for a while during the ash fallout. The stopping of the dredge, of course, impedes the ability of putting the channel back to normal.

Cargo moving in and out of the port could be hurt if you had large amounts of it. The technology and capability of dealing with that ash in a constructive way is something where we could look to the Feds for a little help there in helping us to find new ways to solve that problem.

At the airport, for example, we had the feeling sometimes that we were kind of swooping the dust from one side of the runway to the other. When the wind comes, it all comes back onto the runway. If there is a chemical solution or other things that can settle that out and do it quickly, that would be a useful thing for us to get hold of and be able to deal with. Similarly with equipment, the restoration costs can be expensive if this continues. As you indicated at the beginning, that prospect is there.

Again, I think the Federal agencies can probably, more than we are able to, look at the future and speculate what could happen, more than a small agency like ours can spend the resources to do that kind of research.

Those are my general comments. You do have my statement.

Senator PACKWOOD. Lloyd, the corps will testify later, but what is your current estimate as to when the channel will be back to a 40-foot depth and you can resume close to normal operations?

Mr. ANDERSON. We would expect by the end of August, to my understanding, that the 40-foot channel will be there. Perhaps earlier, Particularly if you are looking at the tides. Then, let's say, in midfall the channel will be back to its full 600-foot width. Frankly, everything has been moving more rapidly than the original estimates and we are very upbeat about how quickly we are going to be back in business.

The two kinds of shipping operations that we are hurting in right now are the container ships, this is the last port of call and those container ships load up and head to the Far East. They are not able to do that right now because they are not able to, the channel isn't available for that. We have been hurt in the container business. Another one is the grain ships. The more rapidly we are back in shape there, the more quickly we are back in business as usual.

Senator PACKWOOD. Thank you very much.

[The statement follows:]

STATEMENT OF LLOYD ANDERSON, EXECUTIVE DIRECTOR, PORT OF PORTLAND

INTRODUCTION

The Port would like to provide comments and information on the following:

The public investment in port facilities on the Columbia River;

The economic impacts the river disruption has had on the Port's marine terminals, in terms of direct revenue losses to the Port, the community "value added" to the region's economy and to private facilities;

The economic impacts the river disruption has had on the Port's shipyard, in terms of direct revenue losses and the community "value added" to the region's economy;

The economic impacts and loss to the hinterland resulting from the ash fallout;

Tonnage losses as a result of the river disruption, both to Port facilities and to private harbor facilities;

A description of the existing situation and the predicted ongoing problems that may result from the volcanic eruption;

A review of the actions taken to date by the Port to respond to the river situation; and

A discussion of what actions the Port sees as necessary for this region to adequately respond to the river situation and the volcano.

EFFECT OF RIVER CLOSURE—PORT OF PORTLAND FACILITIES

	Duration of closure (or draft) (weeks)	Normal volume for that duration (SIT)	Estimated percent of normal volume lost	Estimated volume loss (SIT)	Estimated splits between terminals	Estimated and revenue per ton
Autos	2–3	15,000	100	15,000	10,000 T4 5,000 T6	$3.58 13.81
Container	4–8	100,000	90	90,000	15,000 T4 75,000 T6	3.44 12.87
Combination	4	50,000	75	37,500	T1 & T2	7.60
Steel	4	35,000	75	25,000	T4	8.66
Logs	4	25,000	70	17,500	T4	2.50
Bulk	6	55,000	90	50,000	T4	6.11
Grain	6	450,000	25	115,000		
Total (excluding grain)		280,000	84	235,000		
Total (including grain)		730,000	48	350,000		

PORT OF PORTLAND—SHIPYARD

The Port's ship repair yard expects to have a direct loss of $150,000. Since the eruption, one vessel has cancelled at the Port's ship repair yard for repair work, with other vessels indicating only deferrals at this time.

COMMUNITY IMPACT—SHIPYARD

The annual community-wide impact of the "value added" to the economy as a result of ship repair activity is substantial, as illustrated in the table below:

ANNUAL COMMUNITY ECONOMIC IMPACT OF PORTLAND SHIP REPAIR YARD, 1979 PROJECTIONS OF ERA—1980 UPDATE

	Primary	Induced	Total
Value added (millions)	$52.4	$95.3	$147.7
Employment	1,698	3,090	4,788
Payroll (millions)	$45.6	$100.8	$146.4

TO REGION AND NATION

Import/export statistics (Oregon Customs District):

79 Export value $3,063,615,376.

79 Import value $2,361,768,468.

The Columbia/Snake river system is a grain export pipeline to the world. It's flow has been curtailed. There are 21 river grain elevators located along a 300-mile stretch of the Columbia/Snake river system. Portland is the largest Pacific Northwest grain port. The Pacific Northwest contributed 25 percent of the total annual U.S. wheat exports. Eighty percent of this grain goes through the lower Columbia River ports of Longview, Kalama, Vancouver, and Portland.

HINTERLAND IMPACTS

An analysis of the impacts of the river disruption and ash fallout should also include a review of the impact on the hinterland, which produces much of the cargo that flows through Columbia River ports.

TOTAL TONNAGE LOSS—PORTLAND HARBOR

1,165,000 tons; 9 percent of normal annual tonnage.
Sources: POP Research Department. Information and Estimates from:
USDA
Washington State Department of Agriculture
Oregon State Department of Agriculture
WSU Extension Service
Federal Crop Insurance Corp.
Contacts with private industry

Description of Situation and Problems

EXISTING SITUATION

The Columbia River has a federally authorized deep draft ship channel, 40-foot deep and 600–800-foot varying width, from the mouth of the Columbia River, Mile 3, to Vancouver, Washington, Mile 105.5.

On May 18, 1980, Mount St. Helens erupted and mud and debris were brought down the Toutle and Cowlitz rivers, causing serious shoaling in the Columbia River at the mouth of the Cowlitz, Mile 68. The shoaling extends from Mile 67 to Mile 74. The present estimated volume of material in the Columbia River channel is 22 million cubic yards. It is estimated there are 25 million cubic yards in the river bed of the Cowlitz River.

PREDICTED ONGOING PROBLEM

Continued ash fallout, at unknown times with unknown frequency at unknown levels of fallout in unpredictable directions. The ash fallout potentially could have the following associated problems:

Business interruptions of service, particularly transportation related and equipment/mechanical shutdowns to avoid problems.

Substantial increased "down time" related to equipment maintenance and repair.

Ash impact on commodities (e.g., grain) transported/handled through region and grown throughout region affected by ash fallout. (And probable resultant hesitancy by commodity buyers to purchase Northwest agricultural products.)

Impact on ability of region to permit new or expansion of industries (re: air pollution requirements).

With the channel returning to normal by late summer, we have plans for an aggressive advertising, promotion, merchandising and publicity effort—to "If we can move a mountain, we can move your cargo."

What's Needed

Because of the dramatic impact information has on present and future business activity for the Columbia River area, there is extreme need for a mechanism to dispel rumors and provide the public with factual information.

Related to that, there is a need to maintain (and possibly restore) the trade community's confidence in the safety and viability of ocean commerce on the Columbia River.

Strong assurance needed to general public and national/international businesses of all efforts possible by the federal government to remove the blockage and commitment from federal government that river shall remain open to navigation.

The Port of Portland and Oregon, notwithstanding the ash fallout, were not physically harmed in the manner and magnitude of Washington and Idaho. The variety of federal disaster programs, including the Major Disaster Area Program authorized in P.L. 93–288, are geared to areas suffering severe economic injury and hardship resulting from physical damage and destruction. Although the Port can demonstrate substantial economic hardships resulting from the volcanic eruption, beyond the capabilities of the state or local governments to adequately respond, the impacts to Portland and Oregon are rather unique to federal disaster programs.

A more feasible approach to providing assistance is, therefore, pursuing congressional action to provide appropriations for federal assistance specifically earmarked for the Port and Oregon, notwithstanding the fact that Oregon has not been declared by the President to be a Major Disaster Area.

Specifically, appropriations are needed to provide for the following:

Grants to replace local tax and other revenues lost by the Port at its marine terminals that had operations curtailed as a result of the eruption.

Federal assumption of payments for employment compensation claims resulting from the disaster.

Funding to state and local governments for technical assistance to develop information about the impacts and development of techniques to respond to ash fallout on agricultural production, equipment and facilities operation, transportation, air quality and health.

Although the magnitude and ramifications of the problems facing the Northwest resulting from the volcanic eruption are not now fully known, the combined efforts of the federal, state and local governments, along with many individual and private organizations, can insure that the problems are not unsolvable.

We have made tremendous progress in restoring the full depth of the ship channel.

We do see indications from the international trade community of their continuing desire to move cargo through the Columbia/Snake river system.

We are seeing competitors, such as the ports of Vancouver and Portland, working together on matters of mutual concern.

Perhaps I can best summarize my feelings about why I feel good about the situation and about the future of the river: With apologies to Mark Twain, "Reports of the death of the Port of Portland are greatly exaggerated."

Senator PACKWOOD. I will next take Robert Stevens, the Federal Coordinating Officer for the Federal Emergency Management Administration.

Mr. Stevens?

STATEMENT OF ROBERT STEVENS, FEDERAL COORDINATING OFFICER, FEDERAL EMERGENCY MANAGEMENT ADMINISTRATION

Mr. STEVENS. Good morning, Senator. Thank you for inviting us. We are delighted to be here.

We have submitted written comments and I will just touch briefly on highlights of those. Then I will be happy to try and respond to any questions you might have.

When President Carter declared the State of Washington and the State of Idaho as major disaster areas, he designated me as the Federal coordinating officer for both States. In this capacity, I am responsible under the Disaster Relief Act of 1974 for coordinating the activities for all Federal, State, and local governmental agencies, as well as the volunteer agencies, in delivering assistance to the impacted communities in the most effective and efficient way that we can.

You should understand that many different agencies of the Federal Government have their own independent disaster authorities. These are in addition to the Disaster Relief Act of 1974, Public Law 93–288, which is administered by the Federal Emergency Management Agency. In effect, I am President Carter's representative on the scene. As you know, the President was here on May 21 and was back in Seattle on Tuesday of this week. When he was here on Tuesday, he asked that I come up and brief him. So I have had two opportunities in the last 3 weeks to brief the President. He is taking a very active and continuing interest in this problem.

I should point out that my regular assignment and permanent position is that of regional director for FEMA in region IX, San Francisco. I have served in this capacity for over 10 years with FEMA

and its predecessor agencies, the Federal Disaster Assistance Administration and the Office of Emergency Preparedness. I have functioned as a Federal coordinating officer in literally dozens of disasters all over the United States and the territories, including Guam and Puerto Rico and throughout the Pacific.

At today's hearings, I will briefly review the actions taken thus far to provide Federal disaster assistance in the two States I have mentioned, which, again, is supplemental to the efforts of State and local governments in those States. Federal assistance is not an insurance policy which will restore each individual and all State and local governments to the same condition that existed prior to the disaster.

On May 22 we opened an office in Vancouver. We have a satellite office in Spokane for administering the programs in Washington State, and we also have a Federal coordinator's office located in Coeur d'Alene, Idaho. We have established and operated a total of eight disaster assistance centers in Washington, all the way from Kelso on the west to Spokane in the east, and places like Ritzville, Moses Lake, Yakima, Centralia, and so on.

Also in Idaho we have had centers in Moscow, Coeur d'Alene, and St. Marys. We have substantially suspended that activity at this time because we think we have met the immediate need. As the farm community particularly identifies their problems more specifically, it may be necessary for us to go back in and activate those centers again. Of course we are prepared to do that.

Through June 12 we had just over 5,000 people through our centers in Washington and slightly in excess of 600 in Idaho.

The interesting aspect of this has been the interest in business loans for the SBA. I do notice that you have a spokesman from the SBA who, I am sure, will cover that in more detail, but about twice as many businesses or farms are expressing a need for loans as are home owners and individuals. Usually it is just the reverse of that.

With respect to assistance to local governmental entities, we have held applicant briefings in both Washington and Idaho, a total of about eight. We have identified some 200 State and local government agencies that have filed notices of interest. We currently have 45 teams of State and Federal engineers out in these various areas preparing detailed engineering estimates of the costs involved that will be eligible for some reimbursement from the Federal Government.

With respect to serving the communities and the individuals, we have established toll-free hotlines, which are being manned in our Vancouver office. We have had right around 5,000 calls on these lines from the three States involved, including Oregon.

We have set up, at the direction of the President, a technical information network. When the President was out here the first time, he expressed his concern about the lack of technical information about this problem and the way to react to it. We have gathered information from a vast array of sources, both public and private, and, of course, educational institutions. We so far have published a total of 18 bulletins on all kinds of technical subjects. We will continue to publish those for the indefinite future.

I would be remiss if I didn't acknowledge the tremendous cooperation and support we have had from the various Federal agencies. The

U.S. Geological Survey and the U.S. Forest Service were involved very early and continue to have a very active role with us. We also have had good cooperation and support from the Corps of Engineers and the Center for Disease Control and many, many others that I can't mention at this time.

We have also established a centralized Federal information network in Vancouver. We have about 10 different Federal agencies, as well as the State, and at least two private agencies are participating in that.

When we had this eruption last night, we had a tremendous flurry of activity there. I stopped by there for about 10 minutes this morning on my way down here. During the few minutes I was there, we had inquiries from Australia, from the BBC and also from the Netherlands. I am sure there were many others, but those were noted.

Senator PACKWOOD. I had a phone call at 4:45 from New York.

Mr. STEVENS. That is one of the things we face, Senator. Every morning about 4:30 when the eastern networks come alive, they, of course, expect us to be up and running and we find that a little troublesome, but we have learned to live with it.

Senator PACKWOOD. They assume we are on eastern time.

Mr. STEVENS. Yes; that is right.

We do maintain this, incidentally, on a 24-hour basis and we do provide information and also rumor control, which, I think, has been quite effective. We have had good reaction from the media on that. We will continue that. We could not do that without the tremendous support that we have had from these other agencies.

One very troublesome area, of course, is the availability of funding. I am sure you are aware of this. We are waiting on special appropriations. The President's disaster relief fund is susbtantially depleted. We have a little money in there which we have reserved for things like temporary housing and individual grants and so on to meet the real emergency needs of individuals. We are not currently funding any of the activities of governments. Until we get appropriations, we can't do that. That situation has prevailed for several months now.

Senator PACKWOOD. Part of these appropriations are what you want in this supplemental for fiscal year 1980, as I recall.

Mr. STEVENS. Yes.

Senator PACKWOOD. As you are aware, the first concurrent budget resolution passed yesterday, that should remove the logjam. I suspect now the supplemental appropriations can move along reasonably quickly.

Mr. STEVENS. Well, that is good news, Senator. I should say that we have tried to get all the redtape taken care of, all of the necessary paperwork. That is why we have done these briefings and why we have these teams in the field. As soon as we get this put together and processed, the project applications and funding are available, then we can move it very quickly. I am sure it will move quickly.

This same situation, of course, applies to SBA and ASCS and several other agencies.

The other comment I would like to make is that Federal assistance to governments is supplemental. It is not an insurance policy. We have an administration position that we will fund 75 percent of the eligible public assistance. We have a contract in Washington to that

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effect and we have a contract pending in Idaho. When I talked to the President on Tuesday of this week, he mentioned his support of that position. I anticipate that that will remain the administration position.

I will be happy to respond to any questions you might have, Senator.

Senator PACKWOOD. I want to know what more is necessary to be done to make Oregon available for disaster relief. You heard Governor Atiyeh talk about the areas that he has declared disaster areas. What more does the Federal Government need from the State of Oregon before it can act?

Mr. STEVENS. Well, the requirement is for a request from the Governor. He has to first declare a state of emergency, and that has already been done, then he must submit a request to the President through our offices, which we evaluate and process through to the White House. It does take action on the part of the President to make it available. It usually moves rather quickly. It is necessary, however, to make an assessment of the needs and to take a look at what the State has done and what the State has permitted itself to do and what other needs might be met by the Federal Government as a result of this action on the part of the President.

Senator PACKWOOD. Thank you very much. You are doing a good job. Congratulations.

Your assistant, Bill Mayer, formerly was my administrative assistant in Washington. He never intended on staying there, but wanted to come back to the west coast to live. I think he has lived less on the west coast since he took this job with disaster relief. He spent months in Mississippi, months in Los Angeles, and months where the disasters are and relatively little of it at home, it seems to me.

Mr. STEVENS. That is true. He had planned to be here this morning. Everybody worked all night and he thought maybe he ought to stay in the store.

[The statement follows:]

STATEMENT OF ROBERT C. STEVENS, FEDERAL COORDINATING OFFICER, FEDERAL EMERGENCY MANAGEMENT ADMINISTRATION

When President Carter declared the States of Washington and Idaho as major disaster areas, on May 21 and May 22, 1980, respectively, he designated me as the Federal Coordinating Officer for both states. In this capacity, I am responsible under the Disaster Relief Act of 1974 for coordinating the activities for all Federal, State and local governmental agencies, as well as volunteer agencies, in delivering assistance to the impacted communities in the most effective and efficient manner possible. You should understand that many different agencies of the Federal Government have their own independent disaster authorities. These are in addition to the Disaster Relief Act of 1974 (Public Law 93-288), which is administered by the Federal Emergency Management Agency. In effect, I am President Carter's on-scene representative.

My permanent position is that of Regional Director, Federal Emergency Management Agency, Region IX, headquartered in San Francisco. I have served in this capacity for over 10 years under FEMA and its predecessor agencies, the Federal Disaster Assistance Administration and the Office of Emergency Preparedness. I have functioned as the Federal Coordinating Officer in literally dozens of disasters all over the United States and the territories in the Pacific, ranging from the San Fernando Earthquake in 1971 to hurricanes in Guam and the Trust Territories of the Pacific.

At today's hearings, I will briefly review the actions taken thus far to provide effective Federal disaster assistance in these states to supplement their emergency response, resources, and capability. I would emphasize that, under the

Disaster Relief Act, Federal assistance is supplemental to the efforts of State and local governments and to individuals. Federal assistance is not an insurance policy which will restore each individual and all state and local governments to the same condition that existed prior to the disaster.

On May 22d, I established the Office of the Federal Coordinator at 1220 South Main Street, Vancouver, Washington. From this office, my staff and I coordinate the various recovery activities which are occurring throughout he State of Washington. In addition, we have established an Office of the Federal Coordinator in Coeur d'Alene, Idaho, from which we coordinate activities in the eight counties in Idaho covered by the Presidential declaration.

It should be noted that this coordination effort is a joint Federal-State operation. The Governors of each of the impacted States have appointed a State Coordinating Officer, who is co-located with the Federal Coordinating Officer. There are representatives of each State working with their Federal counterparts in planning the disaster response activities.

Disaster assistance can be broadly broken down into three major thrusts:

A. Assistance to individuals

There are a host of Federal and State-administered programs which can provide asistance to individuals and families who have been adversely impacted by the volcanic eruption. Beginning on May 24th, we established a number of Disaster Assistance Centers in various locations throughout the States of Washington and Idaho, where individuals can come and get information on and application forms for all of the types of assistance available. These Disaster Assistance Centers are staffed by trained personnel from as many as 15 different State and Federal agencies. The types of help include:

1. *Temporary Housing.*—Anyone whose dwelling has been made uninhabitable as a result of the disaster is eligible for temporary housing assistance. This includes families whose homes have been rendered inaccessible or unliveable because of the lack of utilities, as well as those whose homes have been damaged or destroyed. In the Washington disaster, we expect to provide temporary housing assistance to some 300 families.

2. *Small Business Administration.*—In a disaster situation, SBA can provide loans to individuals to repair or replace their damaged or destroyed real and personal property. This comes in the form of low-interest loans (3% up to $50,000 for damaged real property, and up to $10,000 for damaged personal property—combined limit—$55,000.) Businesses are also entitled to receive assistance from the SBA. Businesses can receive low interest loans for physical damage and also can obtain loans for economic injury sustained as a result of the disaster. The interest rate for business loans varies from 5% to 8¼%, depending upon the situation. Farmers are also eligible for low-interest loans from SBA. In the Washington and Idaho disaster, SBA is projecting that they will make 950 loans to individuals for home and personal property damage, 600 loans to businesses for physical damage, 3500 to busineses for economic injury, and 1400 loans to farmers The projected dollar total for all of these loans exceeds $400 million.

3. *Individual and Family Grant Program.*—For those individuals and families who cannot qualify for a low-interest SBA loan, there is a State-administered Individual and Family Grant Program, which makes outright grants of up to $5,000 per individual or family to meet disaster-related serious needs or necessary expenses that cannot be met from any other source. The State of Washington has received 830 applications for this type of assistance. As I indicated, this is a State-administered program, with the State paying 25 percent of the cost thereof, and the balance being Federal funds.

4. *Internal Revenue Service.*—There is a representative of the Internal Revenue Service in each of the Disaster Assistance Centers to advise people as to how they may claim a casualty loss on their income tax return. The IRS has an outstanding record of processing such claims on an expedited basis, thereby making money available to individuals to assist them in meeting their disaster-related needs.

5. *U.S. Department of Agriculture.*—The Dept. of Agriculture has a number of programs to assist farmers. The Farmers Home Administration can also make loans. The Farmers Home Administration anticipates making loans in excess of $30 million, which will include the costs of damage to farm machinery as well as crops. The Agricultural Stabilization and Conservation Service has a number of programs. Farmers experiencing losses below 60 percent of estab-

lished yields for wheat, field corn, barley, grains and sorghum are eligible for this assistance.

There is also an Emergency Conservation Practices Program, which will assist farmers in removing volcanic ash and other debris from their farmland, repairing wells, regrading, shaping and the releveling of eroded areas. It is estimated that USDA will spend in excess of $13 million for this program on an 80–20 cost-sharing basis. There is also an Emergency Feed Program for farmers who have sustained feed-loss damage for livestock in excess of 40 percent of the amount normally produced on the farm. This program pays up to 50 percent of the cost of emergency feed purchased, not to exceed 2¢ per pound of feed grain equivalent. The Soil Conservation Service and the Conservation Extension Service also have programs which can be of assistance to farmers.

6. *Department of Labor.*—Representatives of the Dept. of Labor are in each Center to advise people who have lost their livelihood as a result of the volcanic eruption on Disaster Unemployment Benefits. These benefits also are available to individuals such as the self-employed, who normally are not covered by unemployed insurance. This is a very important form of assistance, for there is a substantial number of individuals who are out of work as a result of the disaster, particularly in the logging industry and in port-related activities.

7. *Volunteer Agencies.*—Representatives of the American National Red Cross and the Salvation Army are also located in the Centers to provide immediate assistance to those who have special needs.

8. *State Insurance Commissioner.*—In the State of Washington, the State Insurance Commissioner has put one of his representatives in each Center to answer questions and counsel people as to insurance benefits that may be available under their private insurance policies. This has been an invaluable assistance to individuals and businesses.

9. *Other Types of Assistance.*—By going to the Disaster Assistance Center, individuals can be counseled on legal problems, and apply for food stamps, and get counseling on consumer protection matters.

Through June 10, 1980, some 5,400 people have gone through our Disaster Assistance Centers. These Centers will be operating in various locations throughout the impacted area until we are certain that everyone who has needs has had the opportunity to go through these centers. Toll-free "Hotlines" have been operational since the 23rd of May, so that citizens of Washington, Idaho and Oregon can receive telephone information as to the type of assistance that is available and where it may be obtained. By June 10th, we have received well over 4,000 calls.

B. Assistance to State agencies and local governments

There are a substantial number of Federal agencies who have programs that can assist State agencies and local governments with their disaster-related problems. These include:

1. *Corps of Engineers.*—Colonel Connell, District Engineer, Portland District, is among your witnesses and will be telling you of the Corps' activities under their own authority. In addition, the Corps has provided technical assistance to a number of communities throughout Washington, assisting them in locating necessary construction equipment, plus assisting other communities in making emergency repairs to their water systems. I would emphasize that the Corps' activities are 100 percent Federally funded.

2. *Federal Highway Administration.*—The Federal Highway Administration has emergency authorities under its Title 23 Program to clear debris and repair and restore damage to roads and bridges that are on the Federal-aid System. It is my understanding that in the State of Washington, the Federal Highway Administration has estimated a $100 million price tag on these types of activities.

3. *Federal Emergency Management Agency.*—FEMA has authorities under Public Law 93–288 to assist State and local governments in repairing and restoring damaged public facilities to their pre-disaster functional capacity. In this disaster, that will include reimbursing State agencies and local governments for eligible costs in removing ash debris from roads and streets that are not on the Federal-aid System. Any publicly owned facility that is damaged or destroyed as a result of the disaster, such as sewer systems, damage to public buildings, etc., are eligible, as are emergency costs, such as the overtime paid to law enforcement officials and other employees of the State and local government in-

volved in emergency activities. Under the FEMA program, State agencies and local governments will receive 75 percent of their eligible costs, in accordance with agreements between FEMA and the respective Governors. Our best estimate at the present time is that the Federal share of such costs will exceed $80 million.

OTHER FEDERAL AGENCY ACTIVITIES

Many other Federal agencies have been actively involved in this effort, and the cooperation among the Federal Family has been exemplary. The United States Geological Survey has been monitoring Mt. St. Helens' activities on a continuous basis since March 27th and has done a superior job in keeping all of us informed as to what is happening.

The Gifford Pinchot National Forest, of the U.S. Forest Service, has also been actively involved since March 27th, inasmuch as the area that Mt. St. Helens is located in is largely within the boundaries of the National Forest. They too have been most cooperative in every respect. The Department of Defense provided helicopter support to State and local law enforcement officials engaged in search and rescue activities. In addition, DOD procured more than 300,000 surgical masks for distribution by the State to ash-impacted communities. The General Services Administration has procured and delivered over 700,000 surgical masks. In addition, GSA has worked a minor miracle in setting up, furnishing and providing communications to four separate offices in Washington and Idaho, in addition to ten Disaster Assistance Centers. The Center for Disease Control, in close cooperation with the National Institute of Occupational Safety and Health, has established a very sophisticated surveillance system throughout the ash-impacted area and is analyzing the potential health hazards which might ensue as a result of continued inhalation of volcanic ash. The respective State Departments of Health have been active partners in this effort. The Office of Education will be responsible for reimbursing the school districts for damages sustained to public schools. They have already commenced their surveys. Many divisions of the Department of Transportation have been involved. Federal Aviation Administration has been monitoring and controlling the airways over the disaster area. The Office of Emergency Transportation has been working with the U.S. Army Tank-Automotive Research and Development Command and the Washington State Patrol developing guidelines on the operation and maintenance of automotive equipment. The Environmental Protection Agency has been working closely with CDC/NIOSH determining health effects, as well as assessing treatment techniques and health impacts, if any, of ash fallout on drinking water supplies. This is but a partial list of Federal agencies involved. A more complete list is attached as an appendix to this report.

C. Public information

Because of the dramatic nature of the eruption of Mt. St. Helens, there has been an unusual amount of media interest and coverage, centering not only on the activities of the volcano and the damage caused by the eruption, but on the activities of Federal, State and local governments as well. A Joint Information Center has been established in my office, which has been operating 24 hours of the day for the past three weeks. All Federal agency news releases are cleared through and distributed by Public Information Officers representing eleven Federal and State agencies located in one room. An arrangement with a Portland mailing service, as well as excellent cooperation from the U.S. Postal Service, has enabled us to get overnight delivery of press releases to all media. In addition, there is an automatic broadcast feed, which is available through WATTS lines, serving Washington, Oregon, Idaho and Montana.

This is a vital function, as it is important that the public be informed accurately as to what is transpiring with the volcano, as well as the type and availability of recovery assistance.

A unique feature has been added to this disaster. Under the auspices of the Office of Science and Technology in the White House, a Technical Information Network has been established as a part of the Office of the Federal Coordinator. The function of the Technical Information Network is to stimulate and expedite the flow of technical information about the eruption of Mt. St. Helens and its effects on man and his environment. It developed from the concerns expressed by President Carter and Governor Ray to create a mechanism for exchanging technical information among experts and then disseminating this information to the public.

The principal means of dissemination is the publication of bulletins. The subject matter of these bulletins varies from "Driving and Vehicle Maintenance In Heavy Ash Areas", "Ash Particles and Home Clean-up Problems", "Research into Free Crystal and Silica Content of Mt. St. Helens", to "Protecting Children From Volcanic Ash-Related Health Hazards". A list of the 17 bulletins that have been published through June 11 is attached. All members of Congress of the affected States, as well as key Federal and State agencies and local governments are receiving these bulletins regularly. Currently, our mailing list for the distribution of these bulletins is approximately 1,000. I have brought a complete set of the bulletins with me for your perusal.

Mr. Chairman, as you may know, the Administration is preparing to submit an appropriation request totaling $917,900,000 to various agencies to fund the disaster response activities. This amount is broken down as follows:

Federal Highway Administration	$100, 000, 000
Federal Emergency Management Agency	86, 000, 000
U.S. Department of Agriculture	63, 500, 000
Corps of Engineers	215, 000, 000
Department of Interior (U.S.G.S.)	3, 400, 000
Small Business Administration	430, 000, 000
Office of Education	20, 000, 000
Total	917, 900, 000

I would be remiss if I did not take this opportunity to remind the members of the Senate that some agencies who have disaster relief authorities have extremely limited funds. This is particularly true of the Federal Emergency Management Agency, which has been unable to approve public assistance project applications from states and local governments in other Presidentially declared disaster areas for three of four months. The Small Business Administration has not been able to approve any loans for more than 60 days. The U.S. Department of Agriculture's Emergency Conservation Program is unfunded. Therefore, many of the response activities delineated earlier are totally dependent on the involved agencies receiving supplemental appropriations.

Mr. Chairman, the eruption of Mt. St. Helens is truly a unique disaster. Such catastrophic events as floods, hurricanes, and earthquakes have a reasonably defined termination period. In this situation, the end is not in sight. On Tuesday, I was privileged to be one of five Federal officials who briefed President Carter. To me, one of the more significant statements that were made came from Donal Mullineaux, U.S. Geological Survey Senior Geologist, when he told the President: "We are clearly at the height of an eruptive episode comparable to the May 18 event, or even larger. We are prepared for additional explosive events. We are not prepared to say Business as Usual. In fact, it is quite the oposite." Therefore, Federal, State and local government must be in a readiness posture and take steps to prepare for the next eruption while we pray that it does not happen. I am recommending a coordinated planning effort, which will involve all of the states which have been or may be impacted by future eruptions, with the purpose of improving the warning system and better preparing both local governments and individuals on how to react in the event of heavy ash fallout.

This concludes my formal statement. I should be happy to respond to any of your questions.

ATTACHMENT 1

Small Business Administration

Disaster business loans, home and personal property loans and economic injury loans.

Department of Defense

Corps of Engineers floodfighting activities and emergency flood control measures, and the cleaning and dredging of navigable waterways.

Department of Agriculture

Disaster loans (FmHA), conservation programs (SCS), agricultural stabilization programs (ASCS), research (SEA), crop insurance claims (FCIC), food stamps (FNS), and forest service programs (FS).

Department of Transportation

Highway repairs and restoration (FHWA), repair and replacement of air navigational aids (FAA), air sampling flights and laboratory studies (FAA), and the patrol of navigable waterways (USCG).

Department of Health and Human Services

Aid to dependent children; death benefits and disability payments (SSA); assistance for the elderly (AOA); data collection and analysis of samples to determine the effect on health (PHS); medicaid and medicare payments (HCFA).

Department of Commerce

Satellite observations, plume tracking, cloud sampling and forecasting (NOAA); grants for business development (EDA); and infrastructure studies and planning guidance (Pacific NW Regional Action Planning Commission).

Department of the Interior

Leadership in the Mt. St. Helens Technical Network for the collection, analysis, and dissemination of scientific information on effects of eruption, ash fall and flow (USGS); monitoring of seismic activity (USGS); overtime, vehicle, and equipment repair (NPS, F&W).

Department of Labor

Administers Disaster Unemployment Assistance through respective State agencies. Summer employment for clean-up activities (CETA).

Environmental Protection Agency

Overflights to collect air samples and the analysis of air, water, and soil samples to determine the effects of ash pollution on the environment.

National Science Foundation

Research projects in the scientific and academic community to furnish knowledge of the effects of volcanic eruptions.

General Services Administration

Administrative support, vehicle maintenance and replacement.

National Aeronautics and Space Administration

U–2 overflights and satellite operations for the collection of high altitude samples and photographic documentation on effects of eruption.

Attachment 2

MOUNT ST. HELENS TECHNICAL INFORMATION NETWORK BULLETINS

No.

1—"The Nature of Mount St. Helens Ash".
2b—"Driving and Vehicle Maintenance in Heavy Ash Areas".
3—"Precautions in Handling Volcanic Ash".
4—"Current Volcanic Hazards at Mount St. Helens, Washington".
5—"Volcanic Ash Could Reduce Insect Populations . . . Temporarily".
6—"Advice for Farmers From Washington State University—Tractors and Water Pumps".
7—"Ash Particles and Home Clean-up Problems—Advice From the University of Idaho".
8—"Physical and Chemical Characteristics of the Mt. St. Helens Deposit of May 18, 1980".
9—"Volcanic Ash Advice to Berry Growers".
10—"Center for Disease Control (CDC) Community Based Health Surveillance Program (Update)".
11—"Poultry—Bees—Livestock".
12—"Foodstuffs and Volcanic Ashfall".
13—"Research Into the Free Crystalline Silica Content of Mount St. Helens Ash".
14—"Protecting Children From Volcanic Ash-Related Health Hazards".
15—"Volcanic Ash and Your Water Supply".

16—"Health and Medical Update".
17—"Insurance Concerns".
18—"Health and Medical Update".

Senator PACKWOOD. Colonel Connell, the District Engineer for the Corps of Engineers.

Before you start, Colonel, let me thank you publicly for the work you have done here, which has been excellent, and for expediting that T-dock problem in Coos Bay that they wanted so badly. As I am sure you are aware now they are starting to build it and are very optimistic. We wouldn't be where we are on that problem today without your cooperation.

STATEMENT OF COL. TERENCE CONNELL, DISTRICT ENGINEER, U.S. CORPS OF ENGINEERS

Colonel CONNELL. Yes. We have had some careful coordination on that with both the local staff, State, and certainly with your own office. I know I have worked with Peter in addressing that question. I think that is coming along fine.

Senator Packwood, I would like to express, as previous speakers have, my own appreciation for being able to come before the subcommittee.

I would also like in this instance to express my own pride in being a member of the Army Corps of Engineers. One thing that certainly has been reassuring for me is that the Army in this instance has had the support of the Federal Government in being able to accomplish some actions very, very quickly.

You indicated a minute ago that the funding had gone through in the Congress and I have received word within the corps that my funding, incremental requests have been extended and I do now have the necessary funding for us to continue with our work in the Columbia River, as well as in the Cowlitz River and in the Toutle River in the Upper Basin.

I would specifically like to express a very, very strong sense of appreciation to the very many local governmental officials and the local agencies, the State officials and the State agencies, and certainly the Federal agencies up through Mr. Stevens who just spoke a second ago.

In terms of the Columbia River dredging, I would like to emphasize the words of Lloyd Anderson that the river is open, it is functioning. We currently have it under some controlled conditions. We are working very, very closely with the U.S. Coast Guard, who establish the channel control, and with the port agencies in expediting and accelerating the continued deepening and widening of the channels in the Columbia River.

We also have in the audience this morning, and I would like to note in addition Riedel International and the General Contracting Corp., I would like to thank them for the work they have done in cooperation with us in bringing their dredges from other projects along the west coast to assist in this emergency situation.

We are ahead of schedule somewhat. We do anticipate today having a 35-foot 11-inch draft capability.

Senator PACKWOOD. Today?

Colonel CONNELL. That is correct, sir. That is ahead of schedule.

We will have a somewhat controlled situation having to depend upon tides and the windows for the next several weeks, but we do anticipate by and before the end of July to have a capability of handling vessels with approximately a 39-foot plus draft, which, in essence, will handle all of the shipping that utilizes the Columbia River ports.

Our dredging has been going very, very well. The resources agencies in particular have been cooperating with us in seeking to ascertain the placement of these materials from out of the riverbeds. We will be coordinating with them in insuring that environmental considerations and future ramifications of the spoil materials are properly and comprehensively addressed.

Senator PACKWOOD. Where are you going to dump all this?

Colonel CONNELL. I would also like to introduce to you Mr. Adam Heineman, who is the Chief of the Navigation Division of the Portland District. Let him speak from the map that is shown here.

Adam?

Mr. HEINEMAN. The green line has been dredged by the pipeline dredges. The initial work by the hopper dredges was done on the south edge of the channel digging as the minimum that they could have through there of 200 feet. We are very fortunate that the bulk of the material was deposited upstream rather than downstream where we had available islands to pump the material onto. So we are putting material on Howard Island. We are enlarging Howard Island. We will be putting a lot of material on Cottonwood Island.

Senator PACKWOOD. Are you reasonably satisfied that you are going to have adequate space to dump everything that you will need to dump?

Mr. HEINEMAN. For the short term, we are working on the possibility of moving the Oregon shore out. We have a wide section of the river here and that was looked into by the Port of Portland several years ago. They are, in fact, right now working on it and talking to Governor Atiyeh. Crown Zellerbach now owns the mill. There was an arrangement made 9 years ago with the millowner, the previous owner, to move a portion of the Oregon shore. That will create a better and stable channel area through that region. With that type of construction, we feel we can handle it over the long term.

We have disposal areas downstream of the bridge owned by the Port of St. Helens. Weyerhaeuser has some land where they are calling for some material to be disposed of.

Right in that 2-mile reach is a problem area for disposal.

Senator PACKWOOD. Judging from the optimism of your statement, is it fair to say that you don't think disposal is an overwhelming problem?

Mr. HEINEMAN. Not if we can stabilize that section of the river.

Senator PACKWOOD. OK.

Colonel CONNELL. Our long-term plans that have been underway historically on the river are to continue to develop the channel stabilization in the Columbia River, the removal of materials from the river on our annual dredging, both from within the river section and also at Astoria, are done with the effort to enhance the channel flow and reduce the annual maintenance dredging requirements. We have been

successful in that. This reach of the river will be included in those plans. The actions that we are taking already will be to look forward to seeking to channelize the river and to do such ongoing dredging.

Senator PACKWOOD. What do you expect in future years of continued silting? Is this going to be a continual problem for a number of years to come, assuming no more explosions?

Colonel CONNELL. We will have some continuing problems. I think the effort that we are looking at for the removal of approximately 22 million yards of material out of the total of perhaps 50 million yards, 50 plus, that has been carried into the Columbia River, probably will insure that the navigation and also the flood-carrying capacity on the Columbia River will be in good shape. We do anticipate an increase in our annual maintenance dredging requirements. We are initiating a study, which will take us approximately 9 to 12 months over this next season, to ascertain how these materials are going to move in the bed of the river and what future problems will be.

One of the problems will be some additional siltation and shoaling along the port and in the estuaries further down the river, but that is a future question and we have to wait and learn more about how the materials are moving.

Senator PACKWOOD. Thank you. I have no more questions. Again, congratulations on a very well-done job.

Colonel CONNELL. Thank you.

[The statement follows:]

STATEMENT OF COL. TERENCE CONNELL, DISTRICT ENGINEER, U.S. ARMY ENGINEER DISTRICT—PORTLAND

The eruption of Mount St. Helens and subsequent floodflows in the Toutle and Cowlitz Rivers resulted in the deposit of more than 50 million cubic yards of sand and gravel in the Columbia River near Longview. An immediate problem was the restoration of the 40′ deep x 600′ wide navigation channel which had shoaled to a controlling depth of only 14′. This blockage in the Columbia River extends over an area more than 9 miles long centered at the mouth of the Cowlitz. Ocean going vessels in the Portland-Vancouver area were trapped above this shoal and all deep-draft navigation was brought to a standstill. We immediately directed our three West Coast hopper dredges to the area. Within 5 days after the eruption, the hopper dredges were able to restore a 200′ wide pilot channel to permit resumption of vessel traffic at high tide. The emergency channel dredged by the hopper dredges has permitted about 60 ships to move up river and another 55 ships to move down river under controlled conditions.

The Port of Portland's 30′′ pipeline dredge *Oregon* under contract to the Corps of Engineers under the terms of the 40′ channel project was moved to the site and began work to assist in channel restoration on May 22.

In addition to the Port's pipeline dredge, two contract pipeline dredges started work last weekend. We expect to have two more contract pipeline dredges on site by the end of the month and plan to have a channel by 30 June which will permit vessels with drafts up to an estimated 38′8′′ to cross the river bar at high tide. Dredging operations to date have resulted in removal of more than 2 million cubic yards of material from the navigation channel. Much remains to be done.

Traffic is controlled by the U.S. Coast Guard. We expect this requirement to continue through most of the period we are dredging in the navigation channel.

We estimate that we must remove a volume of about 22 million cubic yards to insure restoration of an adequate river cross-section. The estimated cost of this work is $45 million. We have already diverted $9 million from other high-priority projects around the country to permit this work to continue over the next several months. It is essential that these funds be restored to the donor projects in order to avoid unacceptable impacts in other parts of the country later this year.

Our present plans provide for our hopper dredges to return to their normal coastal entrance assignments later this month at about the same time that the pipeline dredges open the 300′ wide channel on the north half of the 600′ navigation channel. We expect to provide full project depth on the north half of the channel by 30 September, with the full 600′ channel dimensions by 30 November. Pipeline dredge operations will continue beyond that date in order to restore a stable river cross-section through this reach with completion scheduled by 31 March 1981. (Sketch showing phases of dredging program attached).

The deposit of large quantities of sediments in the Toutle, Cowlitz, and Columbia Rivers will have a long-range impact on dredging requirements in the Columbia River navigation channel. Investigations are underway to ascertain these impacts and to determine methods for minimizing their magnitude. We plan to have studies completed within the next 6 to 9 months which will determine our requirements in future fiscal years. The majority of the impact on the Columbia River navigation channel is expected to occur in the 20 miles immediately below the mouth of the Cowlitz. We do not anticipate any significant impact on shoaling rates in the main navigation and entrance bar channels. We do anticipate increases in shoaling in backwater areas such as Baker and Young Bays which are outside the influence of the navigation channel control structures. We will be monitoring these areas.

Senator PACKWOOD. We will next take Capt. Kirk Greiner, captain of the port, U.S. Coast Guard.

Good morning, Captain.

STATEMENT OF CAPT. KIRK GREINER, CAPTAIN OF THE PORT, U.S. COAST GUARD

Captain GREINER. Good morning, Senator.

I am the captain of the port for the Coast Guard for Oregon, southern Washington and part of Idaho. I am pleased to be able to discuss with you the Coast Guard's authority, responsibilities and activities regarding the emergency situation that exists on the Columbia River as a result of the Mount St. Helens eruption. I have submitted a formal statement and I will just summarize it for you today.

As a result of the volcano's eruption on May 18, severe silting, as you have heard, occurred in the Columbia River between miles 67 and 70. Silting has occurred in other portions also, but it wasn't as severe.

Under the Ports and Waterway Safety Act, the Coast Guard is charged with the supervision of vessels and port operations to reduce the possibility of vessel, cargo or property damage, loss of life, or damage to the marine environment. This act contains the authority for the Coast Guard Captain of the Port to create a safety zone, control shipping and issue other orders when necessary.

A safety zone was established between miles 67 and 70 on the Columbia River shortly after the volcano erupted, and will continue in effect until the emergency work is completed to restore the channel to its normal project width. That will probably be this fall.

Within the zone, controls prohibit the passage of deep draft vessels except during specific periods of the day. Maximum draft limitations are also set daily by my office. All vessels must give my office 24 hours advance notice of intent to transit the area, thereby insuring positive controls should unexpected circumstances preclude safe passage.

These procedures were accomplished after discussion with the Corps of Engineers, the pilots and other interested industry personnel.

I would be remiss not to mention the pilots here. My primary concern is safety on the river. Without the pilot's contribution to main-

taining the shipping access to the upper river ports, we would have had safety problems. Their professionalism, seamanship, et cetera, has been outstanding.

We have had no instances of vessels passing through the zone, in other words, we have no record of any touching of the bottom or any problems by the ships. As a matter of fact, I might mention that the BT *Alaska*, a very large crude oil carrier, a VLCC, passed through this zone. It was 188,000 dwt and had a beam of 166 feet. We are talking about going through a 200-foot channel 1 mile or so long.

Also this morning we had the Arco *Juneau*. I don't believe she has arrived yet. She is not quite as large, but she is a VLCC inbound for repairs in the Portland area.

Coast Guard efforts have been twofold, to coordinate vessel movements to minimize time needed for transit so as to give the Corps of Engineers the maximum dredging time. Second, to facilitate safe transportation.

Besides setting traffic controls, the Coast Guard has been repairing damage to aids to navigation. That was immediately after the eruption. They have been setting and resetting temporary aids to navigation, and establishing ranges. These were necessary in order to improve the safety through the zone by assisting the pilots in the navigation of the vessels.

Today we are allowing vessels of 35½-foot draft to transit the safety zone; 83 upbound and 62 downbound deep-draft vesels have transited the zone since the eruption. This is according to Coast Guard records, and I must admit that the Coast Guard records differ from other records namely because of the manner in which we keep them. There has been approximately 60 percent less traffic through the period from the time of the eruption to today; a 60 percent decrease in deep draft vessels.

Our predictions indicate that by the end of June vessels of approximately 38-foot draft will be able to return to Portland, Vancouver, and Kalama.

A copy of our June 11 press release detailing the predictions has been furnished to the committee.

There are two collateral issues which should be addressed. There are currently two captain of the port orders in effect, in addition to the safety zone regulations. One prohibits the anchoring of any vessel between miles 64 and 67 in the Columbia River without the permission of the captain of the port. The reason for this is to allow the hopper dredges to dump their spoils in the river in that area without any impediment. The second order which I have put into effect regulates the lightering of tankers. Initially tankers were unable to transit the zone because of their draft and they were lightering into barges. I put this order into effect to insure that the marine environment quality was maintained and we didn't have spills.

That is the end of my summary. If there are any questions, I will be happy to answer them.

Senator PACKWOOD. Let me ask you about your ships and facilities. Are you satisfied that they have been adequate and that you have not only enough to handle the problem that exists to date, but for any reasonably foreseeable problems?

Captain GREINER. When you say foreseeable, are you talking about a continuation of the existing one?

Senator PACKWOOD. I don't know what might happen. I am not sure anybody can tell us what might happen, but the problem as it exists now.

Captain GREINER. Our staffing here is not adequate to handle a prolonged incident of this nature. What we have done is to bring reserve personnel on active duty. They have provided the extra personnel which we need. The only other area is that there has been in order to save energy, a somewhat drastic cut in transportation funds. Well, basically, we have used up almost all of our transportation funds for this fiscal year.

Senator PACKWOOD. Bringing people in from all over the country?

Captain GREINER. No. This is basically for motor vehicles and local transportation of our people in the area.

Senator PACKWOOD. Are the reservists you have called up mostly local reservists?

Captain GREINER. Yes, sir.

Senator PACKWOOD. How many have you called up?

Captain GREINER. About five.

Senator PACKWOOD. And are they still active now?

Captain GREINER. We bring them on duty for 2 weeks and then phase in a new one. Basically the safety zone management officer has been a reservist. We have set the guidelines and made up the forms and they have to answer the phone and take calls from Japan to Europe concerning what draft vessels can go through each day.

Senator PACKWOOD. Thank you.

[The statement follows:]

STATEMENT OF CAPT. KIRK GREINER, CAPTAIN OF THE PORT, U.S. COAST GUARD

Good morning Senator. I am Captain Kirk Greiner, the Coast Guard Captain of the Port for Oregon, Southern Washington, and much of Idaho. I am pleased to discuss with you Coast Guard authority, responsibility, and activities regarding the emergency situation that exists on the Columbia River as the result of the Mount St. Helens eruption.

When the volcano erupted on Sunday morning May 18, 1980, severe mud slides caused almost instantaneous flooding of the Toutle River which empties into the Cowlitz River. Large amounts of debris and logs were swept down the river by the floodwaters. The Coast Guard initiated Notices to Mariners early Sunday afternoon to warn ships in the Columbia River to expect that there would be hundreds, perhaps thousands of logs flowing into the Columbia from the Cowlitz River and recommended that vessels not transit the river at night.

As you have heard, the Columbia River channel has a project depth of 40 feet and in the area of Longview, the channel is 600 feet wide. Sometime in the early morning hours of Monday, May 19, tens of millions of cubic yards of fine moraine type sand were swept unexpectedly into the Columbia River from the Cowlitz River. Interesting enough, in spite of the fact that there was an ebb tide at the time that it came into the Columbia River, most of the sediment moved upstream. Channel depths over a nine mile stretch were reduced to varying degrees with minimum depth of 14 feet recorded opposite the Cowlitz River confluence.

Before I discuss the actions of the Coast Guard, I think it's appropriate to address the Coast Guard's concerns and mandates under the Ports and Waterways Safety Act. Under this act we are charged with the supervision of vessel and port operations to reduce the possibility of vessel, cargo or property damage, loss of life, or damage to the marine environment. This act contains authority for the Coast Guard Captain of the Port to create a safety zone and control shipping when necessary. This authority, codified in 33 U.S.C. 1224 and 1231, was used in this emergency to establish a Safety Zone between miles 67 and 70 in the

Columbia River with vessel traffic controls in the Zone. Several Captain of the Port Orders imposing vessel operating constraints and limitations were issued under this authority.

Shortly after five o'clock Monday morning, the Norwegian Motor Vessel *Hoegh Mascot* upbound in the Columbia River grounded in mid-channel at river mile 67, just down stream from the mouth of the Cowlitz River.

When I was notified of the *Hoegh Mascot* grounding, at about 6 o'clock Monday morning, it immediately became apparent that major silting had occurred in the river since this vessel was only drawing 18 feet forward. While continuing the precautionary warning regarding debris in the river, I closed the river in the Longview area to all vessels with more than 10-foot draft. At 0615 the Corps of Engineers was requested to survey the Longview area and evaluate the situation. From that point on until today, the Coast Guard instituted the control of shipping in the Columbia River just up-river of Longview. Regulations establishing the Safety Zone were published in the Federal Register on June 2 and copies have been furnished to Senator Packwood's office. The safety zone controls regulate the time and maximum draft for vessels transiting the zone. These controls probably will continue into September or such time as the channel is returned to normal project width and depth. While this control process may seem a simple matter it involves the collection and assimilation of data from a number of sources. The Corps of Engineers furnishes the Captain of the Port with daily dredged depths of the channel. This information has to be modified by the river height caused by not only the tide but water releases from the up river dams. Water level predictions are furnished by the National Oceanic and Atmosphere Agency. From this data, the Coast Guard sets a window, or time span, during which vessels may transit the safety zone, and calculates the predicted maximum draft which may safely pass. I must emphasize the word "predicted". To assure that the predicted depth is reached, we receive actual river level reading just before the window opens to confirm accuracy of the predictions. In one case, the predicted level was not reached at the opening of the window and vessels scheduled to transit had to anchor. All vessels must give my office 24 hour advance notice of intent to transit thereby insuring positive controls of maximum traffic should unexpected circumstances preclude safe passage.

All of these procedures are accomplished through constant liaison with the Corps of Engineers and the River Pilots. I think the pilots should be recognized for their contribution in maintaining shipping access to the up river ports. Their professionalism, good seamanship and co-operation have been key factors in making this control effort successful. For example, on June 4, they safely navigated a 166 foot wide Very Large Crude Oil Carrier BT *Alaska* of 188,099 DWT through one one mile of 200-foot channel.

Coast Guard efforts have been two fold—to co-ordinate vessel movements to minimize time needed for transits to give the Corps of Engineers maximum dredging time—and to facilitate safe transportation.

Besides setting traffic controls, the Coast Guard has been repairing damaged Aids to Navigation, setting and resetting of five temporary buoys, and has installed two navigational ranges to assist the pilots to navigate the 200-foot channel.

Today, we are allowing vessels of 35½-foot draft to transit the safety zone; 83 upbound and 62 downbound deep draft vessels have transited the area since the eruption. This is approximately 60 percent less than the same period last year. Our predictions indicated that by the end of June vessels of approximately 38-foot draft will be able to return to Portland, Vancouver, and Kalama. A copy of our June 11 press release detailing the predictions has also been furnished the Committee.

There are two collateral issues which should be addressed. Earlier I mentioned Captain of the Port Orders that impose vessel operating constraints and limitations. There are currently two in effect—one which prohibits the anchoring of any vessel between miles 64 and 67 in the Columbia River—and the second which regulates any lightering of petroleum products from tankers down river of the safety zone. The first order is to prevent interference with the dredges which are dumping spoils in that area. The second is to assure safety and marine environmental protection.

That is the end of my prepared testimony. May I answer any questions.

33 CFR PART 165 [CCGD13-80-04]

COLUMBIA RIVER, MILE 67-70, LONGVIEW, WASHINGTON; SAFETY ZONE REGULATIONS

Agency: Coast Guard, DOT.

Action: Final rule.

Summary: This amendment to the Coast Guard's Safety Zone Regulations establishes a safety zone on the Columbia River between mile 67 and mile 70 for all water-borne traffic. The Coast Guard has determined this safety zone is required for the protection of vessels dredging in the zone and for vessels transiting this area. The special regulations for this safety zone will minimize hazards in transiting the zone. The Coast Guard invites comments on this regulation.

Effective date: The amendment is effective beginning at 2400 PDT May 22, 1980 and will terminate when cancelled by the Captain of the Port, Portland, Oregon.

Addresses: Comments should be mailed to: USCG Marine Safety Office, 6767 N. Basin Avenue, Portland, OR 97217.

For further information contact: LCDR Harry Dudley, Chief Port Operations Department, Telephone Number (503) 221-6328, FTS 423-6328, or LT Hugh N. Johnston, Chief Investigations Department, Telephone Number (503) 221-6334, FTS 423-6334, Marine Safety Office, 6767 N. Basin Avenue, Portland, OR 97217.

Supplementary information: This safety zone is imposed as a result of the volcanic eruption of Mt. St. Helens on May 18, 1980, which caused tremendous flooding of the Toutle and Cowlitz Rivers in Southwest Washington. The resulting flooding caused silt to be deposited in a 3 mile area at the point where the Cowlitz River meets the Columbia River near Longview, Washington. The navigable channel of the Columbia River, which prior to the volcanic activity was dredged to forty feet, now has a minimum depth of 19 feet within approximately 3 miles beginning at approximately mile 67 and extending to mile 70. The volume of silt is estimated at 10 million cubic yards. This deposit of silt has consequently caused numerous deep draft vessels to be trapped in the Port of Portland, Portland, Oregon and Vancouver, Washington. In addition there are numerous vessels waiting at the mouth of the Columbia River for eventual transit to Portland, OR, Vancouver, WA, and Kalama, WA. The economy of Northwest Oregon and Southwest Washington is dependent on the rapid opening of the navigable channel to water borne commerce. The Captain of the Port, Portland, Oregon, in consultation with the other Government agencies, including the U.S. Army Corps of Engineers, State and local officials, vessel's agents/owners and the Columbia River Pilots Association developed this rule, which will allow minimum interference with foreign and domestic commerce but at the same time allow for dredging operations by the U.S. Army Corps of Engineers to continue in order that the advertised channel depth of forty feet can be restored to normal as soon as practical.

This amendment is issued without publication of a notice of proposed rulemaking, and this amendment is effective less than 30 days from the date of publication because public procedures on this amendment are impractical due to the emergency nature of the situation and there is not sufficient time to allow for public comment. Although this safety zone is published as a final rule, public comment is nevertheless desirable to ensure that the requirements concerning this safety zone are workable and reasonable. Accordingly, persons wishing to comment may do so by submitting written comments to the address stated above. Commenters should include their names and addresses, identify the docket numbers for this safety zone (CCGD13-80-04), and give their reasons for the comments. Based upon comments received, this regulation may be revised.

Drafting information: The principal person involved in the drafting of this document is LT Hugh N. Johnston, Chief, Investigations Department and Project Attorney, Marine Safety Office, Portland, Oregon.

In consideration of the above, Part 165 of Title 33, Code of Federal Regulations, is amended by adding a new § 165.1303 to read as follows:

SECTION 165.1303 COLUMBIA RIVER, MILE 67 THROUGH MILE 70, LONGVIEW, WASH.

(a) The following area is a safety zone—the Columbia River Mile 67 through Mile 70, including the original channel and the waters on either side of the

channel to shoreline. This zone is effective 24 hours per day beginning at 2400 PDT on 22 May and will continue in effect until cancelled.

(b) The following Special Regulations apply to Deep Draft Vessels (i.e. those vessels which must remain in the navigable channel because of their draft) entering the safety zone—

(1) Transit through the above safety zone is limited to those hours and maximum drafts which are established by the Captain of the Port, Portland, Oregon. The times established for transit will be modified as necessary and will be based upon the optimium river conditions, including tide, flow rate, and gauge, the needs of domestic and foreign commerce, weather including visibility, the progress of dredging operations, and the degree of interference that transit has on the dredging operations.

(2) Upbound and downbound vessels will not be allowed to transit through the zone at the same time.

(3) Individuals desiring to transit deep draft vessels through the zone shall obtain information concerning the periods during which the zone will be open on a particular day, the maximum draft permitted and the allocation of this time between upbound and downbound vessels by calling the Captain of the Port, Portland, Oregon at (503) 221–6342.

(4) Individuals desiring to transit deep draft vessel through the zone shall give the Captain of the Port, Portland, Oregon, 24 hours advance notice (including the name of vessel, the anticipated draft and the date of desired transit of the zone).

(5) Vessels approaching the zone shall communicate directly with the dredging vessels on scene via channel 13 as far in advance as possible in order that arrangements may be made for a safe passage.

(c) The following special regulations apply to Shallow Draft Vessels (i.e. those vessels which because of their draft need not remain in the navigable channel in order to make a safe transit through this zone) entering the zone—

(1) Transit through the safety zone is not limited to particular hours, however, transit shall be made utilizing that area of the Columbia River which is to the South (i.e. Oregon side) of the original 40 foot channel except as provided in paragraphs (c) (2) and (3) of this section.

(2) Shallow draft vessels which desire to use the original channel shall comply with all regulations that apply to deep draft vessels and in addition shall take on a state or federally licensed pilot.

(3) Vessels entering or departing the zone from the Cowlitz River or Carrolls Channel shall remain to the north (i.e. Washington side) of the original 40 foot channel and shall not proceed east of the western tip of Cottonwood Island while north of the original channel.

(4) Vessels approaching the zone shall communicate directly with the dredging vessels on scene via channel 13 as far in advance as possible in order that arrangements may be made for a safe passage through the safety zone.

(5) Individuals desiring to transit the safety zone with shallow draft vessels shall contact the Captain of the Port, Portland, Oregon at (503) 221–6342 in order that they are aware of the operating conditions and times of allowable transit for deep draft vessels. Shallow draft vessels are encouraged but not required to avoid transit in the safety zone during the period of use by deep draft vessels.

(d) The following Special Regulations apply to All Vessels entering the safety zone regardless of their draft—

(1) Vessels which because their steering or propulsion systems are not designed to operate safety under a minimum draft may be required to have a tug escort while in the safety zone.

(2) No vessel may anchor within the safety zone unless, in the opinion of the Master or Pilot, further transit is considered unsafe. In that event the Captain of the Port, Portland, Oregon shall be notified immediately.

(3) Recreational vessels may not use the zone except to transit and in no case shall they enter or cross the dredged channel within the zone.

(92 Stat. 1475 (33 U.S.C. 1225) ; 49 CFR 1.46(n)(4)).

Dated : May 22, 1980.

G. K. Greiner, Jr.,

Captain, U.S. Coast Guard, Captain of the Port, USCG Marine Safety Office, 6767 N. Basin Avenue, Portland, OR 97217.

[FR Doc. 80–18881 Filed 5–30–80 ; 8 :45 a.m.]

Billing Code 4910–14–M.

COAST GUARD NEWS

The Coast Guard Safety Zone Management Office, which was established at the CG Marine Safety Office, Portland, OR to control the movement of vessels through the Safety Zone near Longview, WA, has made predictions of the maximum draft of vessels that will be allowed through the "window" for the next eight weeks. As indicated in the last release, these predictions will be updated each Wednesday until the portion of the Columbia River which was closed due to deposits left after Mount St. Helens erupted has been restored to normal conditions by the Army Corps of Engineers. The predictions are based on the expected depth of dredging as reported by the Corps of Engineers, the predicted height of the river at Longview, WA as predicted by the Northwest River Forecast Center (NOAA—National Weather Service) and a safety factor of 1 foot net hull to bottom clearance applied by the Coast Guard.

The Corps of Engineers has indicated that their dredged depth predictions are contingent on them not striking any major obstacle to the dredges. The River Forecast Center pointed out that the extended forecast for Longview high stages are based upon average forecast weather conditions and average outflows from Bonneville Dam. Extreme weather conditions or unexpected outflow schedules from Bonneville Dam may cause unexpected deviations from the forecast Longview stages. In addition high wind with westerly or easterly components may cause Astoria tides to deviate from forecast values which will be reflected directly in the Longview stages. Also during low flow periods normally July through September, Bonneville Dam outflows are often reduced to below 100,000 cubic feet per second from Saturday morning through Monday morning. The effect of these weekend reductions will be observed at the Longview location on Monday and Tuesday reducing the stages below the weekly mean forecast.

Week of (1980):	*Predicted maximum draft*
June 18	35′ 3″
June 25	35′ 10″
July 2	39′ 2″
July 9	38′ 1″
July 16	38′ 4″
July 23	37′ 4″
July 30	39′ 11″
August 6	38′ 6″

The predicted drafts are the average that can be expected for each week. The time of the "window" opening will generally be no more than 2 hours on either side of time of high water as predicted by tide tables for Longview, WA except that no night passages are being permitted. The other conditions required for transit of the Safety Zone (Columbia River mile 67 through 70) as published by the Coast Guard Captain of the Port, Portland, OR on May 22, 1980 remain in effect. Shipping interests are reminded that the Coast Guard should be advised of your desire to transit the zone at least 24 hours in advance by telephone (503) 221–6342 or 6329.

The actual draft of vessels which will be allowed to transit the following day is announced by the Coast Guard at noon each day. The Coast Guard points out that additional aids to navigation have been established in the area to facilitate the passage of deep draft vessels and notes that 120 vessels with drafts up to 33′ 9″ have transitted the zone since May 23, 1980.

Senator PACKWOOD. Next we are going to have a panel. We are going to have Edwin Sleater and Jim Brady of the Small Business Administration, and Tom Current, the Oregon Administrator of the Economic Development Administration, Dr. Donal Mullineaux from the U.S. Geological Survey, and Arvid Ellson from the Forest Service.

Good morning.

STATEMENT OF EDWIN G. SLEATER, ASSISTANT DISTRICT DIRECTOR, SMALL BUSINESS ADMINISTRATION

Mr. SLEATER. Larry Gourlie, our Regional Administrator, is unable to be here this morning because of the shut-down of the airport.

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I am Ed Sleater. I am the assistant district director with the Portland District Office of the Small Business Administration. I am sitting in for our Regional Administrator.

Mr. Gourlie has provided a statement. I will briefly review that, if I could.

We at the Small Business Administration realize that many Oregon residents may have suffered damage to residences and businesses following Mount St. Helens' eruptions and ashfall.

At this time, the State of Washington, and 10 northern Idaho counties, have been declared major disaster areas by the President of the United States. However, while this declaration does not cover any part of Oregon, there are options available to certain Oregon residents covered under the SBA's disaster loan program.

First, those residents of Oregon with homes in Washington which were damaged by the eruption or ashfall may be eligible for direct loans of up to $15,000 for structural and real property damage, and $10,000 for personal possession loss. The combined maximum loan cannot exceed $55,000, however. The interest rate on these direct loans on the structural or real property only is 8¼ percent. This is assuming, of course, that the structure was a secondary residence, such as a vacation home. Repayment of these loans can be structured up to 30 years.

Included in the $10,000 personal possession portion are two points which are of interest. Certain Oregon residents may have been in Washington at the time of the eruptions and ashfall. If their vehicles were damaged in Washington, these would be covered under the $10,000 personal possessions limitation for that part of the damages not covered by insurance. Also, certain Oregon residents may have suffered personal possessions damage in a unit that they were renting in Washington. This damage would also be covered under our physical disaster loss program. All loss to personal property, whether in a Washington home owned by an Oregon resident, in a rented unit or vehicle damage carries a 3-percent rate and also may be scheduled for repayment up to 30 years.

Businesses with subsidiaries or facilities located in Washington which suffered physical damage as a result of the eruptions or ashfall may be eligible for direct loans of up to $500,000. For those businesses who could obtain funds through normal lending channels, such as banks, but choose to borrow from the SBA, we can make direct funds available at 8¼ percent. For those businesses who in SBA's judgment could not borrow from outside non-Federal sources at reasonable terms, the interest rate is 5 percent. Once, again, repayment can be rescheduled up to 30 years.

We also have a program for businesses who have suffered economically as a result of this disaster. This economic injury disaster loan, or EIDL, program, is intended to provide working capital to those businesses who have short-term obligations which could have been met had the eruption not occurred. In short, we try under this program to help keep the business afloat during a time of depressed business activity following a disaster until business is back to normal. Under this program, the business owner must use personal and business resources to every extent possible without putting undue financial hardship on the business or individual. To qualify for these 8¼-percent loans a

business must meet SBA's small business size guidelines and, at present, the business which suffered the economic injury must show that this injury is due primarily because of the damage sustained by its Washington facility. The terms on EIDL loans are for a maximum period of 30 years and depend on the ability of the applicant to repay.

Senator PACKWOOD. Tom, I understand you have no prepared statement. Do you want to say anything before I ask you a few questions?

STATEMENT OF TOM CURRENT, OREGON ADMINISTRATOR, ECONOMIC DEVELOPMENT ADMINISTRATION

Mr. CURRENT. Thank you, Senator.

I would just extend to you the regrets of the Regional Director. She couldn't be here. I am here, really, in the role I have been playing right along, which is as an observer awaiting the longer-term reconstruction period to see if we can play an appropriate role there. I would be glad to try and answer any questions.

Senator PACKWOOD. I might say for the press that Tom Current is the Oregon Administrator of the Economic Development Administration. This Administration is not dependent upon emergencies necessarily. They have an ongoing program of aid and have been very successful in Oregon and have had a good working relation with Tom.

Tom, does the State of Oregon have to do anything to qualify for any EDA assistance because of this emergency that they wouldn't have to do otherwise?

Mr. CURRENT. No, sir. They are qualified now, as are all areas in the State except Polk County.

Senator PACKWOOD. How did they get left out?

Mr. CURRENT. Just statistically.

Senator PACKWOOD. Is that right?

Mr. CURRENT. Yes.

Senator PACKWOOD. I don't know if that will be a satisfactory answer for them.

Mr. CURRENT. They have already made that observation.

Senator PACKWOOD. Let me pursue that a little further. How does a county in the center of the State, roughly in the center of the valley, get left out when everyone else around them qualifies?

Mr. CURRENT. Well, I think the economy in Polk County is not particularly urban oriented.

Senator PACKWOOD. That is true.

Mr. CURRENT. The workforce that lives there works in Salem, for instance, and really doesn't count in those statistics. So it is kind of an aberration.

Senator PACKWOOD. That was your word for Polk County.

Next we will take Dr. Mullineaux.

STATEMENT OF DR. DONAL MULLINEAUX U.S. GEOLOGICAL SURVEY

Dr. MULLINEAUX. I am Don Mullineaux of the Geological Survey.

In terms of what has happened in the past, I think it is fairly well known, up to last night, that the earthquakes started under the volcano on March 20 and the first eruptive burst occurred 1 week later.

Senator PACKWOOD. Let me ask you to do this. Since your testimony is very important, and you know more about this mountain and even predicted this eruption, I want you to speak slowly enough so that the news media can pick up what you are saying. Speak especially in terms that I and others can understand.

Dr. MULLINEAUX. I was asked to state what has happened and what will happen and the first one is easier.

The eruption started with earthquakes or rather the episode started with earthquakes on March 20. The first eruptive burst occurred 1 week later. The eruptions from then on into the middle of May were intermittent. We had steam and ash consisting of particles of the pre-existing volcano without new magmatic or molten rock being brought to the surface.

Then on May 18 the large eruption occurred. Then on May 25 the next eruption occurred and after that time it was relatively quiet until last night. A little bit of what is called harmonic tremor, which is simply a constant vibration, different from other earthquakes, started slightly during the afternoon, increased somewhat through the afternoon and into the evening. Then the first eruptive activity that was noted was about 7 o'clock in the evening. At a little after 9, there was a very strong episode of harmonic tremor and a very large eruptive plume. Ashfall had started from the 7 p.m. eruption and continued. It was very strong with the burst just after 9 o'clock and continued with fairly strong activity up until some time around midnight.

The various agencies that are housed in the Forest Service Emergency Coordinating Center in Vancouver, including the Geological Survey, and all the other agencies responsible for safety and warning watched the eruption through the night. The earthquake activity record goes to Seattle and is also monitored in a secondary way in that building in Vancouver. At about midnight the harmonic tremor lessened and as best we can tell, with very slight observations, the plume lessened in height. That was primarily observed by radar from Portland.

As of an hour or so ago, there still continued to be some harmonic tremor and a plume with some ash in it, but the weather is very tight. Helicopters are attempting to assess what happened near the volcano, and at the present time it appears it was mostly ashfall carried away by the winds. There were no reported changes in stream flow or mud flows in the valleys leading from the volcano. That includes reports from the Toutle River, from the Kalama River, and from the Lewis River.

The volcano does continue to swell slightly. This is interpreted as a possibility that magma continues to be injected under the volcano. That, plus the geologic record of the volcano shows we clearly are in an episode of explosive eruptive activity.

Senator PACKWOOD. Wait a minute. I think I understood what you said. Are you talking about a continued period now?

Dr. MULLINEAUX. I am talking about an episode, a continuing period of unknown duration.

Senator PACKWOOD. Where we can expect continuing volcanic activity?

Dr. MULLINEAUX. Not necessarily expect. I don't think we can really use the term "expect" except in perhaps a probalistic sense. We go entirely by the geologic record that we have worked out at the volcano. This shows that once the volcano has gone into these kinds of explosive eruptions, there have been several such eruptions, although there are some episodes recorded in which there has been only one or perhaps two explosive eruptions. There are many episodes that have produced many highly explosive eruptive vents that produced pumice and ash.

Senator PACKWOOD. Let me ask this question again. Based upon the past record of this mountain, can we expect more eruptions?

Dr. MULLINEAUX. I think we have to consider it likely enough to be prepared for that.

Senator PACKWOOD. And we have no idea what magnitude?

Dr. MULLINEAUX. That is correct.

Senator PACKWOOD. What about this in relation to other activity in the Cascade Range? Is this a harbinger of any other eruptions in any other mountains, based upon past experience?

Dr. MULLINEAUX. As best we can tell from the record, there is no connection between this volcano erupting and the other volcanoes erupting. The fact that this volcano erupts now does not necessarily mean that others will. However, we should recognize that it appears to us that the 20th century has been very quiet in the Cascade Range, compared to, for example, the 19th century.

Senator PACKWOOD. Let me ask you this. Back in 1978 you wrote this little pamphlet, entitled "Potential Hazards From Future Eruptions of Mount St. Helens Volcano Washington." Have you written any such publications on Mount Hood?

Dr. MULLINEAUX. There is a report that is being processed now and will be printed soon, yes. The study has been done, the report prepared and it is in press.

Senator PACKWOOD. What does it conclude?

Dr. MULLINEAUX. The frequency of activity at Mount Hood is much lower than that of Mount St. Helens. There have been—I did not do this report, but Rocky Crandall, the other author of the St. Helen's report, did. There are, if I remember correctly, three episodes of eruptive activity at Mount Hood within the last 10,000 to 12,000 years, whereas there have been many times that number of eruptions at Mount St. Helens.

Senator PACKWOOD. So it would be a fair statement to say that the likelihood is greater that we will have more eruptions at Mount St. Helens, while the chances of an eruption at Mount Hood are slim?

Dr. MULLINEAUX. Yes. In addition, the eruptions from Mount Hood have not been the explosive kinds of eruptions that have occurred at Mount St. Helens. So they have not sent the large volumes of pumice into the atmosphere to be carried downwind.

Senator PACKWOOD. Let me ask you a slightly different question, Doctor. How long can we expect the ash, which has already spread over the forests and the farmlands, to continue to wash down into the rivers?

Dr. MULLINEAUX. That is a question that we can't give a good answer to in terms of time. The ash will wash down until something

grows on it or otherwise lodges it in place. As long as it is free to move on the slopes on which it has fallen, rainstorms will move it down to the streams.

Senator PACKWOOD. In other words, there is so much of it that until a new forest cover of some kind grows it is going to continually wash down. It will not wash down in a year or two and that will be it?

Dr. MULLINEAUX. I think it is fair to expect that it will wash down in various quantities over a long period of time.

Senator PACKWOOD. Is that it?

Dr. MULLINEAUX. Probably the most important thing is that we are dependent upon that geologic record and the geologic record does not indicate the time between eruptions. It does indicate that multiple eruptions in an episode of this kind are likely. It doesn't indicate that any given period of quiet after one eruption means that the volcano has shut down. We cannot tell whether the time period between two successive eruptions of the geologic past has been a matter of weeks or months or even years.

Senator PACKWOOD. Is that just because we did not keep those kinds of records, then?

Dr. MULLINEAUX. Yes, but we are talking about the geologic record thousands of years ago, within the last few thousand years.

Senator PACKWOOD. Doctor, thank you very much. Congratulations on the accuracy of your past predictions.

We sit in Congress and part of our budget is a contingency for disasters and floods. In the budget process you are trying to speculate what kinds of disasters are you going to have the next year. Of all the things you put into the budget, I guess that is the most difficult one to estimate. We just try to take averages of floods in the past, or hurricanes in the past, and average it over the future and hope that the fund is enough to cover it.

Dr. MULLINEAUX. This is one of those things that has a low probability in any 1 year.

Senator PACKWOOD. It is like the Corps of Engineers and their estimates of the once-every-500-year flood. It may only come once every 500 years, but when it comes it is an expensive flood.

Dr. MULLINEAUX. Yes.

[The statement follows:]

STATEMENT OF DR. DONAL R. MULLINEAUX, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Mount St. Helens, dormant since the middle of the 19th century, began erupting on March 27, 1980, after a week of premonitory seismic activity. From March 27 through May 17, the volcano intermittently erupted steam and ash with some larger fragments from a crater that opened at the summit. The erupted material was derived from the pre-existing cone. No new molten rock reached the surface during that time. A sector of the north flank of the volcano, however, moved outward to the north and northwest for more than 3 weeks prior to May 18 at a rate of 1 to 1.5 meters per day, and the increasing instability of that flank made the north side the primary focus of concern.

On May 18, immediately after a magnitude 5 earthquake at 0832, the north flank of the volcano slid northward, producing a massive avalanche and debris flow, and the volcano began to erupt violently. A hot lateral blast devastated an area that reached from northwest to northeast of the mountain and overwhelmed about 500 square kilometers with hot gas and rock fragments, knocking down trees to distances of as much as 25 km. Winds caried volcanic ash ENE and E across

Washington, Idaho, and Montana, then southeasterly across the central states and ENE again across the rest of the nation. Beginning in the early afternoon, hot masses of pumice and gas, called pyroclastic flows, streamed down the north flank of the volcano. The debris avalanche produced a huge 25-km-long deposit in the North Fork of the Toutle River adjacent to the volcano; mudflows extended down both the North and South Forks of the Toutle, and significant floods extended as far as the Columbia River. The lateral blast extended about three times farther than any such blast recorded by the geologic history of the volcano; the distribution of wind-carried ash, pyroclastic flows, mudflows, and floods, however, closely match locations and extents anticipated from the geologic record, and most people had previously been evacuated from the most severely affected areas.

On May 25, a second explosive eruption of ash occured during the early morning hours while winds above the volcano were blowing toward the northwest, west, and southwest. As a result, ash fell on a large area of southwestern Washington and northwestern Oregon.

Since May 25, the volcano has been relatively quiet. Earthquake activity has been at a lower level than at any time between March 20 and May 18, and only a few small episodes of harmonic tremor indicate minor movement of molten rock is taking place under the volcano. Eruptive activity has consisted of small emissions of gas and ash. The volcano does continue to swell slightly, at approximately the same rate as it did before the May 18 eruption. Neither the instrumental data nor surface observations, however, give evidence of exactly what to expect from future eruptions. Monitoring now underway at the volcano includes an extensive system of seismometers which relay earthquake information directly to the University of Washington, and tiltmeters which record movements that could be caused by the movement of molten rock into the volcano. In addition the flanks of the volcano are being surveyed periodically to monitor their stability.

The volcano has the potential for highly explosive eruptions. The geologic record of Mount St. Helens shows that a few eruptive episodes have consisted of a single large explosive event, but also that many have included several voluminous explosive events. Thus, the geologic record, in addition to the continued slight swelling of the volcano, indicates that future explosive activity is likely enough to warrant preparation for such activity. In general, the larger the eruption, the more severe its effects. The kinds of eruptions that would be especially dangerous are voluminous ejections of fragments and gas that rise high into the stratosphere and are carried in whatever direction the wind is blowing at that time. Future eruptions of that type could be small, but the geologic record indicates that they could be even more voluminous than that of May 18 and lay down thicker deposits at similar distances.

A second type of dangerous eruption that should be considered possible could occur if a large volume of material from an explosive eruption fell back onto the flanks of the volcano, forming pyroclastic flows that streamed down the slopes of the mountain into any or all valleys that head on the volcano. Such pyroclastic flows in the past have traveled as far as about 25 km from Mount St. Helens, and they commonly form mudflows that can travel much farther.

In the immediate future, relatively small explosive eruptions are likely to be directed to the north because of the large breach in the north wall of the crater, and to preferentially affect the Toutle River drainage.

A critical question for which we do not have a good answer concerns the timing of possible future eruptions. The geologic record does not indicate whether the relatively quiet periods between high explosive eruptions during periods of explosive activity are measured in days, weeks, months, or even years. Thus we cannot predict just when another eruption might occur, and we cannot say now how long a quiet period must last before the volcano can be regarded to be dormant again for planning purposes.

Senator PACKWOOD. Mr. Ellson?

STATEMENT OF ARVID C. ELLSON, DEPARTMENT OF AGRICULTURE

Mr. ELLSON. Thank you, Senator.

I think anything following Don's statement is somewhat of an anticlimax.

We welcome the opportunity to appear before the committee to discuss the Forest Service actions relative to the volcanic eruption.

I am Arvid Ellson representing Richard Worthington, Regional Forester of the Pacific Northwest Region. I appear today as director of the Mount St. Helens Recovery Planning Unit that was set up by the Regional Forester on May 29.

Our efforts are being coordinated with other Forest Service offices as well as other Federal, State, and county offices. We anticipate a major effort will be required to restore the facilities and rehabilitate the renewable resources of the area.

Several USDA agencies, cooperating with other Federal, State, and local agencies, are now assessing damage to crops, soils, and streams.

I would like to discuss and summarize just a little bit about some of our estimates of the resource damage. I guess I want to emphasize, Senator, that the estimates are based only on limited aerial observations. As you can well realize, the resources we manage are relatively close to the mountain and most of our people are quite reluctant to get on the ground.

First, we estimate right now 477 miles of class I and II streams. These are major streams and their first tributaries. There is considerably more miles of smaller streams, intermittent streams, and so on. These are the major streams and the first tributaries that have been damaged in some way.

Senator PACKWOOD. Give that figure again.

Mr. ELLSON. About 477 miles. This we did off of maps, aerial photos.

Of these we say that 28 miles are almost completely destroyed by mud flows.

There are two lakes that were destroyed. This includes Spirit Lake; 27 lakes were heavily damaged, including parts of Spirit Lake and beyond. This is about 1,262 surface acres.

We say there were 2,300 big game animals that were killed, including deer, elk, bear, and so on. About 60,000 acres of big game habitat was severely damaged.

Totally we estimate a volume of about 3.2 billion board feet on all lands were damaged. Approximately 1.6 billion board feet were on the 45,000 acres of National Forest land.

Senator PACKWOOD. Give me those two figures again.

Mr. ELLSON. We estimate right now, and, of course, these are very rough estimates, we are in the process of revising them, totally there are around 3.2 billion board feet of timber on all lands that were damaged.

Senator PACKWOOD. And how much of that is on Forest Service land?

Mr. ELLSON. About 1.6 billion.

Senator PACKWOOD. Just about half of it?

Mr. ELLSON. Yes.

Now, the current net volume is estimated at 800 million at this time.

Senator PACKWOOD. What do you mean "net volume?"

Mr. ELLSON. This is the volume that would be salvageable, that could be salvaged.

Senator PACKWOOD. So you have got 3.2 billion board feet total damage, of which only about one-quarter is salvageable?

Mr. ELLSON. No. The 800 million relates to the 1.6 billion Forest Service.

Senator PACKWOOD. About one-half of the Forest Service damaged timber is recoverable?

Mr. ELLSON. That is the way we see it.

Of this net volume, we know that some of the damaged timber cannot be salvaged because some of the area will be recognized for its scientific and geologic value. So this will have some effect on the 800 million. We have no way of estimating what that will be, but there will be a lot of public involvement there.

Senator PACKWOOD. Even if the timber at the moment is salvageable; is there a market for it?

Mr. ELLSON. We think there is, yes. Weyerhaeuser is moving in on there and they are optimistic. They are doing some of the work first. Our timber operators are quite optimistic that we will be able to salvage this.

Senator PACKWOOD. A technical question. Is there any problem in milling this timber with the ash all over it and the damage that has been done to it?

Mr. ELLSON. We understand that it is going to be more costly. There is probably no question in that. It depends on how damaged, how much rock is embedded. We don't have the answers on this. Of course in the field there is damage to equipment that is more than normal. I guess experience this summer will tell us more about that.

Senator PACKWOOD. When will you be able to start salvage operations?

Mr. ELLSON. Well, up to last night, I would have said that maybe within a month, month and a half, we would have started. Of course it all depends on the volcano as far as the national forest lands are concerned. Certainly, again, we are closer to the mountain and the safety of our crews and our own people is paramount at this time.

Senator PACKWOOD. As to the timber that is down, how long can you leave it down before it would be beyond salvaging?

Mr. ELLSON. We say from 2 to 4 years most of it would be salvageable. This is quite normal. Some of the smaller material would be less.

We lost an estimated 26 million dollars worth of facilities. These are facilities such as roads and buildings, recreation facilities. These are facilities we constructed. This is not a damage estimate to timber or anything else. 1,700,000 dollars worth of recreation improvements, for example, were destroyed.

We estimate that around 266,000 visitor days of recreation will be lost to the public because of facility loss, but I think we have to point out that the volcano also offers a unique opportunity for public education and scientific study. We expect a fairly heavy influx of visitors this year. We are getting prepared by installing visitor information centers. They are in mobile trailers right now. We think that is wise so we can move them as the need arises. We plan on more permanent centers and will build them as the mountain becomes more stabilized.

We say that there are 63 miles of road that were obliterated and about 1,714 miles of roads are covered with ash that will require some work to put them back into operational condition.

We lost about seven permanent bridges and about five log stringer bridges. The estimated construction cost on those is around $10 million.

We lost 97 miles of trails. There were 15 Forest Service buildings at the Spirit Lake Work Center which were destroyed. The St. Helens Ranger Station had to be abandoned. It is still there, most of it is still there, but we have no one there at all. We have no estimate of what the replacement would be, but these are actual losses right now.

The recovery and the rehabilitation activities are underway, although for the most part these are limited at the present time to planning efforts. You are aware, I am sure of the activities of the Federal Emergency Management Administration. Bob talked to us earlier. They are charged with the coordination activities to restore the economy and the public facilities of the disaster area. Our activities are going to be fully coordinated with them.

We are only beginning the rehabilitation necessitated by this event. We cannot predict with any certainty the scope and size of the effort at this time. We do believe that proper and thorough assessment of the extent of damage and comprehensive planning are the key to the success of the rehabilitation effort. We want to emphasize that the Forest Service has the experience to deal with disasters of this kind. We have been through a lot of them.

I appreciate the opportunity to testify. I have abbreviated several of the items of the testimony, but I am prepared to answer questions on them.

Senator PACKWOOD. You hope to be able to start salvage operations, before last night, that is, within the month?

Mr. ELLSON. Maybe it is better to say within 2 months as we get into the summer season.

Senator PACKWOOD. And about half of your losses, in your estimation, are salvageable?

Mr. ELLSON. That is our estimation right now.

Again, part of the area that is salvageable may well be considered or set aside for its geological value.

Senator PACKWOOD. You are not talking about the other 800 million, then, that is not salvageable as part of maybe a scenic or some other area?

Mr. ELLSON. The 900 million is part of that. We just said that if you could go into the whole area we could salvage about half of it.

Senator PACKWOOD. But of the half that you can salvage, we may want to set aside these for purposes other than timber salvage?

Mr. ELLSON. That is right.

Senator PACKWOOD. No other questions, gentlemen. Thank you very much for coming.

[The statement follows:]

STATEMENT OF ARVID C. ELLSON, DIRECTOR, MOUNT ST. HELENS RECOVERY PLANNING UNIT, FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman: We welcome this opportunity to appear before this Committee to discuss Forest Service actions relative to the volcanic eruption which occurred on Mount St. Helens May 18.

I am Arvid Ellson, representing Richard Worthington, Regional Forester of the Pacific Northwest Region of the Forest Service, Department of Agriculture. I appear here today as Director of the Mount St. Helens Recovery Planning Unit established by the Regional Forester on May 29, 1980.

This team, composed of specialists from many fields, will: (1) Assess the impacts from the volcano. (2) Develop a plan of short- and long-range alternatives for managing the Gifford Pinchot National Forest.

These efforts are being coordinated with other Forest Service offices as well as other Federal, State and county offices. We anticipate a major effort will be required to restore facilities and rehabilitate the renewable resources of the area.

Several USDA agencies cooperating with other Federal, State, and local agencies, are now assessing damage to crops, soils, and streams.

I would like to summarize our estimates of resource damage that has been caused by the eruption of the Mount St. Helens volcano to the Gifford Pinchot National Forest and lands adjacent to the Forest. These estimates are based only on limited aerial observations. Since damaged lands are close to the mountain, we have so far been unable to enter the area for on-the-ground examination.

The data presented here pertains to the forest resources on and in the vicinity of the Gifford Pinchot National Forest, which includes an area devastated by the blast, the subsequent flows of pyroclastic materials and mud, and heavy ash fallout. This area totals about 100,000 acres, and covers about 150 square miles. This is not meant in any way to deemphasize those direct personal losses of human life, private property, and resulting personal anguish.

Damage to resources and improvements can be summarized as follows:

Resources: 477 miles of Class I and II streams damaged.

These are major streams and their principal tributaries. This includes 28 miles destroyed by mud flows. These rivers and streams are those that provide water for hydroelectric power, recreation, municipal and industrial uses and anadromous and resident fisheries habitat. Many miles of secondary streams and intermittent creeks were heavily damaged that are important in maintaining downstream water quality and aquatic life. Downstream reservoirs and hydroelectric impoundments will be affected as sediment from the streams is dumped into them. It is estimated that 1,100,000 cubic yards of sediment will be deposited into Riffe Lake and Swift Reservoir alone.

2 lakes destroyed (6 surface acres).

27 lakes heavily damaged, including Spirit Lake, comprising 1,262 acres.

2,300 big game animals were killed. These were elk, deer, bear, and mountain goats.

59,520 acres of big game habitat were severely damaged by complete or near complete loss of vegetation. In addition, many thousands of acres are covered by heavy ash fall.

An estimated total of 3.2 billion board feet of timber on all lands were damaged. Approximately 1.6 billion board feet of timber on 45,000 acres of National Forest land was damaged. Current net volume of National Forest timber damaged is estimated at 800 million board feet with a value exceeding $100 million. "Net" volume estimates reflect that volume on areas that are loggable. These figures will change as we are able to examine the area in more detail. Some of the damaged timber will not be salvaged, because some of the area will be recognized for its geologic value, scientific study and public education.

Salvage of damaged timber is faced with many unknowns. Access to the timber is but one problem. Others include the selection of logging systems suitable for removing the timber, condition of the timber, and the health and safety of the loggers. It should be recognized that we are assuming we will be able to use more helicopters than normal for logging. This will reduce the miles of road needed and hence road density. We have found that local mill capacity (representing firms within a 50 mile radius of the area) is capable of handling the additional volumes that will be removed, which represents about a 2-year timber harvest level on the National Forest. Most of the timber should remain in a sound condition for up to 4 years. Our forest products utilization program will be directed to assisting private landowners, mill owners, and loggers regarding harvesting and processing of the logs containing imbedded rock, ash, and pumice.

Facilities: Collectively Forest Service facility loss is estimated at $26,000,000. This includes:

$1,700,000 worth of recreation improvements destroyed. This includes the destruction of 27 developed recreation sites.

266,000 Visitor Days of recreation will be lost to the public because of facility loss and necessary Forest closures. The volcano offers a unique opportunity for public education and scientific study. We expect a heavy influx of visitors wanting to visit the area. Display and interpretive programs are being installed at two mobile visitor centers and in local National Forest offices.

63 miles of roads were obliterated—loss $10,000,000.

1,714 miles of roads are ash covered.

7 permanent bridges and 5 log stringer bridges were destroyed at a loss of $9,800,000.

Damage is so severe it will not always be feasible to replace some transportation facilities at all or at least in the same general location. This is particularly true in the Toutle River drainages. The restoration of the transportation system is a fundamental need and must involve construction of temporary bridges and removal of ash from roads to abate dust.

97 miles of trail were obliterated in the blast area and an additional 30 miles will require ash removal.

15 Forest Service buildings at the Spirit Lake Work Center were destroyed with a loss of $1,100,000. The St. Helens Ranger Station Office has been abandoned and will not be reoccupied except as a day use work center. This administrative site consisted of 19 permanent buildings. Privately owned improvements under four National Forest special use permits around Spirit Lake were lost as well as buildings on privately owned land.

The potential for a major fire is present due to the timber on the ground, a danger which will be made more acute when the public gains access to the area.

A major reforestation and revegetation effort will be required to stabilize eroding watersheds and restore the renewable resource capability of the area. The effort cannot be started until it is safe to enter the area. But, in the meantime, determination of the best vegetation to plant, as well as tree seed collection activities, will be intensified to ensure adequate water supplies. Fortunately, this appears to be a good seed-producing year. The Emergency Watershed Program (Section 403 of P.L. 95–334) will be used for some of the watershed restoration. This activity will take place on all affected ownerships and will involve our State and Private Forestry program working with the Soil Conservation Service.

Our Forest Service Research staff will address not only the immediate effects within the devastation area but also the subtle, long-term ecological processes, whose effects may be much greater. This research will aid Forest Service and private land managers in restoration and future management strategies.

Recovery and rehabilitation activities are underway, although for the most part these are limited at the present time to planning efforts. You are aware, I am sure, of the activities of the Federal Emergency Management Administration, the agency charged with the coordination of activities to restore the economy and public facilities of the disaster area. Our activities are fully coordinated with them and with counterpart State and Federal agencies.

We expect to enter only the safe zone this fiscal year, and we will proceed cautiously. The public's safety will remain of uppermost importance when the area is reopened for public use. The National Forest is working closely with State and local law enforcement authorities to ensure this.

We are only beginning the rehabilitation necessitated by this catastrophic event. We cannot predict with any certainty the scope and size of the effort. We do believe that proper and thorough assessment of the extent of damage and comprehensive planning are the keys to a successful rehabilitation effort. We want to emphasize the Forest Service has the experience to deal with rehabilitation needs following natural disasters.

We appreciate the opportunity to testify. I have a copy of my statement available for insertion in the record. I would be happy to answer any questions you may have.

Senator PACKWOOD. Now we will take a panel of Art Riedel, Floyd Shelton, and Malcolm Jones.

Good morning gentlemen.

Art, I just saw you 2 days ago in Washington.

STATEMENT OF ARTHUR A. RIEDEL, RIEDEL INTERNATIONAL, INC.

Mr. RIEDEL. We are following each other around the country.

We have got so many good facts here from everybody involved that I am just going to mention two or three things to kind of

bottom line. Everybody else has mentioned it, but as chairman of the Governor's Maritime Committee, and also very interested in the maritime industry from various angles, I am just completely impressed by the tremendous teamwork by everyone involved from all levels, starting with the Governor's coordinating staff, the port authorities, and right on down through. I have just never seen such a diverse and tremendous large group of people work together.

Senator PACKWOOD. You hate to think that it takes disasters to make government coordination work.

Mr. RIEDEL. Right. I especially want to talk about the Corps of Engineers, the Coast Guard and the bar and river pilots because of this tremendous potential problem of blocking the river, which never did really happen, only for a few hours, but we see those agencies led by their able staffs really just jumping in there and working together and this was something to see. It was almost like a time of war where everybody pulls together for the common good.

The dredging contractors mobilized equipment from up and down the coast coming from every direction in order to back up the corps and the Port of Portland. This is something that I personally am proud of. The fact that nobody asked from the contractor's side price and tried to negotiate, it was all show us where to sign and pay us what you think is right. I think that is a compliment to free enterprise that people aren't out with what are you going to pay me before I pick up my pick and shovel.

Senator PACKWOOD. How many of your dredges do you have working?

Mr. RIEDEL. At the moment, we have three there. We have got three more moving toward the site from California. I am pulling them off other jobs and getting other people mad at us, but we have come to the motherhood, apple pie, and the flag State of Oregon because we believe in it.

I would add to what other people have said about this need for long-term funding and study since we all know that this is going to be solved in the short term to get things back to normal, but the long term of keeping the streams and the rivers and everything open is something that nobody wants to take lightly.

Thank you.

Senator PACKWOOD. I will let the rest of the panel go ahead and then I will ask some questions.

STATEMENT OF FLOYD SHELTON, MANAGER, PORTS DIVISION, OREGON DEPARTMENT OF ECONOMIC DEVELOPMENT

Mr. SHELTON. I am Floyd Shelton, manager of the ports division of the Oregon Department of Economic Development.

I have to say, as everyone else has, I extend our compliments to the Coast Guard, the pilots, the Port of Portland, Port of Astoria, the Corps of Engineers for an incredible job of coordinating the efforts. I think everyone really needs a very sound pat on the back, which, I think, they are getting here today and it is most appropriate.

Some other comments have been made here today with regard to the fact that the port and the inland area of the Columbia River is

open for business. I think that is an extremely important point that has to be conveyed. After the major eruption on the 18th, I was in San Francisco for a meeting. Just before I left I had a phone call from the people I was meeting with to see if I wanted to cancel because they didn't know if we could get out up here. They thought the place was virtually covered with a couple feet of ash and the river was shut down.

This morning I drove in from Salem and the media was really hyping the ash fallout of last night. I was really concerned whether I was going to be able to make it into the city and how serious it was. I was making a number of phone calls as I drove it. I kept looking for the ash on the freeway and all I could see was good old Oregon rain that just kept coming down. Obviously when we got off there was some ash that had been falling. My point is that as it was presented in the media it was considerably different than what my experience was when I arrived here.

I think it is important that the media, both television, as well as the radio, the newspapers, accurately reflect what is going on with regard to the volcano, and particularly to prevent any misconception. That does have a very serious impact on the economics of this area, the Portland and the Oregon area, in terms of perception overseas. In fact, the Governor early on recognized this problem with the cooperation of the Port of Portland and gave a press release that has been widely disseminated to foreign agents and the Pacific rim countries, as well as Europe, who were just diverting ships to other ports along the west coast based on a popular press and media report in their local countries. We saw this happening and we thought it was very detrimental to the Port of Portland and to the entire State of Oregon's economy.

I think that is a very important point that should be taken and should be recognized.

As far as the immediate impacts on the economy of this State, we have checked with the agriculture people, the Department of Agriculture in the State of Oregon. We don't see any immediate short-term direct impacts of any significant magnitude on the agriculture. Of course except the possibility of the reduction of movement of that particular cargo and the diversion of cargo to elsewhere.

Currently, again, with the tremendous effort that is being done on the Columbia River, I don't see that as being a significant problem. The lumber industry in Oregon, I think, the issue of how to handle some of the small amounts of lumber in Oregon that has ash on it, has yet to be decided. I don't see that the lumber industry is going to have—except as a spinoff, of course, of what is happening over in Washington—any direct impact on our industry in Oregon.

The fish industry, I think, will be addressed later in the day. They are much more knowledgeable about that than I am. I don't think I will make any remarks on that.

One area that I do work in is the area of industrial siting. The impact that this particular type of activity can have on the psychology and on the decisions being made by other people outside of this area, as well as inside this area, in terms of the future location of industry in this area, is very significant. I think it is really not measurable at this time. It really deals in an area of just value judgment based on a

great number of people. We have received calls in our department about the volcano and although they are very guarded questions we certainly suspect what is behind them is they don't know that we are still open for business and what about the siting and a variety of questions such as that.

Senator PACKWOOD. Let me ask you this question.

Now, when you answer their questions and you indicate that, indeed, the port is open and trucks can run and railway trains come and go, the real reason for their decision not to come here cannot be the volcano. They may use that as an excuse, but that can't be their real reason?

Mr. SHELTON. That is quite correct and I think there is some recent evidence. Many people who work in this field and are very knowledgeable and know many of the principals involved in it feel that very strongly, and that includes myself. I think that sometimes the volcano might be a convenient excuse for other decisions being made.

I do think there are some problems with the volcano. The ash fall out. We have heard unspecified and unsubstantiated rumors that there are some problems with air conditioning and some of the manufacturing and things like that, but I think they are very minimal and very small and they get really out of proportion when they are transferred into the national press.

So I think in terms, you asked earlier about long-term impact, this is one area that I think is really going to have impact in the future and we, of course, have to deal with it. We all have to deal with it, I think it is manageable, but certainly the decisions of many people in terms of industrial siting in the southern Washington and Oregon area are significant on that thing.

There were also some remarks made about the Port of Portland and I have put together some very quick facts from a study that we are just completing in Oregon now, the Department, it's called the Oregon port study and we have picked out some figures with regard to the Port of Portland and I have kind of mixed up some of these figures. I would very quickly like to run them. It will only take a moment.

It should be clearly understood and I think it is, that the Port of Portland is Oregon's primary export port. It is, I mean, when you talk about ports, it is the major port in the State of Oregon, bar none. We do export a tremendous amount of products through our port. For example, where 13 percent of all manufactured export products on a regular basis through the Port of Portland, compared to the national average of 8 percent.

Senator PACKWOOD. Explain that figure again.

Mr. SHELTON. If you take the primary export through the port, from our State, you find that there is about 13 percent of all manufactured export products, export products that have been manufactured, are exported on a regular basis through the Port of Portland.

Senator PACKWOOD. All the manufactured products in the United States?

Mr. SHELTON. In Oregon. No, in Oregon, our manufactured products. That compares to a national average of about 8 percent. So we are significantly above that in terms of our manufactured products.

Senator PACKWOOD. You say all the manufactured products made in Oregon?

Mr. SHELTON. That is right.

Senator PACKWOOD. Thirteen percent of them are exported through the Port of Portland?

Mr. SHELTON. That's right.

As a matter of fact, the Port of Portland handles 95 percent of all exports from Oregon.

We have some 1977 figures. The exports valued through the Port of Portland in 1977 is $1.8 billion. The imports is $1.5 billion. As I indicted, 95 percent of that, that's through the entire State, 95 percent of those numbers, virtually all go through the Port of Portland.

Another interesting figure I think is the trade volume as it is translated into employment and payroll. It is our estimate that the jobs related to the trade volume, through the Port of Portland, amounts to in the neighborhood of 50,000 jobs, statewide. In terms of payroll it is approximately $800 million. A very large chunk of the Oregon economy.

Our current port study indicates the total economic impact. The total economic impact for Oregon's trade, which the Port of Portland is a primary facilitator of is about $1.75 billion. We do a little calculation on that, and it was really interesting here earlier, I heard the Coast Guard say that there had been a 60-percent reduction of shipped traffic through that Columbia River in the last 4 weeks, approximately.

Earlier we were talking around the office about what could be some sort of reasonable assumption that we might make in terms of the impact on Oregon from the reduction in activity through that Columbia River. This was just a guesstimate, anyone could pick the numbers, but it seemed reasonable to us, so we looked at what would be the loss of 5 weeks of trade or a 10-percent reduction in the activity through that area. It was our best estimate, and it is only an estimate, that approximately $175 million would be lost to the Oregon economy, as a result of that 10 percent reduction. Well, I don't have my calculator, but you can see if we are talking 60 percent reduction in traffic through there, clearly the magnitude must be very, very great.

I think that gives you some idea of the types of impact we see in Oregon with regards to the problem on the Columbia River. I think that is the major problem, as far as our economy goes.

We do have some recommendations.

I think it is important, as necessary as it is, to work, and as we are doing as effectively and efficiently as we can to get that river open and get the traffic moving through it, clearly we can't forget the other ports in Oregon either. We do not want to lose the equipment, the opportunity and the ability of the corps to provide the necessary dredging at other Oregon ports. That is required for the shipping activity to continue. Coos Bay and Newport on the southern Oregon coast are major ports. Coos Bay is one of the world's largest lumber exporting ports and they have a new channel down there. You mentioned earlier the T-dock, in which we were all very much involved and those types of activities are going forward, dredging is important to continue those activities.

I just would like to mention that we should not forget those in the whole process on the thing.

I think another important point is the focus on the transportation problem. This whole activity is focused on the problems of our railway,

down to the Astoria area, and how dependent we are on that particular rail line. As a matter of fact I have seen some press releases from the Burlington Northern that have indicated that they could put another line on, a train on, but that their policy was to try and direct as much traffic to Seattle or the Oakland area as possible. We don't feel that that is in the best interest of Oregon and we don't want anyone to take advantage of our volcano, as it were, to have cargo migrating elsewhere.

Senator PACKWOOD. Which never comes back.

Mr. SHELTON. That's right. Once it migrates it never comes back. New linkages are established and it is a very difficult thing to recover.

I think it is important that the Fed demonstrate, as they have, we have a tremendous amount of facilities and navigation projects on the Columbia River, but it is extremely important that the Fed reissue and restate their commitment to the Columbia-Snake system, in terms of its contribution to the national system. It is a security issue for this country, as well as just a commerce issue. I think that is very important, that the Federal Government continue and reassert their role in that particular area.

Finally, I would like to make one final comment. I think this was touched on earlier.

We really don't know what the long-term impact of all this ash that is falling down. As I mentioned, I was driving in this morning, I had to think that all that silt and all that ash was running into the river somewhere and going to show up somewhere as a dredging problem.

Down river is an area that has not been immediately impacted in terms of movement of cargo, but clearly, over time, this dredging material will have to continue on down and it is going to end up in an area, we feel, down along the port and the entrance to the river and in the future that can translate into impacts on that local port district and has a very difficult time meeting its own dredging problems now, let alone additional ones. So that would be an important problem in the future.

I think that summarizes my comments with regard to what we view at the department, the problems that the volcano has generated in the Oregon economy.

I would be happy to answer any questions that I could, Senator. Thank you very much.

Senator PACKWOOD. I will wait until the rest of the panel has finished, because I find often that they will answer questions that I might otherwise ask of a previous witness.

I might ask Mr. Newman, Steve Newman, if he would come up and join this panel and I will have him testify when we have finished with the other two witnesses.

Mr. Armstrong?

STATEMENT OF DICKWIN D. ARMSTRONG, EXECUTIVE VICE PRESIDENT, PORTLAND CHAMBER OF COMMERCE

Mr. ARMSTRONG. Thank you. I won't read my testimony. It is available to you and let me just paraphrase some of it.

The chamber, of course, is concerned with all aspects of not only the economic development and economic growth of our community, but also the liveability, because one depends on another.

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One thing that has not been discussed to any great extent, and properly not mentioned is the media affect upon tourism and convention business, and it has had a media effect. I think also on retail businesses, because people are told to stay inside. They obviously don't go out and shop. The Memorial Day weekend was a good example of that.

We are doing some survey work right now to determine how many day/nights have been cancelled in hotels. One hotel told us about 1,100-room nights have been lost already.

What will affect that, of course, has to be the media spokesperson question and we have all discussed that and are all concerned about what happens.

I think it behooves all of us who do speak to the press to, and particularly sciences and health authorities, to be alert to the dramatic effect of our commitments. I think it also behooves the media to really look behind some comments and some things that are happening.

I saw on morning television this morning that, a live show from Portland in which the ash was falling behind the commentator. It was rain and we do have that, so we have to be careful about that.

I think also, we have tried to answer inquiries, we have had a lot of them, as to our personal experience with the ash, how has it affected us. We are going to blame the ash for anything that happens now.

I was in Vancouver the other day and a barge load of sand went down the river. Unfortunately it is about the same color and the people next to us commented, see all the ash they are taking down the river. The fellow I was with said, that's not ash, it's sand. The weather commentaries this morning all blamed, the weather is completely formed by the volcano, so we have to be very careful about that, but we would ask your help because the Greater Portland Convention Bureau, the Oregon hospitality people, are dealing with these facts on a 1 to 1 basis on a national advertising campaign, but that will have no effect whatsoever unless we, who are in a position to speak factually, do that. The media can erase any effect we have from a 1 to 1 cancellation.

There is some guarded optimism about the people that want to come and see the volcano. We are concerned about the media effect.

I think you are going to discuss agriculture. You certainly have had expert industry spokesmen on the port, industrial development. We have had no cancellations in our dealing with prospects, to date, that we can document.

I think another ripple effect——

Senator PACKWOOD. No cancellations of what?

Mr. ARMSTRONG. Industrial prospects, and I don't know of any convention cancellations, to date. Again, that could change. Last night could have changed some of that, but I don't think we have had any. Most people look back and say, well, every place in the country has natural disasters. Hurricanes in Florida and tornadoes in Indiana and so we have to look beyond that into the long-term effect.

Another ripple effect that I would like to, that you have alluded to, and we certainly have to be aware of is that here we are in a position when people say, we want less Government spending and an im-

pending disaster is going to cost a lot of money to the Government. so we have to be alert to the fact that those Government spendings, the things we are talking about today, all come from taxes and we all pay taxes. We certainly must be aware of that.

I will be happy to try to answer any questions you have.

We would also like to congratulate everyone that is on the firing line. Those that had to make immediate decisions, and in many cases life and death decisions, and I think none of us ought to be critical of those decisions, looking back at them with hindsight. But all of us ought to be alert to applying the lessons that could have been learned, and learned, in a constructive manner toward even future, better readiness and an awareness plan.

The chamber is looking at what it can offer to the emergency services. We have resources, we have phone lines and we have an ability to talk to the business community. So we are meeting with people right now to see what we can personally do, in our office, to assist and we also had a meeting with the other metropolitan chambers in the area.

I appreciate it, sir.

Senator PACKWOOD. Mr. Armstrong, thank you.

[The statement follows:]

STATEMENT OF DICKWIN D. ARMSTRONG, EXECUTIVE VICE PRESIDENT, PORTLAND CHAMBER OF COMMERCE

For the record, my name is Dickwin Armstrong, 824 S.W. 5th, Portland, Oregon, representing the Portland Chamber of Commerce, an organization of over 2700 businesses and professionals throughout the greater Portland metro area, Vancouver and other areas of Oregon.

We appreciate the concern shown by your committee in coming to Oregon to assess the impact of eruptions of Mt. St. Helens on our area and for inviting the Portland Chamber of Commerce to present its views on the effect this has had, and continues to have, on our community and the region.

Our immediate concern was for the health and safety of those in the area, though we realize that there is nothing that will replace the lost lives or totally repair and restore the property of those who got out, we want them to know we share their grief and loss.

Currently the Chamber is working on improving ways to deal with the human needs of the community in the event of another outburst from Mt. St. Helens or other disasters.

The psychology of fear and restoration of public confidence in our future can only be met by providing assurance that these needs can be handled in a calm, planned and efficient manner. For your information I have included a working plan which is getting underway with the governmental emergency service units to develop such a program utilizing whatever resources the Portland Chamber has available. (Exhibit A)

We understand that you are looking at the effects of the eruptions on commerce, fishing, and shipping and have invited experts in those areas to provide you detailed information, so my remarks will be to other areas.

The direct and immediate impact upon river and highway traffic, timberlands, and water are highly visible—the "ripple" effect and the immediate and long-term effect of the volcanic ash is still primarily a matter of great discussion and surmise.

Service industries to crop-growers have stated that barring more major ash eruptions, it is their opinion that operations can proceed with expectations of a fairly normal market.

In discussions with these and many other industries—there is a growing concern about the immediate and long-term effect of the ash on nearly anything that moves; cars, trucks, tractors, pumps, electronic equipment, cooling-heating-electrical systems—the list is continuous and long—impacting everyone from the

tractor in the fields, to hospitals, banks and utilities—and I suspect—even the zoos.

Independent study teams on a variety of levels, are needed to survey, assess and relay information to those affected as to general things to look for, react to, and prepare for. While a number of industries are doing this for their own operation, assistance and fact sharing to others should be looked into. (Exhibit C)

Another "ripple" effect, often overlooked, will be the impact upon commerce and business of the increased governmental costs due to this disaster; clean-ups, repairs to roads and bridges, I might even add, hearing and official visits! Public concern about high taxes is at an all-time peak, and since all tax revenue comes directly or indirectly from business, it is important that these unanticipated governmental costs and their effect be taken into account when assessments are made.

We want to congratulate those on the firing line, those who had to make immediate decisions—life and death decisions. Let none of us be critical of those decisions with hindsite, but all be alert to applying the lessons learned in a constructive matter towards an even better future readiness plan.

It has made the Chamber of Commerce aware of our role and we will continue our working with businesses and governmental agencies to determine where/when we can be of service. Thank you for this opportunity to share these views with you.

Attachments: Exhibit A—Portland Chamber of Commerce Disaster Plan Proposal; Exhibit B—Greater Portland Convention and Visitors Association and Oregon; and Exhibit C—Northwest Oregon Council of Hospitals—Volcanic Ash Preparations.

EXHIBIT A

PORTLAND CHAMBER OF COMMERCE,
Portland, Oreg., June 2, 1980.

DISASTER PREPAREDNESS AND EMERGENCY PLANNING

In the event of a major area-wide disaster, such as another eruption of Mt. St. Helens, which might leave a significant accumulation of ash over the Portland Metropolitan Area, the Portland Chamber of Commerce could possibly play some positive role in response to the situation.

The Portland Chamber of Commerce is a private, non-profit civic organization representing some 2,700 businesses (4,500 individual members). Due to the ongoing activities of the Chamber, we are continually in contact with employers who represent a major portion of the area's employment base, particularly in regards to information and referral and coordination of joint civic improvement effort of local businesses. Because of these activities, the Portland Chamber may be able to act, at least as an adjunct to public agency efforts, as a communications network center, coordinating activities and responding to information requests of businesses as needed in the event of a major disaster.

In order to determine the optimal role of the Chamber in such an event, the following items need to be determined:

I. Status of Disaster and Emergency Preparedness Planning: A. City of Portland; B. Metropolitan Area Counties; C. Metropolitan Service District; D. States of Oregon and Washington; and E. Federal Agencies.

II. Determination of In-house Resource Availability: A. Physical Plant; B. Staffing: 1. Event occurrence during regular working hours; and, 2. Event occurrence outside regular working hours.

C. Communications Systems: 1. Input (from established accurate sources); 2. Output (established contacts, etc.); 3. In-house (timely linkage of input to output); and 4. Hardware (telephones and reproduction capabilities).

III. Community Resources Availability: A. Identification of Membership Resources and Metro Area Chambers Resources; B. Integration of Available Membership and Staff Resources; and C. Identification of Contacts and Proper Procedures.

IV. Decision Control and Coordination: A. Centralized, Recognized and Integrated Control; B. Established Chain of Command; C. Pre-event Training in Emergency Procedures; D. Final Responsibility; and E. Established Control of Activation and Deactivation of Emergency Management Procedures.

If these processes are established prior to any event, it is hoped that a timely and effective integration of private and public resources could be activated.

EXHIBIT B

GREATER PORTLAND CONVENTION & VISITORS ASSOCIATION, INC.,
Portland, Oreg., June 1980.

DEAR FRIEND: Thank you for responding to Portland's advertisement in Travel/Holiday Magazine. Your interest in our "City of Roses" pleases us—and I assure you a visit to Portland will please you. We offer modern accommodations at moderate rates an abundance of attractions, excellent restaurants, and a full schedule of activities of all types.

Enclosed is a selection of folders to assist you in planning a future visit to Portland and Oregon. If you require more detailed information on a specific subject, please let us know. We're here to serve you.

There has been considerable news coverage throughout the country regarding the Mt. St. Helens eruption. Please be assured that the eruption and subsequent volcanic ash fallout has not affected Portland. Mt. St. Helens is approximately 50 air miles northeast of Portland. Our prevailing wind is from the southwest, which carries the ash away from Portland.

Again, thank you for expressing interest in visiting Portland in the future.

Yours truly,

A. F. TONY RAITER,
Director of Tourism.

INNS AND RESORTS OF WASHINGTON,
Seattle, Wash., June 1980.

DISASTER HITS MOTEL INDUSTRY

The Board of Directors of the Inns and Resorts of Washington held an emergency meeting on June 4th.

This meeting was asked for by Ray Gilmour, Vice President and also owner of the Colonial Motor Inn in Yakima, to discuss the tremendous impact of the Mt. St. Helens disaster on the motel industry in eastern Washington. Their cash flow went to almost zero after the mountain blew!

The first topic discussed was the adverse publicity by the news media. The people in eastern Washington really pitched in and cleaned up the ash that fell. They should be commended for their efforts.

The media has put so much fear into the people that no one is traveling in eastern as well as western Washington. People are cancelling reservations because of fear of problems that really don't exist.

We must turn this around. Please tell all your customers that all of Washington is cleaned and open for travel. Ray and Les McNary of Yakima's convention center are working very hard to change the image the media puts out.

The second topic discussed was disaster relief offered by the Federal Government. What the government is calling disaster relief is a Small Business Administration loan at 8¼ percent interest. Our fellow members are being told that it may be as long as two years before they get the money if their loan is approved.

These people need help now. What the Federal Government offers is not immediate help at all.

Ray is waging a campaign in Yakima to get all the facts of the loss together. He is going to make up packets of facts and figures and letters from those properties affected. These packets will be sent to President Carter, Governor Ray, Senators Magnuson and Jackson, Representative McCormack and the state Insurance Commissioner.

Some of our fellow members are in jeopardy of losing their properties if they don't get federal help now.

We must use all the influence we as a group have. Most of us have reader boards and there is an election in November. We will keep you informed as to who helps us and those that do not. Please let them know this. We will remember in November.

If any of you are having the same problems as those people in Yakima, please call Ray Gilmour so he can include that information in his packets. Call or write to: Ray Gilmour, Colonial Motor Inn, 1405 N. 1st., Yakima, Wash., 98901. His telephone is 1–509–453–8981. We will remember in November.

EXHIBIT C

NORTHWEST OREGON COUNCIL OF HOSPITALS,
Portland, Oreg., May 23, 1980.

Re volcanic ash preparations.
To: Chief executive officers, plant engineers.
From: Ad Hoc Committee on Volcanic Ash Preparedness.

The Northwest Oregon Council of Hospitals recently conducted a session with several hospital plant engineering directors to discuss what can be done to prepare for volcanic ash or other problems presented by the eruption of Mt. St. Helens and future activity in the mountain, particularly if the winds should happen to blow southward.

Jerry Bucher of St. Vincent, Don Breland and Jeff Selberg of Good Samaritan, Dale McCauley of Emanuel, and Gene Domke of Portland Adventist met with Steve Berkshire and Tony Giardina on Friday, May 23.

There was some indication that because of the crater being on the North side and other factors, the Portland metropolitan area would probably experience fallout similar to Spokane if ash and other fallout should blow South. Other areas to the East of Portland might experience heavier volcanic ash.

It was also noted that the ash from St. Helens is mostly a glass substance and therefore is quite heavy as well as being rough and sharp. A quart jar of the ash is estimated to weigh about 7 pounds.

Major problems. It appears that the major problems occurred during the first 24 hours of fall out and while there were medical considerations, primary concerns were mechanical. Areas of the hospitals most likely to be affected include the filteration, cooling and heating systems, duct work, fans, electrical systems, and motor vehicles.

Since hospitals have varying systems within the hospitals no attempt will be made to provide detailed technical information, but rather this memo identifies general things to look for, react to, or prepare for.

Hospitals in Spokane with filters which were not "sock" type filters vacuumed them out when needed. Initially it was necessary to vacuum often, but this need was reduced after the initial period. There is a need to watch the pressure between the filters closely. It was noted that those with sock type filters cannot vacuum them because of the danger of punching

Make sure there are sufficient surgical masks available.

MEDICAL ISSUES

Major medical problems tend to be respiratory related or eye irritants. Attached is a respiratory therapy plan from Good Samaritan (Portland).

The impact on surgery and other areas requiring large air exchanges should be considered.

SOME THOUGHTS

The group made some coments concerning preparation for unknown situations. A hospital simply cannot prepare for all emergency situations. However, here are some things to be considered:

1. How long would it take to evacuate the hospital if needed because of a disaster befalling the hospital?
2. How would the hospital get rid of solid waste and sewage if normal methods cut off?
3. Water supplies.
4. Can you economically prepare for a lengthy duration beyond minimum inventories for cost containment vs. stockpiling for an emergency?
5. Are all areas prepared including dietary, laundry, central supply, others if disaster lasts for a length of time?
6. It was noted that the possibility of major disasters is becoming more evident with the increase in transportation of chemicals and radioactive substances, nuclear plants, earthquakes, a disaster occurring at or in the hospital.
7. While it isn't possible to prepare for every inconceivable disaster, hospitals normally can react quickly and innovatively to meet the need at the time.

Senator PACKWOOD. Mr. Jones?

STATEMENT OF MALCOLM JONES, NORTON, LILLY & CO.

Mr. JONES. My name is Malcolm Jones with Norton, Lilly & Co. I am also president of the Portland Steamship Operators Association, which represents 26 steamship agencies here in Portland and about 90 percent of the vessels hauling the Columbia River and Portland.

First, for the record, for the Association, we also would like to commend the Coast Guard, the U.S. Army Corps of Engineers, and the Columbia River Pilots, on the excellent job they have done in keeping the flow of vessels into Portland during the trying times.

The Operators Association would also like to thank the Port of Portland for the excellent job they have done in keeping the maritime industry informed as to the daily progress of dredging in the Columbia River. Recent forecasts indicate that vessels drawing up to 39 feet in draft will be able to safely navigate the Columbia River by July 30, which should encompass most of the vessels normally transiting the Columbia River, is most encouraging.

In respect to the impact on vessels, delays have been incurred by vessels waiting at anchor at Astoria for the window to proceed to Portland, inbound. Also delays of vessels have occurred, waiting for window outbound. The vessels cost per day can vary between $15,000 and $25,000 per day, dependent on the size and age of the vessel. Additional delays at Astoria can be incurred if, due to bad weather, vessels miss their connection for the window and would have to wait an additional 24 hours for the next window. These situations can be very costly for the owners.

According to the information from May 18, the volcano eruption, through June 5, 52 vessels have been diverted from the Columbia River. The classification of cargoes was 16 auto vessels, 18 container vessels, 11 general cargo, 3 lumber/plywood vessels, 2 steel vessels, 1 scrap, 1 chip vessel. The dollar impact on the Portland community of the above diversions we are unable to advise, but certainly considerable when one considers the work loss for each vessel to the following, such as barge and river pilots, tug operators, stevedore companies, ILWU longshore gains for discharge load operations, steamship agencies, commissions and customhouse brokers, ship handlers and the loss of revenue to the Port of Portland. Recent port information of June 12 indicates 120 vessels with draws up to 34 feet have transited the Columbia River area since May 23. That is also an encouraging sign.

Some container lines are beginning to return to Portland; Johnson Scanstar, recently. Hopefully others will follow. Other large vessels, such as boat carriers, changed their loading itinerary and stowage for northbound ports to Portland to meet the lighter draw requirement.

We would also like to add that the speculation by news media reporters as to what the volcano may do next and when has done considerable harm overseas, in Europe and the Far East. Ship owners are beginning to look at Portland and other Columbia River ports with a jaundiced eye as to whether they should commit their vessels to this area for loading and discharge as, according to some sensational news items, vessels being trapped in Portland or the Columbia River is

a real possibility. In view of the fact that Portland is already a 1-day loss in transit, coming to the Columbia River, vis-a-vis, other west coast ports, under normal circumstances, it behooves all of us as steamship agents, importers, exporters, the Port of Portland to do a better selling job. Also an increase in gang productivity would go a long ways to overcome the bad publicity brought about by the volcano eruption and to attract ship owners to continue having their vessels call Portland and other lower Columbia River ports.

In conclusion, the membership would also like to go on record that we fully support the Corps of Engineers request for emergency additional funds for dredge operations to maintain the normal, navigable depth of the Columbia River.

Senator PACKWOOD. Let me address this to you and to the other members of the panel who want to answer it.

We will get the corps the money that they need. We will have the dredging done and, then, the channel will be back to 40 feet and 600 feet, but I notice a certain tenor of, well, competition with Seattle and an extra day. These are not problems related to the volcano.

What are the port's advantages over Seattle or its disadvantages? Let's talk about the advantages first. Why would shippers want to come here in preference to San Francisco, Oakland, or Seattle?

Mr. JONES. Basically, because the cargo is here and the loyalty that many of the importers and exporters here have to the steamship lines calling direct on Portland.

Senator PACKWOOD. But if the steamship line pulls out?

Mr. JONES. Well, they have pulled out, a number of them have, for economic reasons. Container vessels is one in particular, but other than that it could be productivity in Portland.

Senator PACKWOOD. The productivity here is not worse than elsewhere; is it?

Mr. JONES. Well, we are getting on a touchy subject. The productivity on the nightside here has not been as good as the day, in Portland. But that is a matter we are trying to straighten out with the ILWU local.

Senator PACKWOOD. Does anybody else want to address themselves to this question of the advantage of Portland?

Mr. PERRY. I think one of the real reasons is the aggressiveness and the role the Port of Portland has taken in the past. After the merger in 1973, the Port of Portland has entered into an aggressive marketing program and provided new facilities and modern facilities and has a tremendous OCP or inland cargo programs and we are certainly well represented internationally. I think that is certainly to the credit of the State of Oregon and to the Port of Portland, the job they have done is one of the major reasons they have come there. Their drydock is a good example. I happen to know that the Port of Portland's reputation on the entire west coast for ship repair and maintenance and things of that nature is really unsurpassed. One of the reasons they, I think, are successful is because of the quality of work and the quality of business that they deal with there.

I was down in San Francisco for a number of years and even at that time, before the merger of the Port of Portland, the workmen up here had one of the real credits to this particular area. I think that that is one of the big factors that we have working for us.

Senator PACKWOOD. Gentlemen, I have no other questions. Thank you very much.

Let me tell the other witnesses what I plan to do. I want to take this next panel and, then, we will take about a 5- or 10-minute break, but I am going to work right through lunch and we will finish up everyone before we break for lunch.

Let's take the panel of Bill Fast, Lloyd Knudsen, and Bill Luch.

STATEMENT OF WILLIAM FAST, MARINE ENGINEERS BENEVOLENT ASSOCIATION

Mr. FAST. Senator Packwood, members of the Commerce Committee, I am Bill Fast, representative of the Marine Engineers and the Seafarers International Union, two seagoing unions.

I would like to thank you and your committee for taking the time and effort to enhance an industry which has been determined to be essential to the well being of the State of Oregon's economy.

It is a tremendous strain under which the merchant marine and associated industries find themselves today. I sincerely hope that your efforts and analysis may help us in appropriating the moneys that is needed to get us back to operating in the efficient manner we were before the eruption of Mount St. Helens.

On May 18, when Mount St. Helens erupted, the channel depth in the Columbia River went from approximately 40 feet to 14 feet deep. The Army Corps of Engineers dredges, the dredges *Harding*, *Biddle*, and *Pacific* went to work as soon as possible, within 3 days the channel was 25 feet deep. These dredges are manned by the Marine Engineers Beneficial Association, the Masters Mates and Pilots, and the National Maritime Union. I am proud to say, regardless of what union a seaman belongs to, it makes no difference where the emergency is, the seaman always responds.

I would like to add in my comments here, the Army Engineers also has the dredge *Exxon*, which is a very large dredge, which is up for sale and I believe Saudi Arabia is interested in buying it, today. I think it would be a shame, Senator, if that dredge was sold when we need it here, right here in the United States and essentially right here in the State of Oregon. I think that would be too bad.

Business could have almost gone on as normal, but the news media, radio, television were saying the Columbia River was closed. The steamship companies radioed their ships at sea to go to other ports to load or discharge their cargoes. It was not long until the ports on the Columbia River began to feel the impact of such diversion. The loss of employment for seamen was drastic. There are normally 50 to 60 ships calling in the Columbia River every week, with only 10, at the most, flying American flags. As we only furnish engineers and seamen to the American flag vessels, you can readily see what happened. The seamen went to San Francisco, Seattle, and other ports, where they could find employment and ship out. The shipping industry was drastically put on the slow bell because of the misinformation being put out by the news media. By the first week in June the channel in the Columbia River was 31 feet deep, yet the news media was still saying Mount St. Helens may erupt again, thereby the steamship companies,

the steamship agencies were very reluctant to have their ships call on the Columbia River.

I might add, there again we are the 10th largest port in the United States, as far as tonnage is concerned, because of our bulk carriers and our bulk cargoes, the wheat coming down and our grain elevators and what we ship is quite tremendous here in the Columbia River. People don't realize that this is a very large port.

The steamships were in fear of taking the chance of coming up the river because their ships might be bottled up. When a ship is in port the company has to pay for moorage, fuel, and feeding the crew and most modern vessels carry approximately 35 crew members. I would say this ranges from $3,000 to $5,000 a day, depending on the size of the vessel, of course, and also you have to take into consideration the money the company is losing, because they are not in operation.

The loss of jobs, as well as money that is generated by the shipping industry will be felt for years to come. Once a person or a steamship company starts doing business with other ports they are very reluctant to change, and I am sure the shipping industry is no different. The seamen, the shipyards and the port, as well as other business connected with the shipping industry will be feeling the loss of revenues for years.

Also the State, with the unemployment factor, would be hard hit for revenue as the ports along the Columbia River have a large effect on the budget of the State, much more than any industry in the State.

The Cowlitz River is still jammed up and it will be quite some time before the silt will be dredged out, but I am sure it will have no great effect on the Columbia River, as far as traffic is concerned, if dredging continues as it is today. I don't believe the public knows it will cost over one-half billion dollars to dredge and put the Columbia River back on as good an operational basis as it was before.

I say this, as was testified before, the water shed is gone off the mountain I imagine it will be many years before the silt is done coming down the river and I think it will be years before it will really be back to the 40-foot, 600-foot channel

The fishing industry is hard hit, commercially as well as pleasure. How far the silt will be carried out into the ocean and what effect it will have on the salmon run is still not known. The fishing industry is an important part of the Oregon industry and businesses, as well as the States, will suffer. The seamen that man these vessels will be hard hit getting other jobs. It will be quite difficult and most fishing boats have their own crews, year in and year out, and when a boat goes out of service, in most cases, it also pertains to the seaman.

As far as the seamen on ocean going vessels is concerned, it will be quite sometime before we are back to normal.

I would like to say, in closing, vessels operating in an international economic arena must depend on how much time elapses before the Government approves the money that is so needed to have a financially healthy ocean going fleet on the Columbia River.

It would be extremely disheartening if funds were held up and we were not able to have the capacity to meet the growing demands of our expanding trade in our State. In the long run, with taxes, em-

ployment and business as usual, the Federal Government will be paid back many times over.

Senator PACKWOOD. You are right.

Mr. FAST. Thank you.

Senator PACKWOOD. Lloyd?

STATEMENT OF LLOYD KNUDSEN, EXECUTIVE SECRETARY-TREASURER, METAL TRADES COUNCIL

Mr. KNUDSEN. Good morning, Senator Packwood. Welcome back to Oregon.

Senator PACKWOOD. Thank you.

Mr. KNUDSEN. My name is Lloyd Knudsen and I am the executive secretary-treasurer of the Metal Trades Council of Oregon.

As background, I think probably the Senator knows, but we represent and negotiate the contracts for roughly 350 to 400 employers, some large and some small, in various metal fabrication industries, some 12,000 to 15,000 people, and also the shipyard repair.

This area once was one of the great shipbuilding areas in the country and hopefully we will not need to have the merchant marine building again, but in the event the Middle East keeps doing what it is doing, this area does not want to be excluded from potential, that Kaiser did and others that in this fresh water port, of having those jobs that did apply a strong economy for this area. Hopefully without any war or any strife, but in the event, to get our merchant marine back going again so that we do have either No. 1 or No. 2, instead of No. 6 or 7 in the world ranking of the merchant marine.

This area does have good productivity in that line of work. The people that I represent, the 25 unions that are affiliated with the Metal Trades Council have an excellent training program, that produces workers that can think on their feet and do repair and quick work, rather than assembly lie work or, similar to what they have in the Deep South where productivity is down.

We are concerned with the effects of Mount St. Helens. It is active. It could cause problems so that no one would want to build in this area, put a large amount of money in there. We are concerned about ships that would come up. If there is any damage to that Burlington Railroad bridge it could really affect a lot of things there. All of these things, unstability of the ground, whatever, could endanger, some accident, a pilot could be preoccupied and damage that bridge. It happened in Miami.

I probably shouldn't bring this up, but I will. I am very concerned about power in this area for future growth jobs. Trojan is in the site of that mountain. I am not one to be a doomsayer, but it must be considered in there. It is in the path and we see the environmental posey picking, birdwatching, hippie, Sierra Club member obstructionist trying to shut down Trojan. Some of it is emotional and some of it may be factual, but nevertheless, up and down the Columbia River, dams, coal-fired or whatever, future power is definitely needed and I hope that Mount St. Helens activity would not spur any more growth from the people that want to climb fences and try and use whatever they can to shut down those types of jobs.

We want to do whatever we can to assist, in our small way, along with the Corps of Engineers, the Coast Guard, the Federal, the State, county, and city and all other people that have really rallied to the cause and it shows what we can do. Organized labor definitely wants to be, take their responsibility in doing this.

I have checked with the shipyard people and they claim that they have not had an appreciable amount of, any lack of work. That the ships basically come in for a patchup or whatever they need or ship repair, but are usually not loaded fully. I think one ship, Northwest Marine and Iron Works in Willamette said that they did have some problem, but I cannot tell you that the ship repair has been impaired. We really don't get enough of it.

What Mr. Fast said about the number of ships coming up is really quite terrible, if you think about what happened to our ship repair business in this area, so many ships are registered under foreign flags, Lebanese and others, that when one of those foreign vessels comes up he is not going to have a complete overhaul. He is just going to have what is barely needed to get back to his own home port. There have been jobs created by this. I represent machinists, boilermakers, the glass workers and others. Last night, people turned on their windshield wipers, it does grind into the glass, so I caution anyone not to do that. The glass people might love it, but I am sure that our members and other residents do not. The steamfitters and the machinists that I represent do do air-conditioning work, heat and frost type work, cooling, and your air-conditioning can be plugged rather seriously with sediment and sand and it could damage it. Your radiators, which are auto mechanics, do get damaged from being plugged up when you are driving down the road, not to talk about engine repair, going down into the engine. It would spur some increase in all of those things that filter out that, but there needs to be a training program along those lines, if we are going to have a southerly wind blowing that ash if it is going to erupt.

All in all, our people are taking a cautious look at this thing. They are citizens, they pay taxes and they would like to see your office do what you can about maybe some money coming out, some more preparedness and to be aware with some steps that might be taken for the safeguard of this community, and their families can be realistic and plan, such as the Red Cross does in disaster relief, which, this truly proves that we can do that.

So we appreciate you coming out, on behalf of organized labor, and we thank you for all that you have done so far. Keep up the good work.

Senator PACKWOOD. Thank you, Lloyd.

Mr. KNUDSEN. Thank you, Senator.

Senator PACKWOOD. Mr. Luch?

STATEMENT OF BILL LUCH, LOCAL 8, ILWU

Mr. LUCH. Thank you, Senator.

Well, on behalf of the Longshoremen, very briefly, we are down to about 80 percent. Our work force, in the Port of Portland, the longshore work force, including the foremen and the checkers and supercargoes, amounts to somewhat more than 1,000 men.

Senator PACKWOOD. You are down about 80 percent?

Mr. LUCH. About 80 percent; yes, sir.

We have two general dispatch levels. One of them is people, our steady jobs. Those aren't down at all. The 80 percent I am reflecting to you is those people who are, who come into our hall every day to receive their jobs and are dispatched on a daily or a semidaily basis. Some jobs might go 2 days or 3 days and he is back in the hall for another job.

We are a casual industry and we are used to that kind of feast or famine. We take it when it is there and worry about it when it is not.

Quite frankly, the ILWU, my local, is just hunkered down and have kind of pulled their necks in and said, OK, we'll take it, tough it out.

We have a few problems. About 15 years ago, with our contract negotiations, we negotiated what we call an M and M agreement, mechanization agreement. It was the first of its kind in the United States. They still don't have such an agreement on the east and gulf coasts. We gave up about 50 percent of our traditional manning on the waterfront in favor, so that the employer on the west coast could mechanize, and as a result of that we have received what is called the pay guarantee plan. It says something like, if you make yourself available for work and the work is not there, the employer guarantees you that you will receive a certain amount. Well, because of the action of Mount St. Helens, the Pacific Maritime Association has unilaterally and arbitrarily cut off the pay guarantee plan, for whatever reason. We really don't know.

Senator PACKWOOD. On the assumption that an act of God is——

Mr. LUCH. I don't know. Quite frankly, on the assumption that the river is plugged, these people are the same people that are representing the shipping interests that you hear up here. They are telling you the river isn't plugged, but with us it is plugged, so they have cut us off. We'll take them on with that one and kick them in a vital part of their anatomy, without too much problem, and we are going to win that one, so we are not too worried about it.

You asked the people that came up here, at your beginning, your opening remarks, Senator, to testify on what we see as a kind of a long-range thing. Long range—you know, the Port of Portland has impacts that go all the way back to North Dakota, South Dakota, in the movement of grain, for instance. This port has vital impact on the State of Oregon's economy, Idaho's economy, Nevada's economy, northern California's economy, and significant portions of Washington's economy.

What's going to happen to us here are some subtle things that aren't necessarily seen directly, by the immediate impact, and they are kind of long range. They don't necessarily affect my members of my union tomorrow or the next day, but over the next 5 to 6, maybe 10 years they will, if we don't get some help for the port; I mean for the port's traditional capital expenditures. We have in this port one of the most aggressive sales forces on the Pacific coast, and one of the most successful.

The China trade is a good example of the success of the Port of Portland's sales force. That sales force is dependent upon the ability of the port to meet the necessary capital budget items to provide for

the new kinds of service that they develop. The port is not going to be able to do so. They have had to make extremely drastic slashes in their marine capital expenditure budget. They are looking at further cuts in that budget on the replacement, for instance, the addition and the maintenance of equipment. Most of the equipment that they now have at the port is 10 years old or older and it runs literally like 24 hours a day, 7 days a week. With that kind of impact on the equipment from use, it needs to be replaced, and we are running into a point where the port is progressing for replacement of equipment, and this heavy, expensive equipment, transtainers, big large carriers, huge lift machines, and they are not going to be able to do so. They are going to have to cut that out. There is expansion planned for the docks of the port that is going to have to be cut out, because they simply can't lose $1 million or $2 million a week, a month, or whatever, and continue to meet those needs.

We in the longshore industry and, indeed, I think in the entire marine sector within the Port of Portland need some help. We will need it with assistance to the Port of Portland, to meet the kinds of demands they need on capital expenditures, to keep this port a vital port.

The sophistication of the movement of cargo through ocean transportation today is 1,000 percent different than what it was 20 years ago, and it is changing every day. The port needs to be, to have the financial ability to stay on top of that, on a daily basis, to meet this new equipment, new facilities, new methods demand. Without the capital to do so, they are going to be severely curtailed in their ability to meet the requests from shippers all over the world. The director of the port and Captain Norwood, the marine director, John Parks, who is a director of the port commission, just came back from a trip to Europe that was curtailed because of the Mount St. Helens eruption. They were discussing with ports like Hamburg, Rotterdam, Amsterdam, new operations that are going to call for new methods, new mannings, if you will, as far as we are concerned, new responses from the union, certainly new equipment, that they are hamstrung on now because they can't meet them. We are going to suffer severe economic hardship throughout the Pacific Northwest if the Port of Portland is unable to meet these kinds of commitments.

Thank you very much.

Senator PACKWOOD. In your testimony, Bill, were you alluding to the fact that the shipping companies are deliberately avoiding Portland? I'm not quite sure where you were driving with that.

Mr. LUCH. Any time a ship or a shipping company makes a decision to divert a ship it is deliberate. It is not accidental.

Senator PACKWOOD. I understand that.

Mr. LUCH. It is a management decision.

Senator PACKWOOD. Is it a conscious ongoing decision?

Mr. LUCH. I don't think. I don't believe so, and we don't have any indication of this. In fact, to show you one example, Hoegh Line. The discoverer of the blockage in the Columbia River happened to be a Hoegh Line ship. They are the ones that found it; they went aground, and yet Hoegh Line has consistently continued to come up the Columbia River, facing draft problems and a lot of other problems, and they

have kept coming in here. So I don't think that's a true statement at all, Senator.

Senator PACKWOOD. OK.

I have no other questions. Let's take about a 5-minute break and we will start again.

[Short recess.]

Senator PACKWOOD. The committee will be in order.

Let's take a panel of Manny Correia and Martin West.

Gentlemen, go ahead.

STATEMENT OF CAPT. BRICE LOGAN, COLUMBIA RIVER PILOTS ASSOCIATION

Captain LOGAN. First of all I want to apologize. Captain Correia couldn't be here today. I am Captain Logan and I am representing the Columbia River Pilots.

We didn't prepare any statement, but what we have heard, you have more or less dispelled any rumor that we may have had or any worries that we may have had about funding, for the removing of this shoaling. I think everyone has covered fairly well the impact on this area by that shoal, and also what the impact may be in the future on maintenance dredging that is being avoided at the present time.

The figures, I agree with Vic Atiyeh and Lloyd Anderson's figures that they gave you on tonnage and voyages. We don't have available to us the exact tonnage of cargo, only the tonnage of the vessel. These vessels, in the last 23 days prior to and 23 days after, we have a drop figure of approximately 113 transits through that area. So, depending on what cargo they carry, which they have been very light to start with, we now begin to see an increase of draft of ships and also an increase of ships per day. We are very encouraged with the progress made by the corps, and the very well patrolled system that the Coast Guard has set up for this.

I suppose that we could say that the only thing that we would feel, as far as the long-range impact would be, is that as soon as this shoaling has been removed, we have confidence in the ports in the Columbia River to reestablish the shipping as it was before.

I must say we have to thank again the Corps of Engineers for their work that they have done. We didn't think they could get to work that fast. A remarkable job. And again, for Captain Greiner of the port and the Coast Guard.

That's all I have.

Senator PACKWOOD. Thank you.

STATEMENT OF CAPT. MARTIN WEST, COLUMBIA RIVER BAR PILOTS

Captain WEST. Senator, I am Capt. Martin West of Columbia River Bar Pilots.

We handle the ships in the lower river and, of course, we are exposed to the channel shoaling and the concerns for the channel, in general, because they all affect our business, as well as the rest of the community.

I would like to add our compliments to the Corps of Engineers and to all of the public and private agencies, the Port of Portland, U.S. Coast Guard for making the emergency information and assisting the steamship companies and the Columbia River pilots in scheduling ships through the emergency area. The result of this cooperation has been what the publicity around the world has called a disaster of closing the Columbia River for months. It has turned into not a disaster, but a serious economic problem, but one that is being managed very well.

That's the good news.

The bad news you already know about: the projected long-term impacts of the existing and continuing amount of sediment that will be washed into the river.

We have had some concern that the emergency funding, which we are all happy to see and which has received a lot of publicity, we would hope that doesn't turn out to be money transferred from the right-hand pocket to the left-hand pocket, because we at the mouth of the river have an annual ongoing dredging program that seriously affects our bar, and we face not only the funding program, but the problem with the equipment which is being used in the emergency is that which we count on annually to dredge the Columbia River bar.

We don't have an emergency situation there at this time; however, we would hope that both the funding and the equipment would be available to catch up as soon as possible.

You may need to know that dredging season more or less ends with the storms coming in September, and from what I can determine, that equipment is committed until that time. So we are probably facing a winter with the Columbia River bar shoaled to some extent and the prospect of a double job to do next summer.

Along that line, I would like to support Bill Fast's comment about the Corps of Engineers dredge Essayons. Our information is that it is laid up, possibly for sale. You may not know that the Essayons was here on the Columbia River bar a couple of years ago and did some work here. It works here; it works in the bar ports and the additional equipment is available, assuming that the money is——

Senator PACKWOOD. Out of curiosity, I didn't know they were selling the Essayons. I would just as soon they wouldn't sell it, if they didn't think it was surplus. Why are they selling it?

Captain WEST. I assume money is the problem, although I am advised that the corps does have other, at least one new hopper dredger under construction. I am also advised that the private industry, for the first time in many years, is constructing hopper dredges in order to get into that area.

We would hope on the funding matter that Congress continues to be as generous with the ongoing, future problems that can be identified as fallout from our problem, as they are in the emergency.

One of the options available to you is, and one that we would support, the continued and increased funding of the Northwest River Basin or the Northwest River Basins Commission. I see that Mel Gordon will be testifying in that regard.

I am not sure that many people know that the Columbia River and the estuary already had a research project underway regarding research into water quality, sediment regimes, including one of unique significance, and that is the history of shoaling in the Lower Columbia River, before the eruption. Continued monitoring and research in this direction could very well supply you with the information necessary to identify the long-term results of the problem we are having at this time.

Among the problems that we see coming up, Adam Heineman pointed out the dredge spoil sites at the month of the Cowlitz. The fact that this sediment will be working its way down the river suggests that the Corps of Engineers is going to need new dredge spoil sites, and that promises almost immediate battles with the environmental concerns regarding wetlands, wildlife refuge, recreational areas, and land use decisions being made by local jurisdictions. We assume that is going to be taking place.

In the Lower Columbia, I am sure the information will be brought out by the River Basins Commission's study; however, it should be pointed out that the river widens to about 4 miles and at that point it is met by incoming tides, approximate definition of an estuary, which causes the sediment to fall out much more rapidly where it is stagnant. Preliminary river basin studies show 5 inches of ash already, and sediment, in some places. We can expect that to continue where the fallout, where this material will get into our channels and how it will affect the largely stabilized channel condition. The corps has been successful in doing this over many years. We have no idea, and we would hope for Federal support in addressing those problems when they become known.

I have no further comments. If you have some questions.

[The statement follows:]

STATEMENT OF CAPT. MARTIN E. WEST, COLUMBIA RIVER BAR PILOTS, OREGON TRUSTEE OF AMERICAN PILOT ASSOCIATION

Senator Packwood, committee members and staff. I am Captain Martin E. West, Columbia River Bar Pilot and Oregon Trustee of American Pilot Association. As a steamship pilot I am in contact with channel conditions and shipping activity over the Columbia River Bar and lower river.

While you have heard and will hear about a multitude of short and long range problems for shipping channels which have resulted from the St. Helens eruptions, I would like to report first some good news.

Let me be among those who will compliment those public and private agencies who have prevented a serious economic and shipping loss from becoming a disaster. The U.S. Corps of Engineers has performed superbly during this emergency. We somehow do not expect a government agency to meet and exceed its performance estimates in emergency conditions.

The U.S. Coast Guard and the Port of Portland have performed very well in managing emergency information and coordinating the work of shipping agencies and Columbia River Pilots to minimize and contain as much as possible the losses of the Oregon shipping community.

As a result, what has been predicted around the shipping world as a closure of the Columbia River for "months", has turned into a loss of about 20 percent in our volume of business at the Bar for May and we are showing much nearer normal for June.

The bad news is that you will hear today and for years to come about the existing and projected long term problems resulting from the material deposited in the river systems by the Volcano.

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We in the lower Columbia and other coastal ports are concerned that the welcome and much publicized funding made available in this emergency does NOT come out of existing authorization for our regular and on-going maintenance dredging programs upon which our ports depend. We are already aware that there will likely not be enough good weather on the Columbia River Bar to get our regular channel maintenance dredging done this year. We would hope that both the money and equipment to catch up will be available soon.

When Mount St. Helens is no longer big news we expect we will still be having big problems from the volcanic material already in the river system and waiting on the ground to be washed into the river by the coming winter rains. We hope Congress will respond to the long term problem with the recognition we are getting in the emergency.

A step towards future recognition and evaluation of the long term impact would be the continued and increased funding of continued research and monitoring which is already underway in the Columbia River and Estuary by the Northwest River Basins Commission. This research was begun before the eruption and it included information on existing sediment and shoaling areas before the eruption. Continued and increased monitoring of such data could give you information upon which to base accurate estimates of the long term damage.

Another of the developing problems will be the filling of existing dredge spoil sites along the river banks. Location of new and additional sites to handle the increased volume of dredge spoil will bring channel and commerce preservation in conflict with both state and Federal regulations for preservation of wetland, wildlife habitat as well as land-use designations of local jurisdictions.

The prospect of delayed maintenance dredging of Pacific coast bar ports plus the prospect for increased sediment deposits in the channel of the Columbia from the St Helens eruptions suggests that Congress should allow Corps of Engineers re-evaluation of the dredge ESSAYONS which we understand to be layed up and out of service.

We, in the lower Columbia River suspect that we face increased sedimentation of finer volcanic material as the river water slows due to greater width and obstruction of tides. These geographic and hydrolic facts cause us to be concerned about where will the sediment go? How will we deal with it? We expect to be talking to you about it for a long time.

Senator PACKWOOD. No, I don't have any questions.

I think, again, I can assure you that the money will be available for emergency relief. In terms of long-term moneys, we face a perpetual battle balancing the budget. Everybody wants to balance the budget, until it affects a program which they favor. Then, they don't want it balanced if it means cutting anything out there.

We have been reasonably successful in funding most of the concerns you and I have. Not always. The paramount concern of the Congress is still to try to balance the budget if we can. If there is an economic downturn of 1 or 2 percent greater unemployment, then we project it is not going to be balanced, but I am quite optimistic, at least about the funds necessary to take care of the emergency.

Gentlemen, thank you very much.

Now, an Oregon commodities panel, Dick Berger, Wes Grilley, Rex Caffal, Wayne Gaskins, and Norm Bjorkland.

Wes, you're in the center. Do you want to start?

STATEMENT OF WESLEY GRILLEY, EXECUTIVE VICE PRESIDENT, OREGON WHEAT GROWERS LEAGUE

Mr. GRILLEY. First of all I will say, welcome back home. We really had some fireworks last night as a welcoming thing, and I am sure you really didn't care for that too much.

Senator PACKWOOD. I don't mind, on occasion, being blamed for things that are not my fault, but that goes beyond.

Mr. GRILLEY. My name is Wesley Grilley. I am executive vice president of the Oregon Wheat Growers League, which is a nonprofit trade association composed of some 9,000 wheat farmers in the State of Oregon.

I will say welcome, again. It is good to have you here and I am very glad that you are putting this responsiveness of our Federal Government upon our river, opening of the river.

We are fortunate, as you know, within the State of Oregon, that we received a very little amount of ash, as far as agricultural ash would be concerned. In eastern Oregon and within the crop-growing areas of Oregon, I think we have had no more than perhaps a standard dust storm. We are looking at it; still we don't like it. This dust, as you are all aware, it is very abrasive and it is going to cause high machinery wear and, again, increase costs. Some hay farmers are telling us that they are getting 6 acres per sickle and that, within the agricultural community, is always a joke, because a sickle bar should generally last a full cutting. They are getting some 6 acres on the thing, which shows the abrasiveness of the material that is being used.

As far as crop damage, and specifically on wheat, I doubt if we will have any kind of damage on that.

However, we can have the same disastrous effect on the crop as perhaps some of our neighbors to the north are in Washington, just by the closure of the Columbia River. You have heard this all morning, and I think it goes without saying; however, the agriculture production can be just as disastrous from not being able to market the crop as perhaps not being able to grow it.

As a point, we just worked on some figures yesterday, working on the importance of our Port of Portland regarding our grains. Last year some 317 million bushels, worth around $952 million, were shipped down the Columbia River and, of course, you know we have worked so long in protecting our Asian markets, starting back in the 1950's, and this has become a real concern of all of us. That concern goes into being a dependable supplier.

We are aware of what embargoes have done. We think so much of the 1973 embargo on soybeans and what has happened specifically in Japan, where they just invested huge sums of money in Brazil. Brazil, now, exports some five times the soybeans that they did, since that original embargo. I always think of that as saying, hey, if things keep happening in the United States, political or geographical or whatever, we've got to maintain this semblance of being a dependable supplier. Of course, the political reasons for the embargoes are just the same thing as the plugging up of the Columbia River.

Fortunately, I think we can congratulate everybody working on the unplugging of the Columbia River, if it was, in fact, ever plugged, but I am not too sure we can unplug some of our political decisions, perhaps, regarding the Soviet embargo. I wish that they would work as easy, perhaps, as working with the Corps of Engineers has been in opening up the Columbia here.

The disaster that we have been facing in Oregon is just as real as the folks in Washington, in agricultural production, but fortunately, thanks to all of the agencies involved, I think we are doing an excellent

job in getting the river cleared up. It is not only important to Oregon's agricultural economy, but the entire Pacific Northwest, including Montana and Utah, for the whole Columbia River watershed.

Thank you.

[The statement follows:]

STATEMENT OF WESLEY GRILLEY, EXECUTIVE VICE PRESIDENT, OREGON WHEAT GROWERS LEAGUE

Thank you, Senator Packwood, for your responsiveness to the emergency presented by the eruption of Mount St. Helens.

Oregon was lucky that conditions were not present to dump the large amounts of ash in our state. Our neighbor, Washington, received the full brunt of ash deposit and the total damage done is certainly enormous and almost beyond estimations of damage.

Oregon received a small amount of ash and Oregon's wheat country had a minimal impact from volcanic ash. A number of farmers have commented that they had no more ash than a common dust storm. Of course, the volcanic ash is highly abrasive and farmers are taking precautions to protect people and engines. I don't think that we will have any crop damage as a result of the eruption of Mount St. Helens.

The damage to Oregon wheat farmers can come from the closure of the Columbia River and this can have the same disastrous effect as a crop production disaster. Even though we produce the crop, if it can't be sold, we have a real disaster.

We depend on the Columbia River for the export of our wheat. Oregon wheat farmers started looking at export markets to Asia in the early 1950's and now almost 80 percent of our production is exported to our world markets. Washington and Idaho now utilize these markets as well as wheat produced in Montana and Utah. Last year, about 317 million bushels worth about $952 million were shipped down the Columbia River to our markets.

We have been concerned that the United States be a dependable supplier of wheat to our foreign customers. Several events in the last years have pointed out to our foreign buyers that political decisions affect the supplies of grains. The embargo in 1973 of soybeans exported from the United States made Japan look at their source of supply and they subsequently invested large sums of money to develop supplies in Brazil. Brazil's production has increased five times since the initial U.S. embargo.

Wheat embargoes in the last few years for political reasons has caused concern and the most recent was the embargo on sales of wheat and grains to the Soviet Union. The recent embargo to the Soviet Union has not apparently harmed the Soviets because they are purchasing from other world suppliers.

I mention all this to point out that we are only one supplier of wheat and grains on the world market. Our wagon must be open for business when the customer wants to buy * * * meaning that the Columbia River must be open to ship our grain.

The Corps of Engineers is to be congratulated for moving so fast on clearing the river. They are ahead of schedule and this has helped our markets. In fact, Japan pulled out of the market for three weeks and did not buy any wheat from either Australia or Canada and are now back in the market with the news that the Columbia dredging operation is ahead of schedule.

Wheat farmers in Oregon were facing a disaster just as great as those located right next to Mount St. Helens. Oregon wheat farmers had the closure of the Columbia and Washington farmers faced * * * and still do * * * disasters of ash pollution. But, all farmers * * * and all segments of the economy face hardship with the closure of the Columbia.

The Columbia River has become the backbone of our transportation and export markets. It just has to be kept open.

Thank you for placing emphasis on clearing the Columbia.

Senator PACKWOOD. Wes, thank you.

Mr. Berger?

STATEMENT OF DICK BERGER, PRESIDENT, PACIFIC NORTHWEST GRAIN EXPORT ASSOCIATION

Mr. BERGER. My name is Richard Berger. I am a regional manager for Bunge Corp., and I am testifying here today as president of the Pacific Northwest Grain Export Association.

This is an association of 10 grain exporters that operate 10 grain elevators in the Columbia and Willamette Rivers and on the Puget Sound. Six of these ten elevators are located upstream from the eruption caused shoals on the Columbia River.

For the sake of background information, the three grain elevators in the Puget Sound handle primarily feed grains, corn, and sorghum, while the seven grain elevators on the Columbia and Willamette handle wheat exports from this region. Thus, immediately after the blockage, there was only one grain elevator handling wheat still in full operation.

News of this eruption of Mount St. Helens and the subsequent river blockage was carried worldwide. Our wheat customers in Japan, Korea, Taiwan, Philippines, other destinations, were urgently requesting more information on the river condition. You must realize that to these grain importing countries a steady inflow of this important raw material is absolutely critical to them. The Japanese consul called in my office within several days after the eruption. He wanted full details on both the short-term and long-term effect. He was going to report this information back to his government. An important team of South Korean flour millers were here shortly afterward and their first topic of conversation was, what is the river condition and what do crops look like as a result of the eruption.

My main point is that it is essential to have fast and accurate information for grain exporters. We, then, can advise our customers of the problem and lay contingency plans accordingly.

There were many, many examples of misinformation during the period shortly after the explosion. One railroad executive stated that there would be no exports from the Columbia River for at least 5 months and that any shipments during that period would have to be made through Puget Sound or California ports.

Another said the Pacific Northwest is buried in volcanic ash, rendering transportation impossible. Another said the Portland harbor is full of mud with dozens of ships lying aground at the docks. Another said a fragile dam of mud and debris has formed at the site of Mount St. Helens, threatening to break momentarily and send a massive wall of water down the valley, flooding the Longview/Kelso area and sending another mud slide into the Columbia River. Another, the Port of Portland is closed until fall, for a year or for another 2 years. A local TV station mentioned that the grain is rotting in the elevators.

Certainly, this is not true and this information could not have come from any knowledgeable source.

Senator PACKWOOD. You know what happens? I have seen this time and again. It's not the news media's fault. You will get somebody who will say, well, I think the port is going to be closed for 6 months,

whereupon that is a reportable statement. The fact that it is an irresponsible statement is not the news media's fault. Frankly, they may not know any better. A news reporter is not an expert in the ebb and flow of mud in the Columbia River.

You often see in disasters that 500 people are expected dead and later on when you do the count, 50 or 60 have died. This is a disaster, but the initial story goes out that 500 have probably died. I don't think there is any solution to that problem, constitutionally or otherwise. It happens every time there is a disaster someplace else, and I have seen disasters both ways. I have seen them here and, again, I remember the Vandport flood and I have seen other disaster areas in other parts of the country that I have read about. When I went to see them, they didn't seem nearly as bad as when I had heard about them.

Mr. BERGER. My point for mentioning all of those inaccuracies was that the grain business primarily is a business of rumor, and prices fluctuate because of rumors and because those rumors eventually turn into fact or they are later disproven, and it also revolves around the individual's psychological interpretation of those rumors.

I think our ocean freight market does somewhat the same thing.

My point for mentioning some of these inaccuracies is that, in my opinion, the best way to fight the inaccuracies is by publishing a steady flow of correct information, and the Port of Portland has done an excellent job of that. We get a daily teletype indicating the current draft of the river, any other pertinent information, and our own company sends that information to our offices around the world, so if they are asked in New York or London or anyplace else, what is the present condition of the Columbia River, somebody in that office can answer that question factually.

For a little review of what happened immediately after the explosion: On May 18 there were 23 grain vessels in the Columbia River, either loading or waiting to load grain. Export sales commitments for the 45-day period immediately following the explosion were particularly heavy. The river draft necessary for those vessels to sail varied from 27½ feet to 36½ feet. According to my records, only one vessel needed over 34 feet of draft to clear the port. In checking with individual vessel agents and loading elevators, it appears that, on the average, 10 days were lost to this river blockage. Every party I have talked to has remarked favorably on the efforts of the Corps of Engineers to quickly restore navigation in the area upstream of the blockage. The losses to exporters, farmers, dockworkers, charterers, shipowners, and foreign buyers will be large, but these losses would have been much higher were it not for this fast action.

I think you should be commended for calling this hearing so that various waterborne industry segments can voice their opinion on how well this emergency was handled and hopefully to establish a plan to minimize the losses in similar emergencies, should they happen again.

Based on last night's dust eruption that we had, volcanic ash, like you and others, I had early morning phone calls from New York and one from the C & S News Service, asking exactly what the condition is in Portland. I think that we, now, have to cope with the fact that Mount St. Helens, rather than a single eruption or two eruptions which caused our problem, may be an ongoing situation. I think the thrust,

and I think what you are trying to get at, the thrust of the program here today is how we can best cope with that. From what I see, I think that the information part is very important to us. I am particularly concerned about shipowners, ship charterers, and foreign buyers that are looking to the Columbia River as a source of their grain supply, maybe taking the safe route in going somewhere else for that supply.

If you will remember, I said the uninterruptability of supply is so important to them, we have to do everything we can to assure them that, under normal conditions, we will do everything we can to restore the shipments as fast as possible.

Senator PACKWOOD. Mr. Caffal?

STATEMENT OF REX CAFFAL, CAFFAL BROS. FOREST PRODUCTS

Mr. CAFFAL. Rex Caffal, Caffal Bros. Forest Products, a forester in Oregon State since 1941.

I think anything discussing Mount St. Helens from the forestry standpoint—we have to make certain basic assumptions that we have merchantable timber and we probably have the technology and inventive technology to remove it and we probably have some adequate transportation still left; we will add to that. I think we are caught up.

Several items. One: In the management there were several schemes proffered here that we put National Parks Service or some other national entity into the operation of this area, called the Gifford-Pinchot, and joining ground, including the private. We feel the U.S. Forest Service is a management team. They are there with the people, the tools, the equipment, the work force, and they should be left there. Anything other than that I would consider probably a leave of commonsense.

Second: I believe there is an organization around here someplace that should be kept within the organizational limits of geographic plots of Los Angeles County. They want to make the whole place into a volcanic park, recreation area or something. That would just be disregarded.

Our markets, our local industry is in a little problem at the present time with lumber which, of course, hinders production, raising inventories, and probably some layoffs. However, we do have one bank, day before yesterday in Boston, at 12 percent, which brought a smile or two with my lumber department——

Senator PACKWOOD. Say that again. One bank in Boston doing what, yesterday?

Mr. CAFFAL. Twelve percent interest rate.

Senator PACKWOOD. On prime?

Mr. CAFFAL. Yes. There was another one this morning, I think, on the early news, the First National Bank of Boston. We heard it in our lumber department. We would have to double the mill production and so forth, but we felt maybe that enthusiasm was a little bit hasty.

Our mills that we have, that cut especially for Japan, they are operating on a stable pace. What I am getting to here, that the domestic market right now has a dog in the true firs and the hemlock, of which there is some volume in this area up here. I feel the Douglas fir will move out to the lumber and plywood people. I think probably our

transportation that sits up there, we will be able to go east, we will be able to go the Longview/Kalama/Columbia River region. That is really getting into the north regions which do draw from this. Whether they can afford the transportation or not is yet to be seen, and we will find out, but that's a questionable thing.

Hemlock, because of its domestic appeal, may be left in the forest to provide a home for bugs, followed by pathogens, and then varmints will live there that will eat our small saplings or seedlings when we put them in.

We do have an export market in Japan. We have one in Europe for hemlock and I do believe at this time, I would suggest, at least for this special occasion, if this occurs, we can't cut the hemlock, can't sell it here, I would like an abrogation of what we refer to as the Morse amendment, specifically and uniquely to this area. This way we could bring that hemlock out.

In the 1962 windstorm, in order to make a logging plant, I was very happy to be able to take hemlock out and I knew I had a market for it. Today I don't, and I don't want to leave it there, so I would hope that we could get something; if we can't sell the hemlock, let's get it into the export markets rather than leave it there as a peaceful place for bugs and deterioration and some things at a later date.

The economy, you can look at the Oregonian any day, and I looked at June 12: Volcano drives national semiconductor away from Vancouver; I rather doubt that. Oregon bankruptcies up 62 percent over 1979. Oregon steel: 125 mill, 25 management people laid off. The Port of Portland, 14 budgeted jobs, go unfilled, will reduce work hours and possibly layoffs if we don't pick up.

I think with some of this in mind, this ties into what I think here, that our people are doing a wonderful job in opening it.

We do cut for Japan, we can't stop that cutting, but we reach a point where we can't inventory. We are still being able to move on a reasonable schedule, since the river is open.

The other thing that frightened me, and I understand now it is no longer in effect, that H.R. 7454, but I do think—I never read my speeches, but I love what I wrote about it—I didn't like the pernicious implications of it. I think Mr. Weaver has backed off and I am very happy to hear that.

You asked a question of a man earlier, in the shipping business. I don't think he satisfactorily answered it. You asked why the Portland area was an attractive place to be. I can give you a couple of reasons from our own company's point of view only.

One: It is the only trade zone in the United States where you can put merchandise in that is helping us now, with no tax structure on it, either coming in or going out of the country. The five major Japanese trading companies have offices in Portland. There is only one city in the United States so set. We are the closest port in balance of trade. That's $1.8 million in, $1.5 million out.

The thing here, in this calamatous condition, over in the Gifford-Pinchot, I would make two suggestions.

One: I would like to relieve the Governor of Washington of a red pencil. We have red-penciled areas that I think we would go into. There is 445 million feet in sales, green timber. Some had been sold; there are others; the 445 million is off the next cut. I think probably

that should be very closely examined by the Department of Agriculture and then with the DNR to get some of that opened up.

Two: I am an innovative engineer. We can do a lot of things. I wanted to be one about 19 years of age when I tore down one of Mr. Stamms' bridges in the Upper Mollala. I was informed that he would be back in 3 hours and if trucks weren't going over it, a convenient limb and a rope would eliminate my nuisance.

So I do think we should go to the Forest Service. There are two or three things that come to me abundantly clear. We will have to engineer, put these bridges in and all that. We put a bridge in within 24 hours over the Rhine River, with people shooting at us. Well, dammit, us loggers can build bridges; we can build roads and we can get into that timber without a lot of purposeful, professional engineering. It would come later, because you can't maintain roads like we put in. We should have that liberty to be innovative, in that case. I think maybe that some of these things, probably it should be readily looked into soon and see if we can't get some assistance from you people in Washington.

With that, I appreciate being able to speak at this meeting and I am going to read this speech and see if it was any good.

Us loggers are a little bit like Patrick, that drank too much because of his nagging wife. Her people got her together and said, the only thing to do, when he comes home from the pub, step out from one of those gravestones in the cemetery, when he goes by. So she dressed as the devil, jumped out in front of Patrick and his reaction was like a logger. He said, I have been wanting to meet you. I have been married to your sister for years.

Give us a chance, Bob.

Senator PACKWOOD. Gaskins, can you top that?

Mr. GASKINS. Senator, I wouldn't even try.

STATEMENT OF WAYNE GASKINS, WESTERN FOREST INDUSTRIES

Mr. GASKINS. I did appreciate your opening remarks, Senator, that we may have to live with this volcano. We are innovative and we will make things work. Given a chance, I think that we, not only in the short term, but in the longer term, can work with the conditions, whatever they might be, and I believe as far as our products removal, we are going to be successful. We do need some help on a few things.

No. 1: We need a knowledgeable, strong expediter, appointed by Secretary Bergland or Chief Peterson, with authority to cut through the existing redtape of the Forest Service. Some of this is redtape business as usual. Some of it is a man trying to do his job as he has been told in the past. They didn't write the rules with a volcano in mind.

One example that came the other day was an order that if you don't return three books of scale tickets within 10 days, we will start proceedings against you. The three books of scale tickets are locked up in a vehicle in the red zone and we can't even get in to get it. That's just a little problem.

Slash disposal on some timber sales in the red zone. The volcano has covered over 20 feet of that slash. The Forest Service is suggesting, since you didn't cover it, nature covered it, we may have to take back

the money that we have allocated for slash disposal. A number of questions on getting out material that is currently on the ground, both in the red and blue zones. Many companies have felled and bucked material lying on the ground. They need that material. They are not willing to put their people in a dangerous situation, but there are opportunities in some cases to get that material off the ground and into the market stream, where it is needed.

We have other situations where cash deposits are lying with the Forest Service, deposits on timber sales. We need some shortcut to get that money back, even at the new 12-percent prime. That is very expensive money that is lying in the Forest Service.

I have two examples here, Senator, for just two companies where they have addressed these problems that I have just cited, to Bob Tokarczyk, and I would like to include them in the record, just as examples.

The next point; our people would urge no relaxation of the small business program in the salvage program that might be undertaken on the Gifford-Pinchot. We had disastrous fires in northern California just 2 or 3 years ago. The small business people, the large business people, the Forest Service worked together, and both large and small together shared the burden of cleaning up the mess. I believe the same can be done here.

I have to differ slightly with Mr. Caffal in that our people feel that the export restrictions should remain. We have normal procedures if a commodity or a particular species becomes surplus, and those procedures for obtaining export waiver could be pursued. So, at least as far as Western Forest Industries Association people are concerned, that's our feeling.

Senator PACKWOOD. I didn't think you were going to let his statement pass.

Mr. CAFFAL. This is 20 years, I know.

Mr. GASKINS. Another one of the points that was made earlier and we merely supported is access. We are going to need tremendous access in that area, and it should be temporary access to get in there and get something in the way of a road net so that we can get equipment out, equipment that belongs to loggers and that equipment—well, I shouldn't say it belongs to loggers, it belongs to the bank, and unless those loggers have a chance to get it out rather quickly, why even the bank might have a little difficulty getting it out. Repossession under those conditions might be difficult.

Term adjustments. Forest Service timber sale contracts, both in the blue and red zone where we have heavy volcanic dust, we should be able to go in and mitigate whatever losses we could on felled and bucked timber, putting a road back into some sort of condition so it isn't going to wash out next winter, and then get the heck out of there. Under present conditions the Forest Service says, if you go in and operate in the blue zone, they charge that against your operating time. You know, this is different. I don't think even the Forest Service has ever engineered a volcano before, but the Forest Service does need to get started. It needs to have some attempts immediately to get those logs into mills, sawmills, plywood plants, and let's have some batch tests. Right now they are sending logs back to the Madison laboratory to see

what condition they are in. We can do it right out here. Get some of those logs to the mills; let's see how it affects the equipment, and get moving. That is where the expediter is extremely important. I propose that Secretary Bergland appoint that expediter, not Mr. Andres.

Thank you.

Senator PACKWOOD. Thank you.

[The documents referred to follow:]

ASTORIA PLYWOOD, CORP.,
Astoria, Oreg., June 10, 1980.

Mr. BOB TOKARCZYK,
Supervisor, Gifford Pinchot National Forest, Forest Service, USDA,
Vancouver, Wash.

DEAR BOB: I refer to our Timber Contracts Easy No. 022605, Frass No. 022654 and Oregano No. 060773 located in the St. Helens Ranger District of your forest. Each of the above three sales is located well in the "Red Zone" and inaccessible for current operation. On each of the above sales Astoria Plywood Corporation has initial unused cash deposits as follows:

Easy	$49,023.01
Frass	32,000.00
Oregano	39,000.00
Total	120,023.01

Because we have no assurance of being able to operate these sales in the near future, thus preventing us from recovering these initial bid cash deposits, we request:

1. Return of the amount in full to Astoria Plywood Corp.
2. A reduction of the performance and payment bonds on each of the above sales to the absolute minimum.
3. Properly documentation on our request for term adjustments on the above sales because of the "Red Zone" volcano activity preventing our operating of the sales in 1980.

Because of the unusual nature of the situation, created by the eruption of the volcano and the critical market conditions facing our industry, prudent use of capital becomes extremely important.

Sincerely,

HAROLD "SMOKEY" OLSEN,
Timber Manager.

MULTNOMAH PLYWOOD CORP.
St. Helens, Oreg., June 12, 1980.

Mr. BOB TOKARCZYK,
Supervisor, Gifford Pinchot National Forest, Forest Service USDA,
Vancouver, Wash.

DEAR BOB: I refer to our timber sale contract No. 02650–7, Beech No. 3 located on the Randle Ranger District of your forest. Beech No. 3 is located within the Forest Service "Red Zone"—17 air miles Northeast of Mt. St. Helens. Unit No. 3 of our Beech No. 3 timber sale, the unit of immediate concern, is within two (2) miles of the exterior boundary of the "Red Zone."

Our immediate problem is one of the balancing of our mill wood quality needs in order to keep our 300 impacted workers employed. Our mill is operating on a week to week basis, however, we are extremely short of high grade logs for face stock. Our only immediate supply lies felled and bucked on Unit No. 3 of Beech No. 3.

Our needs are:

1. An opportunity, with or without District or S.O. personnel, to inspect Unit No. 3 of Beech No. 3, felled and bucked timber.
2. If still useable, to immediately develop an emergency removal plan for the felled volume.
3. Do such minimal road work as is necessary to remove the useable felled volume.
4. Develop the special communication and other precautionary needs for emergency removal of the felled timber.

Our goals are:

1. Safety for anyone going into the Unit No. 3 of the above sale.
2. Remove the raw material needed to continue employment opportunity at Multnomah Plywood.
3. Prevent, as much as possible, felled volume losses.

Although we had planned to operate this sale in 1980, the volcanic eruption and subsequent fallout makes additional felling operations impossible.

We are now requesting a term adjustment on Beech No. 3 until we can operate the other units of this sale.

Sincerely,

JAMES D. CRISWELL,
Timber Manager.

Senator PACKWOOD. Norm, you can go now.

STATEMENT OF NORM BJORKLAND, EXECUTIVE VICE PRESIDENT, INDUSTRIAL FORESTRY ASSOCIATION

Mr. BJORKLAND. I am Norm Bjorkland of the Industrial Forestry Association. I will kind of just briefly take a few things out of a short statement I have, then, so I won't be repetitious.

One thing that I think has been mentioned, and I know you realize this, is that the area of the Gifford-Pinchot and the surrounding parts of the Mount St. Helens area are a timber supply for a number of manufacturing plants in Oregon. Our people down here are vitally concerned about that, and directly. A lot of them have timber up there that they are wondering if they are going to get. Believe, we have to get in there as fast as we can. We are getting, fortunately, some ideas on operations. Weyerhaeuser, as pointed out, has started some of theirs and are finding out some of the problems. Their information is going to be available to others on how to operate in there. It is a new ball game. It is certainly one that we can't do business as usual on.

I think one thing, if I may, I would like to put in the record a series of questions and answers that were given to industry people at a meeting on the Gifford-Pinchot timber purchasers in the north end of the forest yesterday. It shows a lot of the questions that are coming up. I think maybe it points out that there are a lot of things we still have to answer. Believe me, the timber sale purchasers are going to have some severe problems trying to work out these things over the next several years. If I may, I would like to, because I think they are very enlightening as to some of the things that are happening.

Senator PACKWOOD. They will go into the record.

Mr. BJORKLAND. One of these things is, of course, and one of our main concerns on it, with all this extra work and everything, how it is going to affect the whole timber supply picture in this area, the timber sales.

We know that they figure this year, the rest of this fiscal year, probably the timber sale program will be down around 180 million board feet. That is an estimate. It could be more before we determine the long-term impacts.

We believe, as stated before, but I think you have just got to repeat the thing, we have to get in there and salvage this as fast as we can for a number of reasons. A lot of us are very much concerned about the fire risks out there. Even in some of the areas, that may not be too severe because there is ash on them. That ash, in many cases,

will blow away or get washed off. We know that under the ash in some of the places, apparently, there are fires burning right now. When they take infrared pictures, they come up with hot spots. They knew right after the first explosion there were fires in many places. Apparently it is just like burning of a coal seam. They are burning under there. If those things come up and have something to burn, we could have a real disaster and it could spread out of that area into surrounding green timber.

The same thing on the insect problems. Every time you get damaged timber, you have an area where bark bettles can operate. We know that maybe some of the timber up in the blast zone, that the cambium layer is so dried out that it won't support them. We do know that the trees, for instance, in the Toutle River that were washed in the floods, do have a green cambium and they are going to be very subject to bark bettles. So we have to watch that.

Maybe we are going to have to have some relaxation of some of the, I guess you would call them, environmental requirements. I can see that temporarily, and looking at the long-term effects, we may have to relax some of the clean air and clean water standards. If you don't, the long-term impact will be a lot worse than that short-term impact to get something done. I think it has to be looked at very carefully. We need to streamline some of the procedures so we don't go through so much redtape before we get something done that by the time we can do it, the timber is lost. I know that Mr. Ellson of the Forest Service indicated 2 to 4 years. Well, there is some of that where it may not be that long in some of the higher elevation species. It starts to really lose value. That is a point. I think we don't want to lose any more volume or value of our product than we have to.

One thing that I think is essential that we get started on right away is that as these areas are harvested and we can find out ways to do it—and I think we have some of these means—we get these areas reforested, revegetated. That is the only way we will really hold down the material up there. We do know that it will support tree growth. A lot of the area around Spirit Lake, for instance, went through a previous ash flow of this site and supported large timber. The only trouble is that if nature does it by herself, it takes a long, long time. I don't think we can afford to wait that much.

I might point out that I think a disaster like this maybe points out the need for legislation such as your S. 100 to make it easier for people to reforest lands, to give an incentive to the private forest landowners. Most of the landowners affected in this one are large. They are fairly large companies or the U.S. Forest Service or the State of Washington. I do know, because I have worked on properties up there along the Toutle River where we have small tree farmers who have lost areas and are going to have to do something about it. I think they have to be encouraged to do that.

I think that there are certain things we can do and we have to look at every prospect. Maybe we would want to plant some cottonwoods along the streams because they do grow naturally there and they are one thing that will come in on a fairly sterile soil as long as there is water against the stream. I think we have to use every effort we can to get these back and get them back fast. If we can, it is not only

going to get our timber production back, but I think it will also help as far as wildlife and fish habitat to make that available a lot sooner.

Thank you.

Senator PACKWOOD. Norm, gentlemen, thank you. I have no questions. I appreciate your coming very much.

[The statement and material referred to follow:]

STATEMENT OF N. E. BJORKLAND, EXECUTIVE VICE PRESIDENT, INDUSTRIAL FORESTRY ASSOCIATION

Mr. Chairman, my name is N. E. Bjorkland. I am Executive Vice President of Industrial Forestry Association, which has been working to assure an adequate and permanent timber supply for the Douglas Fir Region for over 45 years. I am a professional forester and have been active in forest management and timber supply matters in this region for nearly 32 years.

The timber supply from the public and private forest lands in the general area of Mt. St. Helens are essential to many of our 100 members. We believe it is essential to start salvage of timber values in the trees which have been blown over, killed or damaged as soon as possible. The devastated lands must be rehabilitated and replanted to reduce the potential of continuing floods and to restore fish and game habitat. Of course, the actions of the mountain will dictate when it is safe to carry on the above activities, but every effort should be made to initiate them as soon as possible.

One of the first steps needed is restoration of access to most of the area devastated. Such access will be needed for salvage and for protection from fires. If timber isn't salvaged rapidly there is a real chance of widespread fires and insect attacks. Such catastrophes could spread to areas of green areas outside Mt. St. Helens. Access is also needed for regeneration of the devastated areas.

Relaxation of clean air and water requirements on a short-term basis is necessary to reduce long-term environmental impacts.

The Mt. St. Helens disaster points out the need for legislation such as S. 100, sponsored by Senator Packwood, to help insure that forest landowners will have the incentive to reforest lands.

Timber purchasers who depend on the Gifford Pinchot National Forest and particularly the Mt. St. Helens vicinity for their timber are facing real problems. During the rest of the fiscal year ending September 30, 1980, the Gifford Pinchot National Forest estimates that 180 million board feet of timber which they planned to sell will not be sold. There are chances there will be additional impacts on the timber sales program on the forest. It is essential that every effort be made to assure that timber sales on the Gifford Pinchot National Forest are maintained as high as possible. The communities and forest manufacturers in the area have already sustained significant damages and shutdowns.

GIFFORD PINCHOT NATIONAL FOREST MEETING WITH PURCHASERS AND OPERATORS OF NATIONAL FOREST TIMBER—JUNE 12 AND 13, 1980

Question. Can a timber purchaser or operator enter the Red Zone?

Answer. The answer is no with one exception: If the operator has equipment within the Red Zone, he may be permitted to enter to retrieve the equipment, but only with written permission by the Emergency Conrol Center in Vancouver. A list of special precautions will need to be taken, and Forest Service may escort the party into the area.

Question. Can a person fly over the Red Zone to look at his timber sale?

Answer. The FAA has a temporary ten-mile radius restriction on the airspace surrounding the Mountain at the present time. Any exceptions to the restriction would have to be obtained from the Seattle Flight Service Center (FAA).

Question. Will timber sales or contracts be advertised and awarded in the Red Zone in calendar year 1980?

Answer. No.

Question. Will timber sales or contracts be advertised and awarded in the Blue Zone in calendar year 1980?

Answer. Yes.

Question. If I have a timber sale in the Red Zone, can I be relieved of my contractual obligations?

Answer. Only if the remaining work is assistance in slash disposal.

Question. If I have a timber sale in the Blue Zone, can I obtain an adjustment of the contract term if I elect not to work during the 1980 Normal Operating Season?

Answer. Yes.

Question. If a public works road contract exists in the Red Zone, will I be given the option to hold the contract even though work will not be allowed at this time?

Answer. All road construction contracts in the Red Zone are being terminated.

Question. Will unit slash disposal, such as broadcast burning, be allowed in the Blue Zone?

Answer. Not in 1980.

Question. Can slash piles, such as right-of-way debris piles, be burned in 1980?

Answer. This may be possible in the Fall under controlled conditions.

Question. If I have a public works or service contract in the Blue Zone, will I be required to operate this season?

Answer. No. If the contractor works, it is at his option. There will be no time penalty.

Question. What will happen with sales in the Red Zone that have elected to "opt" the road construction?

Answer. The Forest Service will not proceed with a road construction contract.

Question. What will happen with new timber sales and public works contracts within the Red Zone in 1981?

Answer. The Forest Service does not know; it is dependent upon the mountain.

Question. Will the Forest Service assume the burning responsibility on timber sales and road contracts within the Blue Zone?

Answer. Not at this time.

Question. Will burning still be used as a right-of-way debris disposal option for new timber sales and road contracts in the Blue Zone?

Answer. Yes, along with other acceptable options which may vary with each particular project.

Question. How much of the ash has been cleaned off the main travelways in the Blue and White Zones in each of the Ranger Districts?

Answer:

	Percent
Packwood	75
Randle	75
St. Helens	0
Wind River	95
Mt. Adams	100

Question. Approximately how much effect will the Red Zone have on the Forest's sell volume?

Answer. The planned timber sell for the second half of Fiscal Year 1980 will be reduced from 455 MMBF to 275 MMBF.

Question. What action is the Forest Service taking to access the downed timber in the Red Zone?

Answer. New aerial photography, existing resource photos, along with on-the-ground knowledge, will be used to develop a damage assessment along with a plan to get to the damaged area.

Question. When can we expect to be active in the Red Zone again, such as for logging and road building?

Answer. In 1981 at the earliest, and this depends on the activity of Mt. St. Helens.

Question. Will the public be allowed into the Blue Zone in 1980?

Answer. No.

Question. How many Forest Service bridges are destroyed in the Red and Blue Zones based on current information?

Answer. Red 10 and Blue 0.

Question. How many miles of road will need to be rebuilt in the Red Zone to access the downed timber; when and if the opportunity arises to remove it?

Answer. There are approximately 60 miles of road that will have to have major reconstruction because of the damage from the volcano. There are 150 miles of asphalt and 1,500 miles of aggregate road that are covered with ash.

Question. What is the date that the Forest expects to have the large quantities of ash off the main travelways; the ditches, culverts and drainage structures cleaned within the Blue and White Zones?

Answer. July 1, 1980; provided no additional large ashfall occurs.

Question. Can the purchasers or contractors do some of the road cleanup themselves and be reimbursed?

Answer. Yes, only with prior written approval. However, the Forest Service can put equipment and operators under contract and, if work is completed under Forest Service agreement and direction, they will be reimbursed.

Question. Will the Forest attempt to abate the dust caused by ash on roads on which they have the maintenance responsibility?

Answer. Yes, but we are somewhat uncertain as to how effective the abatement will be.

Question. Will the purchasers or contractors be required to continue to abate dust on roads where they have the maintenance responsibility?

Answer. Yes, to the extent that it is reasonable and prudent and is required by the contract.

Question. What is the status of sales within the Red Zone with volume remaining?

Answer. There are 68 timber sale contracts within the Red Zone involving over 521 million board feet.

Disposition of these sales cannot be ascertained until a full assessment has been made of each area. If all remains quite on the Mountain, the Forest Service would hope to have information by this late summer.

Question. What is the status of sales within the Red Zone with all volume removed but there is still work remaining?

Answer. There are 27 contracts involved with various amounts of work remaining.

Assessment of all sales in the Red Zone will have to be made before any decisions can be reached on the disposition of individual sales.

Question. Are existing sales within the Blue Zone required to be operated?

Answer. No the purchaser has the option of operating the sale, or receiving contract terms adjustment, at least for the foreseeable future; probably the 1980 Normal Operating Season.

Question. If operations are started within the Blue Zone on a sale, and then it is later deemed inoperable because of conditions on the area, will the sale then qualify for any adjustment of the contract terms?

Answer. Yes. Purchaser must coordinate the start and stop dates of operations with the Forest Service Representative.

Question. Will the Forest Service require the purchaser to work those sales purchased in the Blue Zone after June 4, 1980?

Answer. The Forest Service expects that those new sales will be operated within the time frames of the individual sales offerings. It is recognized that future volcanic activity or other conditions could necessitate a change in direction.

Question. Must operations on a B or above day in the Blue Zone be required to end at an earlier hour in order for the watchman to be out of the area by 1900?

Answer. Watchman service will have to be retained for at least three hours after cessation of operations. All crew members will have to observe the 1900 exit time. The watchman will have to depart the Blue Zone no later than 2000.

Question. How long will sales within the Blue Zone be held open for the completion of slash disposal assistance which cannot be accomplished due to the broadcast burning restrictions?

Answer. The Forest Service will consider relieving the purchaser of this contractual obligation after two seasons or more have elapsed from time of removal of timber from the cutting unit.

Question. Does the Forest Service forsee any change in the boundaries of the the Red and Blue Zones?

Answer. No, probably not this year: 1980. However, adjustments may be made if conditions change.

Question. What is the status of sales within the Blue Zone with work remaining, but on which all volume has been removed (firelines, slash piling, erosion control, final road maintenance, etc.)?

Answer. The Forest Service will expect all work to be completed, but assistance in burning. This obligation will have to be deferred, probably until next year or later.

Question. Is the Forest going to increase its timber sell volume in the Blue Zone to compensate for the proposed sales reductions in the Red Zone?

Answer. This depends on two factors: how long the Red Zone remains intact, and the amount of full harvest acreage within the Blue Zone. The Forest will study this situation and make any adjustments possible within the frame work of its land use plan.

Senator PACKWOOD. Now we will hear from an Oregon ports panel, George Grove, Steve Felkins, and Richard Lawrence.

STATEMENT OF GEORGE R. GROVE, DIRECTOR, PORT OF ASTORIA

Mr. GROVE. Senator Packwood, my name is George Grove. I am the director of the Port of Astoria.

I have a prepared statement that I would like to put into the record.

Senator PACKWOOD. All of the statements will be put into the record in full.

Mr. GROVE. On May 19, 1980, the Port of Astoria commenced its semiannual dredging program after the usual public call for bids. We all know what took place the preceding day. Given the facts as they were immediately valuated by the Corps of Engineers, our port determined that we would make our facilities available to any vessels not able to traverse the river above Longview.

At the same time, questions arose about the possible effects on our berths of the silt from the upper river. In short, were we removing a teaspoon of silt and finding a shovelful being deposited in its place? Nevertheless, we determined to continue the dredging program to assure that as many vessels as possible that saw fit to use our facilities could be accommodated.

As of today, we have not experienced silting problems of the magnitude originally feared. Of course, this is deeply gratifying to us. You all know the corps will dredge to within 100 feet of pier facilities. Anything within the slips is the responsibility of the Port Authority.

If, however, due to changes in runoff patterns, our berths are unfavorably impacted by the silt, we will seek financial aid to help in correcting any deficient depths in our berthing areas.

We have asked through a letter to Colonel Connell to start a monitoring program in the lower river. I have talked with him in the hall this morning. He has already commenced that. You heard some of the testimony this morning that indicates the silt may impact the lower reaches of the river. We don't know yet. We are very interested in finding out and the Corps of Engineers will start that monitoring program.

As a result of the channel blockage, some automobile vessels, as well as a container vessel and lumber and log ships were accommodated. It was our feeling that we would make every effort to accommodate as much tonnage as possible to maintain shipping in the Columbia River and to prevent as much diversion as possible to other areas.

We, like others, did not want to see a pattern formed which would permanently disrupt shipping in the Columbia River. Our efforts to

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assure the maritime industry that Astoria was in full operation were accomplished through the news media, as well as personal contacts. However, we learned that some of the decisions were being made overseas and vessels were being warned to stay out of the Columbia River, that the Columbia River was closed. This, of course, as we all know, was an unreasonable conclusion.

One of the wild statements that was made, according to one of the automobile importers, was that his ship with 800 units was requested to use the Port of Oakland at the cost of moving that automobile back into the Pacific Northwest at an approximate cost of $250 apiece, and 800 automobiles at $250 apiece is quite a sum of money.

It has become apparent from this unfortunate incident of the channel blockage that Columbia River shipping, as it involves the State of Oregon, does have an alternative port in Astoria. While Astoria's present facilities are not adequate to handle all types of cargo under all conditions, nevertheless the role of the Port of Astoria has been brought into sharper focus.

Progress in the area involving improved facilities, such as the upgrading of our grain elevator, land acquisitions, and the present negotiations for bulk loading facilities, are all indications that the State can have an adequate backup port. The recent appointment by our Governor of the Lower Columbia River Development Task Force Committee further strengthens the direction of the port's efforts to enhance the economic activities of Clatsop County.

Our pledge, then, is to work closely with any State or public agency to maintain the world trade now being accommodated by Oregon ports and Columbia River ports in particular.

I want to thank you, Senator, for the aggressive stance that your staff has taken locally, and some of the people in Washington, D.C. They have maintained close liaison with us. They are fully aware of what is going on in Astoria. That will make our job of communication with your office much easier.

Senator PACKWOOD. Well, George, you make it easy for us.

Let me ask you about the dependability and the sufficiency of your rail line out of Astoria. Are you confident of keeping it, continuing it, and that it is adequate so that you can make connection by rail with other ports?

Mr. GROVE. Yes. However, the big bulk-loading facility will move ahead and become a reality and that track will have to be updated to the tune of about $40 million.

Senator PACKWOOD. Is that right?

Mr. GROVE. Yes.

Senator PACKWOOD. Steve?

STATEMENT OF STEVE FELKINS, PORT OF COOS BAY

Mr. FELKINS. I want to first thank you, Senator Packwood, for inviting me to this meeting.

I would like to preface my written report here with a backup for Captain West, who testified earlier. After hearing yesterday about the tremendous volume of material that is in the water and yet to come down off the mountain, and no one quite certain how it is going to migrate, we are concerned about the corps capability of dredging

the river mouth. There are five major bars on the coast that require hopper dredging, the Columbia River, Eureka, Goos Bay, San Francisco, and Grays Harbor.

The dredge Essayons, which was primarily kept going by dredging New York Harbor, has now been supplanted by a private industry dredge and is laid up. The Essayons has a capacity of over 6,000 cubic yards, which is equal to the Biddle and the Harding, which are working here, combined. If what we heard yesterday is true, that the Essayons is up for sale, it would seem prudent to us to at least put a hold on it for a year or so to see what the long-term requirements may be here in the Northwest. If we have to triple or quadruple the amount of dredging at the mouth of the Columbia River, there really isn't going to be capacity or time for the other dredges to work within the good work season.

I would appreciate it if somebody from your office would look into this.

Senator PACKWOOD. The first I heard of it was when Bill Fast mentioned it today.

Mr. FELKINS. She did work out here 2 years ago. The corps took the captain and operations officer on a tour of other Northwest ports where they went out with the pilots and determined the feasibility of using the Essayons in Coos Bay and Grays Harbor. I think they concluded that the Essayons itself could work in all these harbors.

The Port of Coos Bay, upon hearing the consequences to the maritime traffic due to the blockage of the Columbia River, called a special port meeting on May 23, 1980. Invited to this meeting were representatives of the shipping industry, stevedores, marine terminals, and the waterfront labor force. The purpose of this get-together was to assess the port's capabilities to handle any cargo destined to the Portland-Vancouver area that might be diverted to the Port of Coos Bay by the steamship companies, railroads, and other parties.

The consensus resulting from this meeting was as follows:

That very little, if any, cargoes would be diverted to the port of Coos Bay as the result of the present crisis.

That the traffic stoppage in the Columbia River would be short lived and no permanent diversions of cargoes based on these temporary physical restrictions was likely to occur.

That the scheduled vessels already lined up for the port in the next 30 days would utilize most of the available berths and manpower.

What the volcano's aftermath did for our port was to force us, labor, industry and government, to take stock of our capabilities. What we found out, and what I think most of us already knew in general terms, is that what we do, that is, handle the bulk of Oregon's forest products—I might take exception to a previous statement here about 87 percent of the State's manufactured tonnage going through the Port of Portland. The largest single tonnage moving out of Oregon is wood chips, which the 5-plus million tons we do consider a manufactured product, but we won't get into that—anyhow, we do this very well. We do not have the facilities to handle most of the cargo classifications that move through the Port of Portland.

We have limited dock space, no container cranes, and no direct transfer docks. These are docks where you can put a railroad car directly alongside the ship and work into or out of those. We have no

grain elevators. The railroad serving our port, the Southern Pacific, informed us that if an automobile vessel was diverted to Coos Bay, it would be impossible to ship the vehicles out on their auto-pac cars because these railroad cars are too large to go through the tunnels en route to Eugene.

Lastly, there is the distance factor. The Port of Coos Bay lies 220 road miles from the Port of Portland. The ports of Astoria, Longview, Tacoma, Seattle, and even Everett, Wash., are physically closer to Portland than Coos Bay.

This particular disaster did not offer the Port of Coos Bay an opportunity to participate in the assistance given to the Port of Portland, but I think it will serve to focus Oregonian's attention statewide to the fact that we have very little in-place capacity to handle the State's maritime commerce at any other location than the Port of Portland.

Thank you.

Senator PACKWOOD. Give me a quick update on the T-dock today; how far along are you?

Mr. FELKINS. The T-dock is under construction. The final phase will begin July 1. We last week signed up a new corporation which is going to build a plant to process an underutilized species, black cod, year-round with marketing in Japan of 10 million pounds, which certainly will stabilize our fleet operations.

Senator PACKWOOD. Are you at liberty to say who that is or not?

Mr. FELKINS. A company called All Marine Products.

Senator PACKWOOD. How many people will they employ?

Mr. FELKINS. They have given us an estimate of between 40 and 60.

Senator PACKWOOD. There is employment there and very good stabilization for your fleet.

Mr. FELKINS. Right. We have a surplus of vessels, as I think all ports do.

I certainly want to take the opportunity again to thank you for the assistance your office in Washington has given us. I am positive that the so-called Federal-local resource agencies would have us locked up in that project to oblivion. It did take 2 years to break loose. We would not have been able to do it without direct assistance from your office.

Senator PACKWOOD. You can thank Peter Friedmann. He is the one that did more work on it than anybody else on the staff.

Mr. FELKINS. Thank you.

Senator PACKWOOD. We will move on to our next speaker.

STATEMENT OF RICHARD C. LAWRENCE, EXECUTIVE DIRECTOR, PORT OF VANCOUVER

Mr. LAWRENCE. My name is Dick Lawrence. I am the executive director for the Port of Vancouver. It is a pleasure to be here as one of the three ports that were closed down as part of this problem for a short period of approximately 10 days. Despite all the efforts and the various reports that people still hear that it is a permanent closure and of a much longer duration, we were open and ready for business as of June 1, purely and simply because the type of cargo

that we handle and the drafts that we are required run on an average of about 24 to 26 feet, with possibly an occasional vessel having a draft of 30 to 32. This does not take into account the grain ships, which require another 6 feet of draft at the maximum, but we will see them shortly online as well.

Without being too redundant, and as has been so often repeated earlier, we feel that we cannot emphasize too much the excellent response that has been made, which has been outstanding, by the Corps of Engineers, the cooperation between the Coast Guard, the cooperation between the ports and the pilots; it has all functioned just perfectly.

We are somewhat optimistic at this time; we cannot be overly optimistic. We have had specific and direct impacts and, attached to the testimony that we have, of some projections of the impacts and some of the direct. I would just point out the first column that is in there which covers the month of May and which covers the cost associated with eight deep-draft vessels that were diverted. On down the line it would show the impact involved.

For the month of June, that was a projection, and it was a projection based on the facts that were available and known at that time around May 25, May 26. Fortunately, that is not the total impact. It is very easy to ascertain what the impact is by assessing what was factually there as listed for the month of May, the balance of May following the eruption.

Jumping from the short-term impact, maybe I should drop back to the fact that despite everybody's best efforts, there was so much erroneous information disseminated about this total closure, even appearing in the Wall Street Journal as of June 2, which isn't too far back, that there were three ports in the Columbia River that were closed. So something had to be done. As of last Wednesday, the Port of Vancouver took out an ad in the Wall Street Journal indicating that we were open for business. It is headlined "We Have Been Hauling Ash." That is, principally and primarily the Army engineers have been doing an excellent job of hauling the ash, but what we want to do is get back into hauling cargo. We want to convey the image that we are open for business and we can handle anything and everything that arrives at our port. We hope that as part of this and what all the ports on the Columbia, Snake River systems have to do to restore—already indicated by many people previously—there is a long-term and indirect loss of confidence in the Columbia River.

I would also like to endorse the comment made by Bill Luch, the longshoreman for ILWU, about the impact over the long term and the future as to the effect of being able to finance new facilities. Without the confidence of the bonding people, it will be very difficult to project what the future is going to be for a port. It is highly necessary that we restore the fullest confidence possible so that we can continue on looking down into the future for new facilities and making improvements as they become necessary.

This issue of shaken and lost confidence requires that all of the ports together must get together and redouble their marketing efforts. There are many tasks other than that to be faced to help restore the confidence factor and also it may require joint Federal, State, and local

partnerships. We would like to point out and indicate a few factors such as Congress must assure full funding for an ongoing and intensified maintenance dredging program for the Columbia River.

The Corps of Engineers hopper dredge capability must be maintained.

The waterway users fuel tax, specifically with respect to the Columbia-Snake River system, should be reviewed.

The proposed rail deregulation bill, H.R. 7235—I am not attacking the major components of the bill, but particularly section 301 threatens the competitive position between ports by surcharge provisions. This is coming right now at a particularly bad time for the Columbia River ports.

The Columbia-Snake River system port study, soon to get underway, should specifically address what joint marketing programs could be undertaken.

The Bonneville locks expansion must be expedited.

The 50-foot-deep draft channel feasibility study must be carried forward.

In conclusion, there can be no doubt ever about the importance of navigation and commerce to the economic welfare and well-being of our region. These issues and tasks noted above are, to one degree or another, vital in restoring that confidence and allowing the ports of the Columbia-Snake River system to remain as competitive in the future as we were before.

We thank you very much for your time and consideration. Should you have any more questions or testimony that you need, we will be happy to do so.

Senator PACKWOOD. Not a question, but your closing series of comments are very true; the job never ends. I am not complaining about that. Obviously, circumstances continue to change. You never will have a finished navigation structure where you say, all right, that's it, we don't have to do any more. Ships change, needs change. It is a perpetual, ongoing, I don't want to use the word "battle," but sometimes it is close to that, to keep getting the money and keep getting the facilities that we have to have. Sometimes we win and occasionally we lose.

I will say again that without exception the port directors make it much easier for me. I am very, very pleased with the quality of help that I get, especially when you want something. I appreciate the quality of the preparation of your proposal. You would be surprised in some other types of districts how often I will get requests for things and sometimes we cannot make heads or tails out of them. I am not sure what it is they want. After some discussion, I conclude they are not sure what it is they want. That makes it very difficult. That is not normally true with requests from the port.

Gentleman, thank you.

[The statement follows:]

STATEMENT OF RICHARD C. LAWRENCE, EXECUTIVE DIRECTOR, PORT OF VANCOUVER

The Port of Vancouver is most appreciative of the opportunity to testify before this committee. Our brief remarks are intended to augment and support the testimony presented by the Port of Portland.

By now we are all aware that the May 18th eruption of Mount St. Helens silted in about a nine and one-half mile stretch of the Columbia River with some 22 mil-

lion cubic yards of mud and debris, causing a substantial though temporary constriction in the river's deep draft channel. However, the *tremendous* response of the Corps of Engineers, together with the Port of Portland, not only kept the river open to limited vessel traffic, but around-the-clock dredging resulted, as of June 11th, in the clearing of a 200 foot wide channel open to vessels drawing 35 feet. Moreover, the cooperation between the Corps and the Coast Guard in coordinating vessel passage and dredging operations is enabling the re-establishment of normal vessel traffic on this vital sea-link to our region. Nonetheless, while we are immensely proud of the tremendous response to this crisis, and while we are quite optimistic that normal shipping patterns will be resumed, the impacts and consequences of this situation need to be addressed.

Attached to these remarks is a memorandum dated May 27th outlining the direct and immediate economic impacts on the Port of Vancouver and Vancouver harbor area users as a result of the channel constriction. For the two weeks in May, those impacts were nearly $1.25 millión—losses of ships, cargoes and revenues that can never be recovered. Moreover, those short-term impacts have longer term consequences yet to be sorted out, such as how cash flows, revenues and expenditures affect bonding capacities and our ability to implement long term facility improvements to both our marine terminals and industrial activities. More critically, however, is assessing the extent to which shippers and investors have shaken or lost confidence in this region.

The immediate tasks that must be done are already underway—the full-funding for and restoration of the normal 600 foot channel width and 40 foot depth. However, that accomplishment alone will not fully restore the shaken and lost confidence in this region—the potential permanent loss of cargoes and the (actual) loss of jobs and industries related to that volcanic eruption. More to the point, even as the ports of the Columbia-Snake river system redouble their marketing efforts jointly and singly, there are other tasks that must be done to work towards that restoration of confidence that are broader in scope and require a joint federal/state/local partnership.

Congress must assure full-funding for an on-going and intensified maintenance dredging program for the Columbia River.

The Corps of Engineers hopper dredge fleet capability must be maintained.

The waterways users fuel tax, specifically with respect to the Columbia/Snake river system, should be reviewed.

Proposed rail deregulation bill H.R. 7235, particularly Section 301 of this bill, threatens competitive positions between ports by surcharge provisions, and is coming at us at particular bad time for Columbia River Ports.

The Columbia/Snake River Port System Study soon to get underway should specifically address what joint marketing programs could be undertaken.

The Bonneville locks expansion must be expedited.

The 50 foot deep draft channel feasibility study must be carried forward.

There can be no doubt ever about the critical importance of navigation and commerce to the economic welfare and well-being of our region. The issues and tasks noted above are, to one degree or another, vital in both restoring that confidence and allowing the ports of the Columbia/Snake River system to remain as competitive in the future as we were before. We thank you again for your time and consideration of these remarks. Should you have any questions or desire any follow-up to this testimony, I and my staff will be at your disposal.

Attachment.

PORT OF VANCOUVER USA,
Vancouver, Wash., May 27, 1980.

MEMORANDUM

To : All interested parties.
From : The Port of Vancouver
Subject : Short-range affects of the temporary Columbia River channel constriction at river miles 67 through 68 on the Port of Vancouver and the Vancouver Harbor area.

BACKGROUND

The May 18th eruption of Mount St. Helens and the massive mud and debris slides and flooding associated with that volcanic eruption resulted in a two-mile shoal in the Columbia River's deep draft (40′) channel between river miles 67 and 69 upstream of Longview. Corps of Engineer surveys indicate that, at its shallowest point, the river channel is about 22 feet deep. The Corps estimates

that to restore the original 40 foot deep, 600 foot wide channel will require dredging over the next five months, with completion scheduled for some time in October.

However, it should be noted that as of Friday, May 23rd. only five days after that cataclysmic event, round the clock dredging had allowed limited vessel traffic on the Columbia to resume under the control of the U.S. Coast Guard. Officials expect ships with 33 foot draft to be able to transit the river by June 15th, albeit still under Coast Guard control. This draft should allow most scheduled vessel traffic to call at the Port of Vancouver docks.

In the meantime, fears of another massive mudsilde further constricting the channel have been allayed by geologists, and the Corps of Engineers have assigned their hopper dredges *Biddle, Harding* and *Pacific*, working alongside the Port of Portland's pipeline dredge *Oregon*, to clear the channel. The Corps also plans to contract with an additional three or four pipeline dredges to begin working within two weeks.

Draft limitations for river-traffic will ease as the dredging operation continues. The channel is expected to be 25 feet deep and 200 feet wide by May 29th, 30 feet deep by June 19th, and 35 feet deep and 300 feet wide by July 3rd. It should also be noted these forecasted depths are mean low water measurements; there currently is an additional 4½ to 5 feet of water in the Columbia at Longview.

Thus, in assessing the economic impacts this temporary channel constriction is having on the Port of Vancouver and the Vancouver harbor area, it is important to note that deep-draft vessel movements are occurring now and the situation will improve daily; the river is not closed to traffic. Indeed, such erroneous reports as have been made regarding vessel traffic on the Columbia could have more long-term economic consequences on the Ports of Vancouver and Portland than any channel constriction.

ECONOMIC IMPACTS

The economic impacts noted below are direct impacts only—no attempt has been made to apply any "multipliers" or measure the "ripple-effects" simply because there is no basis at this point in time to assume that any long-term or permanent economic dislocations will occur because of this temporary situation. Nonetheless, it should be remembered that for every dollar in sales to the port industry, another $3.20 in sales is generated in the economy; for every ton of cargo handled, the revenue impact ranges from $60 to $120 per ton, depending on the type of cargo involved.

At the same time, it should also be remembered that for every one thousand tons of cargo handled, one job and $10,000 in payroll is created. Likewise, in the State of Washington, one of every six jobs is related to international trade. Finally, 9 percent (one job in every twelve) of total employment in the State is generated by the port industry.

However, even measuring the direct economic impacts only, the short-term costs for the Port of Vancouver and the Vancouver harbor area users are quite substantial—over $4.8 million for the six-week period (May 19th through June 30th) involved. The breakdown is as follows:

	May	June	Total
1. Deep-draft vessels diverted from port—exclusive of vessel calls at the grain elevator and Alcoa dock—estimated at 20 ships for the 6-week period	[1] 8	[2] 21	29
2. Tonnage (short tons)	16,570	63,890	80,460
3. Marine terminal revenues (gross)	$247,000	$585,000	$832,000
4. Port overhead (an estimate apportioned to marine terminal operations)	143,000	285,000	428,000
5. Stevedoring services and longshore payroll	400,000	1,750,000	2,150,000
6. Tugs, pilotage, and lines	200,000	525,000	725,000
7. Transportation costs (from vessel diversions to other ports and transshipment to or from this area by truck or rail)	255,000	460,000	715,000
Total	1,245,000	3,605,000	4,850,000

[1] Actual.
[2] Scheduled.

At this point in time, it is not possible to assess further economic impacts from July through October, when normal channel width and depth is re-established. The fact is that vessel diversions will depend upon several factors that cannot be projected. First, ships' schedules, including cargoes and tonnages, change on a daily basis. Moreover, even if historical figures could be applied to project the number of vessels, there is no way to know how deeply laden any given vessel would be relative to the deep channel depth at that moment. Secondly, vessel diversions will depend not only on vessel draft and channel depth, but also to the extent that vessel transit time is increased by the controlled passage under Coast Guard supervision—other ports may become closer in terms of transit time and shipping costs. Finally, the degree to which shippers and consignees are confident that further channel constrictions will not occur will determine how quickly normal shipping patterns are re-established.

SUMMARY

There can be no doubt that the projected economic impact for the six-week period is substantial—those direct losses cannot be made up between now and the end of the year. However, the point to be emphasized is that the Columbia River is open to deep draft vessel traffic, and the channel conditions are improving daily—reports or assertions to the contrary truly hamper resumption of normal ocean-going vessel traffic on the river.

This last note is a critical one in attempting to assess any long-term impacts. Decisions are made daily regarding vessel movements for several months or even years, many cargoes are not dependent upon specific port destinations; not only must a high degree of confidence be quickly re-established among the members of the shipping community, but the Port of Vancouver will have to intensify and redouble our marketing efforts to keep or recapture business that may have been lost—even as we continue our efforts to develop new business at the Port.

Likewise, increased manitenance dredging in the Columbia River below mile 69 will be necessary over the next several years—congressional support will be essential. Long-term diversions of particular commodities could result in the temporary or permanent shutdown of certain industries dependent upon ocean-going vessel movements; so too could long-term crop reductions in the eastern Oregon-Washington and Idaho farm belt.

In short, the Port of Vancouver does not intend to minimize the potential for more enduring economic consequences related to the eruption of Mount St. Helens. More importantly, however, we do intend to assess the situation as it exists: river traffic will increasingly return to normal over the next five months; congressional support for the short and long-term dredging requirements will be decisive, crop reductions will be short-term; permanent diversions of commodities critical to certain industries are quite unlikely to occur; and the lower Columbia River Ports are even now redoubling their marketing efforts.

Finally, as with any crisis, the initial response is to assess the problems created before reviewing the opportunities presented. In this case, the communication and cooperation between the members of the Columbia-Snake River port system has never been higher and is sure to result in a stronger, more vigorous marketing effort—on a regional basis—from this point forward.

If this crisis, however, has affirmed the importance of that mutual communication and cooperation, it has truly reaffirmed the pervasive worth of our Columbia River link to the sea and how vital navigation and waterborne commerce is to this region's economic welfare and well-being.

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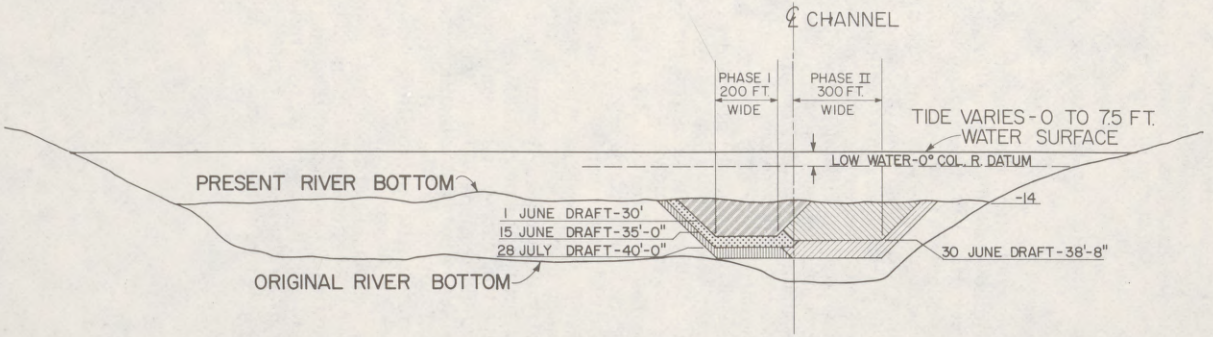
PHASE I	HOPPER DREDGES	200' CHANNEL - SOUTH SIDE, DEPTH CONTINUALLY INCREASES TO 30 JUNE
PHASE II	PIPELINE DREDGES	300' CHANNEL - NORTH SIDE, DREDGE TO 35 FT. BELOW 0º
PHASE III	PIPELINE DREDGES	300' CHANNEL - SOUTH SIDE, DREDGE TO 38 FT. BELOW 0º
PHASE IV	PIPELINE DREDGES	300' CHANNEL - NORTH SIDE, DREDGE PROJECT DIMENSIONS
PHASE V	PIPELINE DREDGES	SOUTH SIDE - DREDGE FULL PROJECT DIMENSIONS
PHASE VI	PIPELINE DREDGES	RESTORE ADEQUATE RIVER CROSS-SECTION SOUTH OF NAVIGATION CHANNEL



TYPICAL SECTION
COLUMBIA RIVER AT LONGVIEW

Senator PACKWOOD. Next we will take Rollie Rousseau and Dale Evans.

STATEMENT OF ROLLIE ROUSSEAU, OREGON DEPARTMENT OF FISH AND WILDLIFE

Mr. ROUSSEAU. I would like to just highlight some comments as we see them, Senator, on the effects of the activities in the last few weeks on Oregon fisheries.

I am going to limit my comment, Senator, to the direct impact to the State of Oregon. I think there will be some others testifying on the fisheries issue that will be more comprehensive and be more involved.

We have had no apparent direct impact of the volcano on streams that are wholly within the State of Oregon to this time. I checked this morning with our hatchery division because of last nights ash fallout, and all of our hatcheries in the Northwest area that could have been impacted by that have received very little ash, with the exception of the Trask River hatchery. Somehow that cloud must have moved in that direction. They do have about one-eighth or one-quarter inch on the ground at this point, but there is no apparent impact on the fish.

I think the problem we are going to see, at least in Oregon, for several years down the road, is the loss of the 10 million smolts from the Toutle hatchery and other hatchery systems, the direct loss that we know of and can account for. Most of those were coho salmon and the majority of these coho are what we call the left-hand turning coho. When they reach the entrance to the Columbia River, they go left. Basically, they are harvested off the State of Oregon. It has been projected that there will be about 30,000 to 35,000 adult fish, both coho and chinook, that will be lost to the fisheries. That is adult fish I am talking about. They would have value somewhere around $8.5 million.

Senator PACKWOOD. Put that in the context of the total number of fish.

Mr. ROUSSEAU. Well, the total fish would be over 1 million fish in a normal year. A million and a half fish would be a good year. This is not substantial, but it is still a lot of dollars that could be lost, or will be lost, in adult fish.

The more subtle effects of this event, of course, from other streams in eastern Washington and Oregon where the ash and the smolts have to move down through the river, are not yet known at this time to really quantify a dollar figure. It is apparent that undoubtedly there was a fish kill on those smolts produced in Oregon streams that had to move down through the Columbia system. We can't quantify that, but undoubtedly that activity was not beneficial to them.

I would like to thank you for your timely help in getting the Columbia River included in the Northwest Fish Enhancement bill. I think that is going to be very helpful in the long term in addressing some of the problems we have with Columbia River fisheries at this point.

There is one further plea that I would like to make to you, Senator. I am sure that you have already heard this and I know that your staff has been working on it, but we very desperately need your

help in assuring the full funding of our Columbia River hatcheries that is now in the Commerce budget process. If the budget were to pass as the administration has proposed, we would have to reduce our production this year, starting with the next couple of months, by one-third. That is 10 million fish. This is not the time that we should be doing that. We very desperately need your help in assuring us the adddition of some $500,000 to the Commerce budget so we can continue full production in those hatcheries.

Senator PACKWOOD. I hope we get it. You know the battle we are going through.

Mr. ROUSSEAU. We appreciate that very much. It is very critically needed at this point.

That concludes my comments, Senator.

Senator PACKWOOD. Mr. Evans?

STATEMENT OF DALE EVANS, CHIEF, ENVIRONMENTAL AND TECHNICAL SERVICES, NATIONAL MARINE FISHERIES SERVICE

Mr. EVANS. I am Dale Evans, chief of the Environmental and Technical Services Division, which is headquartered here in Portland.

As part of the northwest region, we manage service programs through our branches of Environmental Assessment and Fish Facilities Engineering, and the Columbia River fisheries development program. The Northwest and Alaska Fisheries Research Center also has several activities on the Columbia River. All of these programs were affected by the eruption of Mount St. Helens, so we appreciate the opportunity to appear here today.

Acting Regional Director Kruse regrets his inability to be here, but he is committed to being in Canada on international fishery matters.

I will just hit some of the high spots of the testimony that I have provided for the record dealing with damage assessment and some of the measures that we believe should be implemented. Of course, there cannot be a complete assessment of the effects of the eruption on the fishery resources at this time.

With regard to the Toutle hatchery, which is actually located on the Green River, a tributary of the Toutle, I think we can say that it was very badly damaged. That hatchery was constructed by NMFS under the Mitchell Act of 1938 and it is one of those that we provide operation and maintenance funds for. I can't predict when, if ever, that hatchery will be able to be returned to production. It depends primarily on what Mount St. Helens continues to do and how quickly the Green River watershed might return to conditions suitable as a hatchery water supply. If damage to the facility were the only concern, there are some aspects of the hatchery operation such as the State rearing ponds, that could be returned to production relatively soon.

The Toutle River is a tributary of the Cowlitz and the area below the confluence is still impassable to fish. The Washington Department of Fisheries is maintaining young fish there that are suffering direct mortalities after a few hours of exposure to the ash. Preliminary

indications are that the adult fish still would not enter the Cowlitz. So sediments in the river affect not only the Toutle, but the production from the Cowlitz itself.

There was a significant loss of adult and juvenile fish in the Toutle and Cowlitz Rivers from the flood, at lethal temperatures, that swept out into the river. There was extensive loss of benthic life on the river bottoms due to smothering where the silt settled out. As we learn more about the lethal effects of those glasslike sediments on gill tissue, we become more concerned about the effects of cronic low-level exposure to aquatic organisms throughout the estuary.

In terms of response, we, like everyone else, have little experience in responding to the effects of the volcano. What this means is, we must be cautious about broadly extrapolating on the basis of other experiences from the small amount of empirical knowledge that we have gained.

As I mentioned for the Toutle hatchery, preliminarily we believe the hatchery should be cleaned up and protected from further damage. This would include cleaning up around the facility itself and then going into the Green River to remove the sediment from it and restore the river channel so the hatchery complex is not damaged further by high flows this year. We want to clean it up to the point where we know what kind of an option it provides to us in terms of restoring that lost fisheries production when we get a little better feel for what the volcano is doing.

We believe at the same time we should be looking at alternative sites to relocate that production in the case that we simply have to write off the Green River as a hatchery site.

Senator PACKWOOD. What are the options for putting any hatcheries on Oregon tributaries if the Washington tributaries are going to be unusable?

Mr. EVANS. That option does exist. Three or four years ago we contracted with the States of Oregon, Washington, and Idaho to survey all of the available hatchery sites that might be suitable for construction. One of the things we would propose to do is to go back through those reports and perhaps look a little bit more closely at the best of those sites that are available. We want to know that and have those options available to compare with what it looks like for the Green River site.

Senator PACKWOOD. Do you have enough money to restore the Columbia River salmon resource?

Mr. EVANS. No, sir, not in the budget nor anything that is programed.

Senator PACKWOOD. What will it take?

Mr. EVANS. For what we have looked at so far here in terms of the research that needs to be done to determine the impact all the way down through the estuary, something in excess of $1 million the first year and, again depending on how long the condition persists, perhaps $900,000 for another 3 or 4 years following that.

In terms of protecting the hatchery facilities and the surveying of alternate sites, we would need to spend at the hatchery from $500,000 to $1 million to prevent conditions from becoming worse. For the alternate sites survey and to establish water quality gaging sites on

the Green River and on the Kalama River, which is the site of two hatcheries, perhaps another $130,000. If we could go back into the Green River, to rehabilitate the Toutle hatchery, we are guessing maybe $2 to $3 million. If we can't go back in there, a facility of similar production, if we locate a good site, might amount to $15 million.

These figures are preliminary. We have to do some more coordinating with the other fishery agencies and see what might also be scheduled to be accomplished under the disaster relief. Of course, I have to check this out with our Washington headquarters. We will get these figures refined shortly and I believe we can be more specific then.

Senator PACKWOOD. Gentlemen, thank you both very much.

[The statement follows:]

STATEMENT OF DALE R. EVANS, NATIONAL MARINE FISHERIES SERVICE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

Mr. Chairman, members of the Committee, I am Dale R. Evans, Chief, Environmental and Technical Services Division, National Marine Fisheries Service (NMFS). The Division is headquartered here in Portland, and as part of the NMFS Northwest Region, we manage service programs through our Branches of Environmental Assessment and Fish Facilities Engineering, and the Columbia River Fisheries Development Program (CRFDP). The eruption of Mt. St. Helens directly affected these areas of program responsibility, as well as research areas where the NMFS Northwest and Alaska Fisheries Center (NWAFC) has been active for a number of years. We therefore appreciate the opportunity to offer testimony at this hearing on the impacts of the eruption. Acting Regional Director Kruse regrets his inability to be here today as he was committed to be in Canada on international fisheries matters.

I will provide testimony in two parts: Damage Assessment and Recommended Federal Response.

DAMAGE ASSESSMENT

A complete assessment of the impacts of the eruption on fishery resources will not be complete for some time. New information is being reported almost daily. Some tentative conclusions can be drawn, however, concerning the Toutle River Fish Hatchery, constructed by NMFS under provisions of the Mitchell Act, as part of the CRFDP. The hatchery is operated by Washington Department of Fisheries (WDF), with annual operation and maintenance funds provided by NMFS. The location of the hatchery is on the Green River, about ½ mile above its confluence with the Toutle River.

We cannot at this point predict when, if ever, this hatchery will be suitable again for the production of salmon. Most of the facility, with the exception of some residences and rearing ponds, is under from several inches to several feet of mud and ash. A portion of the flood of material that came down the Toutle River, in some manner not entirely clear to me at this time, flowed up the Green River, carrying with it steel bridge girders and parts of logging trucks, and caused significant structural damage to several buildings. The cleanup and disposal of the amalgamation of debris and volcanic residue that is solidifying in place would be a formidable task. An accurate estimate of the total damage cannot be made of course until the facility has been cleaned up and the various operating parts of the hatchery system tested.

In addition to the task of cleaning up the hatchery grounds, there is the problem of the greatly reduced Green River channel capacity in the region of the hatchery. Much of the river channel is now filled to the elevation of the hatchery grounds with mud, ash and logs. For a period following the eruption, the Green River flowed through the hatchery complex.

Other aspects of the hatchery operation were affected also. The Green River is the water supply for the hatchery. Water temperatures were reported to have reached 100° F at the hatchery during the eruption. When we visited the site last Friday, temperatures were a more normal 54° F, but the river was still very turbid and carrying a significant load of suspended material at the surface.

The Green River watershed is about 10 miles north of Mt. St. Helens. I do not have a good description of how the watershed was impacted by the eruption, and any estimate of when the Green River would again become suitable as a hatchery water supply would be speculative at this time.

The Toutle River, a tributary of the Cowlitz River and the migration route to and from the hatchery, remains impassable to salmon. WDF biologists report the Cowlitz River, below the mouth of the Toutle, is still acutely lethal to juvenile salmon because of tissue damage in the gills, apparently due to the effects of sediment of volcanic origin. All aquatic life in the Toutle River must surely have been killed, whether from high temperatures or the scouring effects of the mud and ash. When it will become habitable, even temporarily as a salmon and steelhead migration route, is unknown.

The discharge of sediment into the Cowlitz River apparently is causing adult fish to avoid entering the river. The Cowlitz River supports populations of wild and hatchery reared salmon and steelhead of major importance. There is no means of estimating how long or to what degree salmon and steelhead will continue to avoid entry into the river. How this will affect fishery management decisions is uncertain.

The Kalama River has its origin on the southwest slope of Mt. St. Helens and is the water supply for two salmon hatcheries. Both are operated by WDF and one, at Kalama Falls, was constructed by the CRFDP and annual operating and maintenance expenses are funded by NMFS. Whether the water quality or quantity will be altered over the long term is not known.

The impact of the sediment discharged by the Toutle River through the Cowlitz and into the Columbia was dramatically illustrated when the navigation channel was shoaled and closed to ships coming up the river. Ships already in Portland were stranded there. The manner in which the sediments affect the fish and invertebrate life of the main stem Columbia will not be known as rapidly, and probably not as dramatically as this shipping blockage. Neither will the problem be corrected as readily as the shipping lanes will be opened by the dredging of the channel.

A significant loss of both adult and juvenile salmon and steelhead occurred as the flood, at lethal temperatures, swept out into the Columbia. So far as I know, no estimate of the number of fish killed in the Columbia River has been made. An extensive loss of benthic life occurred due to smothering wherever the sediment settled and covered the river bottom. As more is seen of the effects of the glasslike sediments on gill tissue, we become increasingly concerned about the chronic exposure of all aquatic organisms, even at much lower levels, throughout the estuary.

Clearly, the lower Columbia River fishery resources have been severely damaged, and the effect of this natural phenomenon on the entire aquatic ecosystem of the Columbia River estuary likely may be felt for some time to come. We recognize also that the need to restore other uses in other areas, such as the navigation channel and in the watershed, likely will create additional potential for damage to fish life. Even if we assume hopefully that the worst of the eruptions are over, it likely will be a number of years before the system is again back in some semblance of equilibrium, and conditions may differ markedly from the situation prior to the eruption. Obviously, if Mt. St. Helens continues to be active, further and unpredictable changes may occur. In that event we obviously should be in position to monitor the impacts and be ready to adapt to new conditions as we learn by the experience.

AN APPROPRIATE RESPONSE

Perhaps it is unnecessary, but I will point out that, like everyone else, we have little experience in responding to the effects of a volcanic eruption. What this means, of course, is that we must be cautious about broadly extrapolating on the basis of other experiences from the small amount of empirical knowledge we have gained thus far regarding the effects of the eruption.

We can be a bit more positive concerning some of the physical damage caused at Toutle Hatchery. Preliminarily, we believe the facility should be cleaned up to the point of preventing further damage. Were it not for the questions concerning water supply and migration route, and of course the behavior of the volcano, we probably would recommend prompt rehabilitation of the hatchery facility. At this time, however, we believe it should be brought only to the point where we will know with a fair degree of assurance what kind of an option it provides when the other variables become known.

At the same time, we believe an effort should be made to locate alternate sites on the lower rivers and tributaries to relocate and reestablish the production of salmon previously obtained from the Toutle Hatchery and to replace salmon and steelhead trout production from natural areas affected by this eruption. This opportunity needs to be available to consider as an option when the time for a decision has been reached.

The variables of Green River water supply and Toutle River migration route should be carefully studied, rather than just passively monitoring and recording what happens. If we can instead actively investigate the factors affecting water supply, and factors causing migration route avoidance and tissue damage, we will greatly improve the confidence limits of our decision and hasten the time when it can be made.

It is worth noting here that tradeoffs may need to be considered between the production potentials of the Toutle and Cowlitz systems. In other words, should the Toutle be foregone to secure the Cowlitz if the disruptive effects of runoff from the Toutle were expected to continue for an extended period, but could be controlled at the expense of the Toutle. Improved understanding of the factors at work here will enhance the ability of the fishery agencies to select the best option.

Studies to accurately describe the damaging agent(s) in the Toutle River sediments should be undertaken, as well as to identify the lethal level, and the sublethal level where behavior is affected. This information is needed for the hatchery decision as well as to support reasonable and effective recommendations by the fishery agencies concerning short- and long-term channel dredging and watershed stabilization activities.

For the long term, and considering the potential for the broadest and most lasting impact of the volcanic eruption on the anadromous and estuarine fishery resources of the Columbia River system, maximum effort should be expended to gather information on the effects of the sediments of volcanic origin as they continue to move into and through the estuary.

All of the basin's salmon and steelhead must pass through the estuary as juveniles and as adults returning to spawn. The estuary is a rich production and nursery area for many other species of fish and shellfish. Wise management of the habitat and of the fishery resources depends upon knowledge of factors causing change. Even if nothing can be done to halt or modify the change, knowledge of the dynamics and effects of its occurrence enable better decisions for coping with the change as it occurs.

The NMFS concludes that research studies are essential to determine the impact on the estuarine and anadromous fish resource from the outwash of silt into the tidal estuary.

A series of fishery habitat baseline stations were established in the Columbia estuary in 1978 and 1979 by NMFS. These stations should now be resurveyed to determine the extent of impacts on the ecology from the Mt. St. Helens event. In addition a series of in situ bio-assays should be conducted in the Columbia Estuary using Dungeness crab as an indicator species, to determine the impacts of silt on this and other important commercial and recreational species.

In 1977 NMFS also instituted a study of the migrational characteristics of juvenile salmon and steelhead in the Columbia River estuary. The program is not funded to operate in fiscal year 1981. We believe the baseline data available from this program should be extended now to assess the effects of the continuous turbid water entering the estuary and the near-shore ocean environment. Valuable data could be obtained on changes occurring in distribution, abundance, food habits and predator-prey relationships of the juvenile salmon and steelhead.

As noted about, the quality of the water flowing from the Cowlitz River has been significantly altered, and this condition can be expected to persist at some level for a number of years. Thousands of spring and fall chinook and coho salmon, and steelhead and cutthroat trout will be returning to spawn in the Cowlitz River, and some for the next few years would also be bound for the Toutle River system. Knowledge of how these fish react to this interruption to their normal migration, and the extent of wandering and straying that occurs, would be an important asset to fishery harvest and hatchery management decisions. We believe a means of accomplishing this is the use of radio beacon tags. The NMFS radio tracking research group developed much of the equipment used and have been tracking fish in the Columbia and Snake Rivers since 1971. Equipment is available to do the research for this fall's run.

We also believe that work should be undertaken this year to minimize further damage to the Toutle River Hatchery facilities. In addition to the clean-up work

noted above, the channel capacity of the Green River must be restored to prevent repeated flooding of the hatchery from future high river flows. This will involve removing large quantities of sediment and debris.

Water quality monitoring stations will be needed to assess quality for at least two hatcheries. A remote station on Green River is needed to determine water quality for the Toutle River Hatchery supply before any decision on hatchery restoration is possible. Another station must be operated at Kalama Falls Hatchery to verify quality of its water supply source.

Mr. Chairman, this concludes my testimony. Staff from my office and from the NWAFC have been working closely with other fishery agencies to develop specific recommendations for studies to accomplish the purposes I have mentioned, and to ensure maximum efficiency in the use of the expertise that is available. Should you have any questions I will try to answer them here or provide additional information for the record.

Senator PACKWOOD. Next is Mr. Holubetz and Mr. Ady.

STATEMENT OF TERRY HOLUBETZ, EXECUTIVE DIRECTOR, COLUMBIA RIVER FISHERIES COUNCIL

Mr. HOLUBETZ. Thank you, Senator Packwood.

I am here representing the Columbia River Fisheries Council. The council was set up by the Governors of the three States of Oregon, Washington, and Idaho in 1976 to act as a coordinating body in helping to restore the fishery resources of the Columbia Basin.

The council consists of the State fishery agencies, the two Federal fishery agencies, and the Columbia River Inter-Tribal Fish Commission, which is composed of the four treaty tribes having treaty fishing rights in the Columbia Basin.

The impacts of the eruption of Mount St. Helens are quite severe and were immediate to some of the westside streams that drain into the lower Columbia River, such as the Cowlitz, the Toutle. You have probably heard sufficient discussion of that, so I will move through that part of my testimony and get on to the part that I am more involved with.

The fishery impacts of the eruption of Mount St. Helens were very significant, but quite localized. When considered in comparison with the impacts of the hydroelectric development in the Columbia Basin, they were really quite minor. When you combine both of those impacts, we have a very serious situation in the Columbia Basin. It is the most valuable salmon and steelhead production river in the world and it now is in a very, very depressed state. That is an extremely serious situation. It is going to take an unprecedented level of coordination and funding to return the fishery resources of the Columbia Basin to a highly productive level.

The restoration of the anadromous fisheries of the Columbia River are also highly dependent on appropriate congressional action, such as passage of strong fishery provisions in the Northwest Energy bill. This is absolutely necessary to maintaining the very, very valuable upper river salmon and steelhead stock; also sufficient enhancement funding in the Northwest salmon enhancement legislation.

Senator PACKWOOD. Senator Magnuson and I passed that through the Senate before the eruption. Give me your estimate now of the moneys in that bill and whether or not they will be at all sufficient.

Mr. HOLUBETZ. I can say that they are not going to be sufficient. I can definitely say that. I am reluctant to say how much it is going to actually cost to do the rehabilitation work necessary to offset the

effects of Mount St. Helens at this stage. I think some of the impacts are going to be realized probably not until next spring's runoff. I am reluctant to make a total assessment at this time.

Senator PACKWOOD. I would much prefer an answer like that to a guess that has no foundation. I would hate to have you come back later saying you were off by a factor of 10 times.

Mr. HOLUBETZ. Yes. We are working on this comprehensive plan, which is going to provide us with a blueprint on what is needed to restore the anadromous fisheries of the Columbia Basin. I think in that plan we can identify the relative importance of the enhancement and rehabilitation measures. It is our intent to do that. We should have that plan done in the next several months. I think it is going to be very valuable in providing us guidance on what type of money and what type of actions are going to be necessary to restore these very valuable resources.

Hopefully Congress will be prepared to assist in both volcano rehabilitation work and the more extensive efforts needed to offset the adverse impacts of hydroelectric development and operation in the Columbia River.

I would like to say that restoration of these extremely valuable resources is doable. There have been some people expounding on the fact that the upper river stock are doomed. I want to make sure that you understand that they are not. I think the extremely high value of these resources makes it worth doing. I am hopeful that you will assist us in accompishing this very large task.

Senator PACKWOOD. Don't worry; you can count on it.

Thank you very much for your statement.

[The statement follows:]

STATEMENT OF TERRY HOLUBETZ, EXECUTIVE DIRECTOR, COLUMBIA RIVER FISHERIES COUNCIL

Mr. Chairman: I am Terry Holubetz, Executive Secretary of the Columbia River Fisheries Council. I appreciate the invitation to make a statement at this hearing.

The Columbia River Fisheries Council received a brief report on the fishery effects of the Mount St. Helens volcano at its meeting on May 20, 1980, only two days following the major eruption on May 18.

The Columbia River Fisheries Council (CRFC) was established by the Governors of Oregon, Washington, and Idaho in December 1976 as a coordinating mechanism for consideration of fishery matters of interstate interest regarding the Columbia River. The CRFC consists of the directors of the four state fish and wildlife agencies: Washington Department of Fisheries, Washhington Department of Game, Idaho Department of Fish and Game, and Oregon Department of Fish and Wildlife; the regional directors of the two federal agencies with responsibilities for Columbia River fishery resources: U.S. Fish and Wildlife Service and National Marine Fisheries Service; and the chairman of the Columbia River Inter-Tribal Fish Commission, comprised of the four Indian tribes with treaty fishing rights in the Columbia River: Yakima, Warm Springs, Umatilla, and Nez Perce.

While the majority of the impact on the salmon and steelhead resources occurred to stocks that are produced in the west slope rivers of the state of Washington, these runs contribute to the main stem Columbia River fisheries of both Washington and Oregon, as well as to the ocean fisheries of Washington, Oregon, California, British Columbia, and Alaska. In addition, to the extent that the migratory habitat of the lower Columbia is adversely impacted by volcanic ash and debris, the upper river stocks of salmon and steelhead, produced in Idaho, Eastern Washington, and Eastern Oregon, are affected in their pas-

sage through the lower Columbia River. The Yakima River Basin had extensive ash fall, but the impacts on anadromous fish and habitats are not apparent at this time.

The impacts to fisheries in the Toutle River and Cowlitz River were immediate and extremely adverse. The impacts on fisheries resources in other parts of the northwest may be subtle and more difficult to assess.

Although the fishery impacts of the eruption of Mount St. Helens were very significant and will have an adverse effect on salmon and steelhead fisheries over a number of years, the fishery impacts of this natural phenomenon are relatively minor compared to the extensive and severe fishery impacts caused by the development of hydroelectric dams on the Columbia River System. The combination of both types of adverse fisheries impacts is particularly critical to the anadromous fish resources of the Columbia River and the many fisheries that depend on those resources.

I believe that it will take an unprecedented level of coordination to return the fisheries resources of the Columbia Basin to a highly productive level. The restoration of the anadromous fisheries of the Columbia River are also highly dependent on appropriate congressional actions such as passage of strong fishery provisions in the Northwest Energy Bill and sufficient enhancement funding in the Northwest Salmon Enhancement legislation.

The Columbia River Fisheries Council is prepared to assist the state and federal fishery agencies in a coordinating role through its committee structures, if it is determined that such coordination is desirable in addressing the impacts of the volcano on the salmon and steelhead resources of the Columbia River. The Council is actively engaged in developing a comprehensive plan to overcome the major adverse effects of hydroelectric dams.

Hopefully, Congress will be prepared to assist in both volcano rehabilitation work and the more extensive efforts to offset the adverse impacts of hydroelectric development and operation.

STATEMENT OF CLEMENS ADY, COLUMBIA RIVER FISHERMANS PROTECTIVE UNION

Mr. ADY. I am Clemens Ady. I am an attorney and representative for the Columbia River Fishermans Protective Union and I promise that I will be very brief.

I would like to point out, first of all, the whole thing is the impact that the volcano has had on the lower river. This is just a series of poor seasons that we have had this year. So far we have had one fishing day. That was in April. I think we captured 800 to 1,000 fish among about 1,000 fisherman on the lower river.

The primary impact will be that the only fish that we do catch will be those fish that normaly return to the Cowlitz, Kalama, and Lewis Rivers during the months of September, October, and November. Those are the only fishing dates we will have. We do not know whether or not there will be any fish available.

Second: Though dredging is very important to the maritime industry—and I am an admiralty attorney primarily, so I am also interested in the channel being kept open—on the other hand, every time there is a dredging activity that takes place in the Columbia River, there is a disruption of what the gill netters refer to as their drifts or drift rights.

The eruption silted in all the drifts and the channels, but they also put in a tremendous amount of logs and other debris on the bottom of the drift rights. Now they are going to have to go into everyone of those drifts and remove a tremendous amount of logs and other debris that does exist so they can fish it.

I am very pessimistic about the opportunity of being able to fish during October and November and September because we don't even know if the fish can even get past Astoria or even come into the river. I don't think anyone knows whether or not they will. It would depend on the amount of ash in the river and other circumstances.

What it amounts to is 1 full year without any income for about 1,000 people, including both Oregon and Washington residents, primarily Oregon residents.

We would like to, as an organization, obtain some type of financial loan, not a gift or anything. I am now thinking about pursuing the SBA as an alernative. I do not know if an SBA loan would be available to an organization or to a group. If not, I would like to have an opportunity to use your offices to find out if we could pursue some loan or something under disaster relief to help restore those drift rights. It will be thousands of dollars per individual that belongs to the organization in order to clear those drifts. Disposal is going to be another big problem. What do you do with all the logs that are on the bottom that the dredge digs up?

Senator PACKWOOD. I don't know about the SBA. I don't know the law that well on that subject, but if you have got time to stay and talk to one of my staff before we leave today, we may be at least able to gather some information and start to do some checking for you.

Mr. ADY. I would like that very much.

That is all I have, Senator.

Senator PACKWOOD. Hang around a little longer. We have three or four more witnesses and then we will be done. I am not quite sure that somebody can meet with you right now.

Mr. ADY. I will.

Senator PACKWOOD. Next we are going to have witnesses from the Columbia River Inter-Tribal Fisheries Commission. I don't have all the names of the people who are going to testify, or is only one going to testify?

Mr. DOMPIER. Senator, I can introduce those that are going to testify.

Senator PACKWOOD. All right.

STATEMENT OF DOUGLAS DOMPIER, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

Mr. DOMPIER. My name is Douglas Dompier. I am the manager of the fisheries technical services for the Columbia River Inter-Tribal Fish Commission.

Here with me this morning at the table is Mrs. Kathryn Brigham from the Umatilla Tribe; Mr. Bill Yallup and Mr. Levi George from the Yakima Tribe. Also in the audience is Mr. Moses Stick from the Yakima Tribe.

I would, if it is all right with you, Senator, we have prepared a written statement that we have given to your staff. I will summarize that later. I would first have members of our commission present their thoughts.

Senator PACKWOOD. That is fine. Of course, the statement will go into the record.

STATEMENT OF KATHRYN BRIGHAM

Ms. BRIGHAM. My name is Kathryn Brigham of the Umatilla Fish and Wildlife Committee.

The Columbia River Inter-Tribal Fish Commission is composed of four treaty tribes with fishing rights on the Columbia River, the Nez Perce, Umatilla, Warm Springs, and Yakima. The four treaty tribes are working together to protect and enhance the Columbia River and its tributaries. We are also working with the States of Oregon, Washington, Idaho, and two Federal agencies through the Columbia River Fisheries Council.

The treaty tribes have a great deal of interest in what takes place on the Columbia River because of the treaties and the Federal and Supreme Court decisions. At one time there was more than enough fish for everyone, but because of the dams, irrigation and overharvesting of these resources, they are now much lower today than ever.

There are steps being taken today to try and correct this, but now we have the eruptions of Mount St. Helens, which has had a whole new effect on the fisheries. Therefore, it is the commission's feeling that we have special legislation drawn up to restore the fishery resource.

That is all I have to say.

STATEMENT OF BILL YALLUP

Mr. YALLUP. My name is Bill Yallup. I am the chairman of the Fish and Wildlife Committee of the Yakima Tribe.

I would like to make a comment before I go on to the prepared statement I have with regard to the impact that Inter-Tribal had put together.

I would just like to have you know that me and Mount St. Helens together, we believed in nature, but I for one say horay for her. I wish more people would pay attention to nature, which Mount St. Helens is so much a part of. There are 200 people today that are dead because they fooled with nature. The impact of what I am saying is, that is part of nature, what has happened. Nature takes her course. I don't know about what people have said here, but they call Mount St. Helens a disaster. I wish our Congress would listen to some of the things that people have said about nature. What people call a disaster today is a loss in finances, economy, whatever. No one looks at the Indian people of the Columbia River when they come to Washington to talk to you about disasters, manmade disasters.

However, the Yakima tribal council recently, after we heard of the damage done by the eruption of Mount St. Helens, passed a resolution, a tribal resolution, to deal with the impact of the eruption. The resolution asks for long- and short-term relief and disaster funds for our neighbors of the Yakima Valley. Also the resolution includes language asking for legislation to be set forth to deal with the disaster as a separate issue.

I think some of the people have already talked previously on S. 885, the enhancement bill of Magnuson and yourself on the Senate side. There, again, the Yakima Tribe had asked that you consider some amendments to deal with the things you have talked about. On the

House side, I think, are several companion bills that are popping up, the main one being H.R. 6677. We ask for the quick passage of that bill.

The last time we were in Washington, 2, 3 weeks ago, we talked to several staff members on the House side on the impact of our disaster being considered first. However, you deal with Mount St. Helens from here on out, it should be a separate bill.

The reason behind the resolution passed by the Yakima Tribe is that if you were to attach this type of relief for this disaster, it would cause delays in the enhancement programs that we envision now. I am talking about next year, 2 years from now, whenever the funds will be made available. If we have to sit back and wait for all the information to be gathered by several agencies, we will be sitting for 5, maybe 10 years again. The fish would be dying off.

There are several reasons why we feel strongly about the passage of that bill with those amendments that we ask. We ask to have you consider our neighbors and what has happened to them. We ask for a quick and fast disaster bill for the people that you have heard today.

If it were up to me and Mount St. Helens, I wouldn't give them a nickel.

I will ask Levi to say a few words on what has happened today.

STATEMENT OF LEVI GEORGE

Mr. GEORGE. My name is Levi George. I am chief of the Columbia River and part of the Yakima. I am quite honored, Senator Packwood, that we can come before you.

I have listened to all the statements that were put before you. It makes me wonder, you know, like Bill explained about the Creator. Creating is a funny thing. We have to honor His law. Maybe He is trying to tell us something here and we are not really following it. I am a religious leader and I follow these things very closely.

You know we fight right here on this Earth before our Creator among ourselves. I read that Donaldson is supposed to be here, but he was represented by Rollie Rousseau. We were supposed to sit together at this one table. I was kind of glad that we would for a change sit together and ask for something together that is needed on the Columbia River. I am glad Bill mentioned the dams. That is what I was going to make a statement on, but he already did.

Like I am saying about the Creator. It is a funny thing. He has got the power to do things like what are happening to Mount St. Helens. I think she is trying to tell us to work together, be together on everything, don't be fighting.

You know, the Creator has one thing that he overlooks in this whole world. Everything that is put in this Earth we are supposed to share, land, water, the food, the salmon, the timber, deer, all the other food that is on it. We are supposed to share that. We did when you first came to our country, but now today, we are fighting over it. I don't think the Creator is very satisfied with that and she is trying to tell us something. I wish we could work together and maybe keep the Creator happy.

That is all the statement I have, Senator. Thank you.

Senator PACKWOOD. Thank you.

Mr. DOMPIER. Based on the testimony of the commission, Senator, I don't believe I could add any more than what has been said.

Our written testimony is before you. I believe that our commission members have summarized it very well.

Thank you.

Senator PACKWOOD. That is very well said and I appreciate it. It is different from what we have heard and well worth hearing.

Thank you all for being so patient and waiting.

[The statement follows:]

STATEMENT OF THE COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

On behalf of the Columbia River Inter-Tribal Fish Commission, I welcome you to Portland and extend our appreciation to you, Senator Packwood, and to the members of this Committee for holding hearings on this new threat to the Columbia River fisheries. The salmon and steelhead provide the treaty tribes with a food source, the basis for an economy, and a focal point of religion and ceremonies. The Tribes are vitally concerned with the future of this resource and recognize the necessity of a comprehensive approach to rehabilitating and enhancing fish runs and habitat and compensating for losses to these resources.

Obviously, no group stands to gain if the fishery suffers as a result of the eruption. That is certainly true of the Columbia River treaty tribes which rely heavily on the salmon and steelhead. The courts have recently reaffirmed that the tribes are guaranteed, by treaty, a fair share of the resource. The United States Supreme Court has confirmed that the tribes are entitled to harvest up to fifty percent of the harvestable surplus of fish destined upriver. Thus, the tribes, as well as other users of the resource, have a vital interest in mitigating the effects of the eruption.

Based on historical levels, the current conditions of the anadromous salmonid fisheries in the Columbia River basin are depressed; some runs are so depressed that they are being considered for designation as threatened or endangered species. There is an urgent need to meet the effects of the eruption on these fisheries. That purpose could be pursued in conjunction with efforts to compensate for upriver losses caused by dam construction and with general enhancement programs along the full course of the Columbia River.

The short-term effects of the eruption of Mount St. Helens and the subsequent ash fallout are not yet fully known. It is known, however, that the May 18 blast displaced an estimated 1.5 cubic kilometers of material. Areas to the east of the mountain received ash fallouts ranging from trace amounts to several inches. The upper Yakima River watershed and its tributaries were directly in the path of this ash cloud. The anadromous fish resources of the Yakima River system were extremely depressed prior to the eruption. The ash fallout may exacerbate the resource's condition, thereby further jeopardizing these fisheries. The eruption also directly affected the lower Columbia River. The massive displacement of material on May 18 resulted in the deposition of between forty and sixty million cubic yards of material into the Columbia River above and below the mouth of the Cowlitz River. The Toutle and Cowlitz rivers were extensively damaged by mudflows, flooding, and debris. The deposition of such quantities of material threatens secondary effects on the lower Columbia River to its mouth at the Pacific Ocean.

Initially the smolt count dropped in the area affected by the discharge of ash and heated water from the lower Cowlitz into the Columbia River; the smolt count now appears to be returning to normal. The effects of the volcanic material on the estuary, where the smolts spend from two to four weeks before migrating out to sea, is not yet known. Dredging by the Army Corps of Engineers could prolong the disturbance in the lower Columbia and increase turbidity. These conditions will affect all migrating salmon and as a result the full effects of the eruption may not be known for years.

The ash fallout in eastern Washington may threaten the future value of the treaty fishery resource on the upper Columbia River, where the treaty tribes conduct most of their fishing. The Commission appreciates the Committee's concern and urges that legislation designed to aid fishermen address the dramatic damage done to the lower river and the more subtle damage to upriver habitat and fish populations.

The Commission has identified three avenues by which the Congress could direct aid to fishermen affected by the eruption.

First, provisions for additional funding to deal with the disaster could be included in the Enhancement Bill now pending before Congress. Second, Congress could, through the Mitchell Act of 1938, appropriate funds directed to restoring both upper and lower river habitat and fish stocks. Third, Congress could act, through a special volcano assistance bill, to assist the tribes, states, and federal agencies in rehabilitating rivers damaged by the eruption.

The Commission has concluded that acting through special legislation is superior to the other alternatives. This course would permit the targeting of federal assistance to areas impacted by the volcano.

PROPOSED ENCHANCEMENT LEGISLATION

The Inter-Tribal Fish Commission supports the congressional effort to rebuild salmon and steelhead runs in the Columbia River and its tributaries for the benefit of both treaty and non-treaty fishermen. The enhancement bill is intended, however, as a response to the cumulative and long-term impacts on the fishery of dam construction, irrigation diversion, habitat loss, and overharvest of fish stocks. In addressing the effects of the general degradation of the river, the proposed legislation is necessarily general in character. It deals with the river system as a whole, while the eruption has directly affected a limited area. The enhancement bill is based on a pre-disaster baseline condition; special legislation would offer the flexibility to respond to the unique problems of volcanic damage to rivers and streams.

Finally, there is litigation currently before the courts which centers on the states' failure to properly regulate the resource and on the impacts of that failure for the Indian fishery. The litigation emphasizes the existence of an independent duty to protect and restore salmon and steelhead runs which have been damaged or destroyed as a result of inadequate regulation. Problems of this nature could effectively be dealt with by enhancement legislation.

On the other hand, the Commission recommends that a congressional response to volcano damage be narrow, specific, and tailored to problems intensified by the eruption and ash fallout.

MITCHELL ACT

The Mitchell Act was enacted to provide compensation for fish losses caused by construction of federal hydro-power dams. Its purpose—compensation for losses—is a response to a particular situation. Federal aid under the Mitchell Act should be focused on the geographic areas impacted by hydro-generation facilities and to the end which the Act was designed to accomplish. It was designed not as a response to a natural disaster but rather as a response to man's alterations of the river. Its purpose was to compensate for losses caused by man-made obstacles to migration and inundation of spawning areas by reservoirs. The Mitchell Act should be retained as a means of compensating for up river losses but it is an inappropriate vehicle to meet the needs of areas impacted by the eruption of Mount St. Helens.

SPECIAL LEGISLATION

A separate volcano relief bill could be drafted with particularity to meet the problems caused by the eruption. Two watersheds have been affected by the volcano: the Yakima River system, and the Cowlitz River system. The treaty tribes are particularly concerned about the Yakima system, which an interagency committee found to be in a depressed condition even prior to the disaster. The heavy ash fallout in the Yakima area may have affected this system and the need for rehabilitation of that salmon and steelhead run continues to be crucial. The Yakima tribe has identified several measures which must be taken for rehabilitation of the river. First, a program for installation of fish passage facilities and fish protection devices is needed to protect the migrating fish. Second, a rearing facility, which could be used to replace lost production in the Yakima, should be constructed.

As set out above, the eruption has impacted fish runs in both the lower basin and in upriver portions of the Columbia. The Supreme Court recognized that the United States has solemn obligations to the treaty fishery. The Commission urges that this Committee consider an independent volcano relief bill to preserve the fishery resources. This would offer a comprehensive approach to restoration

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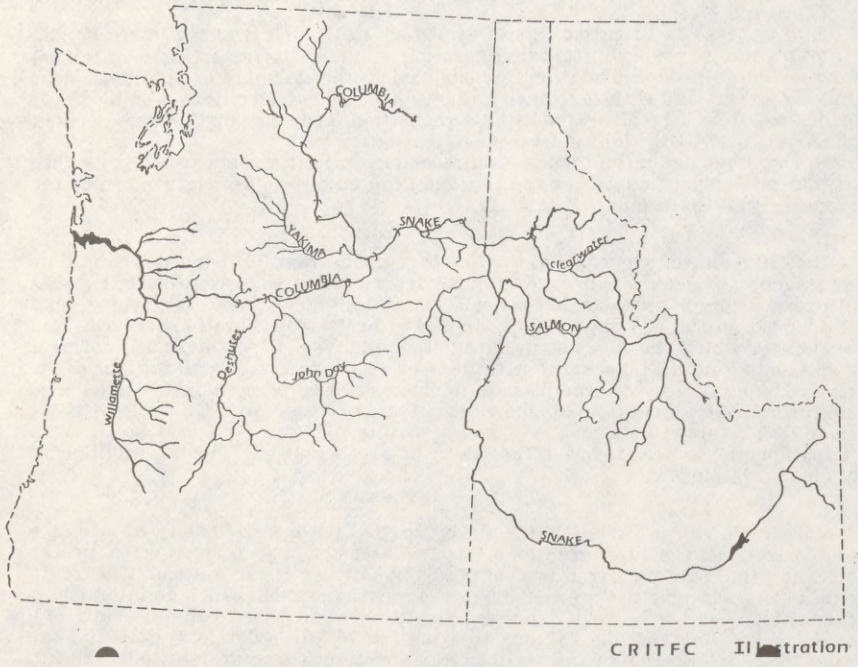
of the Columbia River fishery: The Mitchell Act will serve to compensate for losses caused by man-made obstruction while the enhancement bill promises to remedy effects of environmental degration of the resource.

Regardless of which course the Committee chooses to follow, the Commission requests that the tribes be integrally involved in the direction of rehabilitation programs. The legislation should specifically include tribal participation and provide for tribal agreement on all projects.

The tribes should be involved not only in assessing the impacts of volcanic activity but also in other programs designed to enhance or rehabilitate the Columbia River fisheries. Their input and participation should be included in evaluating measures needed to compensate for losses due to federal water projects and actions required to ameliorate environmental degration, to prevent overharveting, and to enhance the fishery.

The tribes have a significant stake in the future of the fishery, and in the future of the upriver fishery in particular. Legislation should ensure that the tribes have an opportunity to be involved in the coordination of fishery enhancement, rehabilitation, and compensation, and that an equitable part of the funding is used to benefit the upriver fishery.

COLUMBIA RIVER BASIN



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Senator PACKWOOD. Chuck Voss, Northwest Steelheaders Association.

STATEMENT OF CHUCK VOSS, EXECUTIVE DIRECTOR, NORTHWEST STEELHEADERS ASSOCIATION

Mr. Voss. Senator Packwood, I am Chuck Voss, executive director of the Northwest Steelheaders Association.

I think everybody has said what there is to say. It is getting late. I would like to make note of something that was said before.

I would like to read something right here, one paragraph. It comes from the Ocean Law Memo, the University of Oregon. We receive them constantly and they are kind of interesting, but I would just like to put it into the record because it is so important. It is basic, but it is important.

Salmon have five basic environmental requirements. Free access to and from the sea. An adequate supply of clean water. A sufficient amount of spawning gravel. An ample supply of food and sufficient shelter. Alteration of those facts destroy the environment for the fishery.

Now, Senator, I live on the corner of the Red Zone and last night at 8:30 when I was working in my den I thought maybe the house was on fire because there was such a funny noise when all the rocks were hitting the top of the house. I ran upstairs looking and my wife said it was raining. I said I had never heard rain like that in my life. I walked out and everything was coming down. Suddenly everybody started to move and everybody started to scatter. It was night and they never know what is going on over on the mountain except for the movement of the earthquakes that are taking place.

I live on the north fork of the Lewis River, which is one of the biggest salmon rivers that we have here in the Pacific Northwest. As a matter of fact, before three dams were built on that river; it was one of the largest producers south of Alaska for Chinook. It was a marvelous river. It had lots of spring Chinnok and it had steelhead in it. That river now has two large hatcheries put there by the Department of Fisheries of the State of Washington. It is being doubled with a $2 million plant. Please remember that the State of Washington has a $33 million enhancement program taking place.

We come back to the Toutle. I would like to say one thing about the Toutle. Sportsmen here in the Pacific Northwest, both Oregon and Washington sportsmen, consider the Toutle one of the primary rivers for sport coho. Silvers have the habit of coming into the river and once they come in there to spawn, they don't seem to bite. That particular river had coho and you could throw flies at them and pick off a few. It was famous for that. Of course they are washed out.

I did fly over the whole scene a few days ago. I can't believe it.

One of the things that I think that is really important was brought out earlier and that is that the bottom of the river has been scraped.

Have you had an opportunity to fly over it yet, Senator?

Senator PACKWOOD. I flew over it about 3 or 4 days after the May 18 eruption.

Mr. VOSS. One of the things that I think is real interesting, a friend of mine has a trailer up there and we went up looking for it. It was completely covered over. I think the thing that really impressed me was the way the trees have fallen. They look almost like telephone poles with everything gone from them and then completely sandblasted. The thing that amazes me about that is all these trees for some 13, 14 miles are in that same condition. I can imagine what the bottom of that river must look like. Of course it is silt now, but what it took prior to being filled up with sand and soot.

I have a picture. I crossed over the bridge at Longview and looked down the Cowlitz River where it meets the Columbia and I took a picture. You cannot see the water for a mile as it entered the Columbia

because it was filled with logs. You just could not see the water. At that particular time, there were great runs of spring Chinook coming up the Cowlitz River.

It is a very, very sad commentary that our fisheries have to take a beating like that simply because we have been fighting so many other problems, manmade environmental problems. As Levi pointed out, maybe Mount St. Helens is telling us something else.

I would like to say that the Toutle River hatchery, as Dale pointed out, is in pretty bad shape. Please remember that in the enhancement program in the State of Washington there is another hatchery being built above it on the Green River that would double the output of coho. I don't see anyone here from the State of Washington Department of Fisheries. I understand that it looks like the Green River is going to come back pretty fast. It will depend, of course, on what happens this winter. That other hatchery will produce well.

I would say this in conclusion, and I don't mean to ramble on here. The thing that disturbs me—and I represent the sportsmen on the Pacific Fisheries Management Council and salmon panel, and as the association guide for the last 10 years—one of the things that bothers us so much is that we could pour an awful lot of money into this whole Columbia River system and, as both of you gentlemen know, it may just be pouring good money after poor simply because something has to be done about those dams. I think the Northwest energy bill and Congressman Dingle's very constructive amendments should solve a lot of those problems, but we must focus on that one before we start dumping a lot of money and pumping a lot of money into these tributaries and trying to get those fish to and fro up the main water course, since it is plugged up with those power problems.

I would really like to have the chance to ask you, Senator, is to hope that you will support that Northwest energy bill with that heavy fish amendment in it.

Senator PACKWOOD. Chuck, I appreciate very much what you are saying. I know the amendments. They were not in the bill when it went through the Senate. I am convinced that we are going to come out with a bill that is accetable to 95 percent of those concerned. There are going to be 5 percent that aren't, but that is as good a bill as you will ever get, probably.

The input that we have gotten from you and the other sportsmen has been most helpful.

Thank you.

Mr. Voss. Thank you.

Senator PACKWOOD. Jim Thayer and Al Wright.

You have been patient men.

STATEMENT OF JIM THAYER, J. THAYER CO.

Mr. THAYER. I am going to take a few minutes just to review. As you know, I was formerly president of the Port of Portland and more recently the Governor has appointed me chairman of the lower Columbia River development task force. I think this era really started about June 20, 1975, when Senator Magnuson and your other colleagues were up at Lewiston and the water-level route from the sea to Lewiston was opened.

As you know, at this particular time, give or take a few percentage points, but about 20 percent of the gross State product of Oregon is exported, the Nation maybe 1.5 percent, but that is really of extreme importance to the whole inland empire and really is the key to it.

What we have tried to do is to break down this lower Columbia River task force program, to try and isolate a few ideas which I want to pass on to you. I think some of the other witnesses have alluded to some of these things, but I want to take a couple of minutes to reinforce them.

As you know, Astoria, being at the mouth of this great river, it kind of reminds me of the Rotterdam-Antwerp program on the Rhine where one port complements the other. I think that we should consider where we have the good opportunity of perhaps a 50-, 55-foot draft across the bar at the mouth of the Columbia River, that this is a very, very vital thing to have, a deep-water port at the end of this river.

The Port of Portland and Longview and so on have suffered with this 40-foot channel. I certainly go along with the thought of trying to deepen that to 50 feet. I think the key is Astoria because of the possibilities at that point.

One of the things that bothers us—and Dennis Lindsey is working on this strongly, one of my subchairmen—is the rail problem, which was alluded to, at Astoria. I would suggest, Senator, if your office could do anything in regard to the joint use of that by the BN and the UP. The UP needs badly a deep-water port on the west coast because of all the action, particularly in coal, out in the Far East. I would like to suggest that some studies be made on that.

The other thing is, because of the environmental problems of running many unit trains down to Astoria through St. Helens, I think that basically a rail barge program should be worked out from Troutdale to Astoria so that we have a dual method of transportation in that particular area.

As you know, the Taiwanese are interested in 5 million tons a year, which could go to 15 million tons a year. They would like to use Columbia River ports.

So those things and, I think, perhaps one of the major objectives of the State of Oregon should be to develop a deep-water port at Astoria which would supplement the Port of Portland. I am talking about the topping off of these vessels that we can't top off here that are being taken to Vancouver, B.C., or Seattle to be topped off. I think it is very, very important.

The second thing I would like to mention is in regard to the fishing. Bill Wick is on my particular committee, subchairman on the fish program. He is working hard on that 200-mile limit on the use of bottom fish which possibly could bring the tuna industry back to Astoria. I think those types of things will do a lot to assist us in getting the programs back. Of course these all take some Federal funds.

As far as the cottage industries, as you know, that great second-growth fir that is being grown down in that particular area, I think some expanded programs on cottage type industries, electronic industries, could be developed in the lower Columbia and would be a great boon to the natural industry of that area. The biggest single problem, and one that you are very familiar with, is the highways.

I would like to stress that I think some consideration should be given to extending 80 down to Astoria. This would assist in the dual rail-barge and ground transport into that area.

It appears to me at this time that the Port of Portland, particularly the president, Joe Edgar, has suggested that these might be some solutions to the full utilization of that Columbia River.

I appreciate your being here. This has been called a wrap-up and, as far as I am concerned, they are the most significant things that we can do as far as an objective for the State of Oregon to really keep this economy going and perhaps going from a 20 percent gross State product to 25 or 30. I know that you represent the whole Nation as well as the State of Oregon, but with the balance of payments program that the United States is faced with, this is one of the most beautiful areas in the country and we are carrying our load as far as those balance of payments.

Thank you.

Senator PACKWOOD. You mentioned Astoria and you have only got half a dozen natural ports on the whole Pacific coast, as opposed to the Atlantic coast, which has them every place, and Astoria is one of those.

Mr. THAYER. Yes, indeed.

Senator PACKWOOD. There is no reason why it could not be a great port.

Mr. THAYER. Well, this is what we are trying to do. Fortunately I have a splendid committee. Bud Forrester is also on that committee. As you perhaps know, we appeared before the emergency board last week and got the Tongue Point program acquired by the State and probably gives us the best natural maritime harbor on the west coast.

Senator PACKWOOD. Is it going to be transferred to the port?

Mr. THAYER. The first phase, Senator, was to get the State land board to acquire it. I have talked to the Port of Astoria and for the time being, the committee on which I am serving will work both with the Port of Astoria and the State land board to determine the marketing prospects.

I might also mention that I have spent quite a little bit of time with the YMCA in San Francisco that acquired the Alumex site so that we might make that marketable, which is a magnificent 670-acre site down there. Of course, you are familiar with the Skipanong site and the Tansey Point site. What we are talking about is, here is the mouth of a great river system, which you have alluded to, and which reminds me, as I say, of the Rhine. What a great potential we have. You have interviewed all these people today and now we have got to get it going in the same direction.

Senator PACKWOOD. I couldn't agree with you more.

Mr. Wright?

STATEMENT OF AL WRIGHT, NORTHWEST RIVER BASINS COMMISSION

Mr. WRIGHT. I am Al Wright of the Northwest River Basins Commission. I am here on behalf of Mel Gordon, the chairman. I wish to express his apologies for not being able to be here. It is our regular quarterly meeting and he could not attend.

In an effort to enhance the cross-communication between State and Federal agencies on the impacts of the volcano eruption, the River Basins Commission sponsored a half-day forum yesterday on the water resource related impacts of the St. Helens eruption, with an emphasis on mid- and long-term impacts, and, of course, an emphasis on the impacts of water resources. That half-day forum included presentations by over a dozen Federal agencies, presentations by the five Northwest States involved in the River Basins Commission, and a complete transcript of those proceedings and a staff attempt to summarize the findings will be provided to you and all congressional delegations in the Northwest within a 2-week period.

Senator PACKWOOD. Very good. Thank you.

Mr. WRIGHT. A very brief summary of the findings of that 4½-hour session yesterday, which, I am pleased to add, we got through without one ash joke, basically, as you have heard here today, you are dealing with concerns and impacts in three different geographical areas, the first being the Cowlitz and Lewis River ssytems in which vast portions of the watershed have been virtually destroyed; siltation of the entire Cowlitz River system has occurred, which drastically increases the flooding potential, which you heard about from the corps today; and the loss of the very, very productive anadromous fishery systems within those drainages.

The second area of concern is, of course, the mudflow into the Columbia and the layer of sediment that is laid down and being laid down in the Columbia River estuary, which has long-reaching impacts for the entire anadromous fisheries of the Columbia River system, and, of course, all the native aquatic life in the estuary itself.

In that particular area, the River Basins Commission was fortunate that we had an ongoing Columbia River estuary data collection program, which is federally funded, and we were able to shift the emphasis of much of that program in the short term to assessing impacts of that sediment, that laying down of the sediment layer within the estuary.

Last, the major area of concern of the ash fallout throughout the entire Columbia River drainage and what the impacts of increased turbidity levels, different types of turbidity, what kind of impact it is going to have on irrigated acreage, et cetera, throughout the entire Columbia River system.

I think, as a result of yesterday's forum, one of the key terms or operative terms in the short term is monitoring programs. There is so much that is unknown about the effects of this that the monitoring programs to be able to develop restoration systems and damage-control systems is going to be beyond the capabilities of the Federal and State agencies at this point in time. Obviously, that will convert itself into requests for additional fundings, different sources of fundings for monitoring programs over the next 12-month period.

That includes my statement.

Senator PACKWOOD. Thank you.

Thank Mel for me and remind him that as much as I appreciate his testimony today, one of the nicest things he ever did for me was when he served in the Oregon Legislature in 1961 and did not run again. He recommended to me a secretary he had had and she was one of the best

secretarys I ever worked with. I have always been in his debt for that. She has been a good friend and a good campaign supporter ever since.

Mr. WRIGHT. I will relay that to him.

[The statement follows:]

STATEMENT OF MEL GORDON, CHAIRMAN, PACIFIC NORTHWEST RIVER BASINS COMMISSION

Senator Packwood and Committee members, as Chairman of the Pacific Northwest River Basins Commission, I wish to express my appreciation and that of the Commission for the interest demonstrated by your Committee in conducting this hearing on the problems associated with our recent disaster caused by the Mount St. Helens volcano.

The River Basins Commission sponsored a half-day forum on the water resource-related impacts of the St. Helens eruption. The forum, held yesterday, June 12, in Vancouver, Washington, was attended by about 100 people and included presentations by over 20 state and federal speakers on the impacts of the eruption on water and related resources throughout the Northwest region. A complete transcript of the proceedings of this forum, including a summary of the most important findings, will be provided to your Committee within approximately two weeks. We at the Commission believe these findings will provide assistance to you and other concerned parties in identifying the impacts and needed actions regarding the mid- and long-term effects of the eruption on water resources.

In brief, the major impacts on water resources can be summarized in three major categories.

The first category is the impacts on the Cowlitz watershed and stream system and a lesser portion of the Lewis River watershed.

Secondly, a category would be the impacts on the lower Columbia River and its estuary below the confluence of the Cowlitz River.

The third category would be the impacts and concerns associated with the huge quantities of ash fallout throughout the Columbia River drainage area, especially in the northern and eastern portions.

In the first category, several concerns became obvious immediately. Briefly, they are:

A vast portion of the Cowlitz's upper watershed has been virtually destroyed. At this point, it is not known what it's going to take to restore that watershed, but it's important to coordinate those efforts. Considerable monitoring efforts are necessary immediately to provide adequate information to design a restoration program.

We know the anadromous fish resource of the once very productive Cowlitz system will be impacted, but the question is to what extent have or will these fisheries suffer and what is needed to restore this important fishery.

Flooding potential has been greatly increased. The Corps of Engineers will have to expend a lot of money and effort this summer to avoid the flooding potential that will come with winter rains.

We have lost thousands of acres of prime agricultural land in the area and can expect a high degree of sediment to continue to inundate prime land for the foreseeable future. What that means in the way of need for control measures in the long run is hard to say now.

Finally, erosion of the existing mud flows will continue to impact the entire Lewis River system for quite some time.

Regarding the second summary area, that of the lower Columbia and its estuary, the obvious concerns are:

Aquatic life and environment in the estuary have been adversely affected by the layer of sediment which landed in the river as a result of the eruption. Again, the extent of the devastation and its lasting impacts are not fully known at this time.

Dredging operations must continue and accelerate in order to restore the 40-foot navigation channel to a width of 600 feet to insure adequate navigation traffic to the upstream ports. This will require special appropriations to the Corps of Engineers to support this huge effort over the next 12 months or more.

There is a need to monitor the entire gamut of estuary and river conditions for some time to come, in order to attempt to anticipate future problems before they get the better of us.

In the last area concern, that of ash fallout, we have learned that:

There's been an increase in turbidity in stream flows from the ash fallout. We're not sure of the total ramifications of the fallout or how long this condition may exist.

Ash fallout will affect production on irrigated lands over extended periods, but to what extent, we still are not sure.

Snowpack areas don't appear to be greatly affected by the ash, but a big question remains on how the ash will affect the quality of the snowpack runoff.

In conclusion, the Pacific Northwest River Basins Commission's forum identified one major key word. That is, monitor, and monitor to an extent beyond our present capabilities. We must keep current and extensive information on the effects of the eruption for some time to come if we are to develop successful and timely rehabilitative program efforts. If we are diligent and effective in assessing the impacts, the long-term rehabilitation programs should be more successful and greatly reduced in cost.

As Chairman of the River Basins Commission, I pledge along with the Vice Chairman George Proctor from Oregon and on behalf of the Commission to continue to provide coordination and monitoring efforts on the impacts to our precious water resources from the catastrophic event. In addition, the Commission will provide assistance in communication of the needs for federal assistance to both the Congress and to the Executive Branch.

Attachment.

THE EFFECTS OF THE MOUNT ST. HELENS ERUPTION ON WATER RESOURCES

(A forum held June 12, 1980, Vancouver, Wash.)

OPENING REMARKS BY MEL GORDON, CHAIRMAN, PACIFIC NORTHWEST RIVER BASINS COMMISSION

Good morning and welcome to the Pacific Northwest River Basins Commission's forum on the effects of the Mount St. Helens eruption on the water and related land resources of the region. My name is Mel Gordon. I am the Chairman of the Pacific Northwest River Basins Commission. On my right is Mr. George Proctor, our member from Oregon who is also the Vice-Chairman of the Commission. Incidentally, George was originally the one who suggested the idea of holding this gathering for the purpose of discussion amongst all of our regional members.

The purpose of our forum is to provide and exchange information concerning the current and long-term effects of the eruption on our region's water and related land resources, and to take a look at what's being done or may need to be done in that regard. Fostering the exchange of information and coordination of water resources activities is a fundamental responsibility of the Pacific Northwest River Basins Commission.

As we began to examine the topic, we found that it was multi-dimensional and that to do it any justice we would need to allocate a full morning or afternoon to the subject. This forum is the product of our collective thinking and efforts. We thank all of you for coming this morning and especially those of you who have agreed to participate.

It seems most fitting to be holding this forum in the shadow of Mount St. Helens herself. Sometimes it's hard to believe that the very mountain which caused so much destruction and devastation could now be sitting for the moment rather peacefully a mere 35 miles from this very spot. But that is similar to the feeling most of us had on the eve of the mountain's mightest volcanic eruption of the past 32,000 years. It's rather hard to believe that it actually blew.

Looking back to that cataclysmic day in May, it seems odd that an eruption with the force of the most potent hydrogen bomb ever detonated would cause little more than a shudder here and in Portland and yet be felt 200 miles away in Canada. But that's precisely what happened. The sleeping giant in our backyard finally discarded her quiet demeanor and literally caved in upon herself with a force so great that tons of mud and ash shot up ten miles into the air. Scientists have said that within a few hours, Mount St. Helens had thrown up almost as much ash, mud and steam as Mount Vesuvius did when it buried Pompeii more than 20,000 years ago.

Those are somewhat awesome comparisons and yet they are quite accurate.

What was the scenario that led up to the mindboggling natural disaster?

Hundreds of lines of newspaper copy and television commentary have outlined the series of events which preceded the eruption of Mount St. Helens on May 18 of this year. I'll try to briefly summarize those activities now.

The mountain's first stirrings in 123 years came on March 20 when a slight earthquake measuring 4.1 on the Richter scale went almost unnoticed. During the next two days, quake activity grew but little attention was paid to the series of earthquakes, except by seismologists at a station near the mountain's peak.

By March 24 the quakes started overlapping and the peak was closed to the public. Seismological instruments became unreadable but still the shaking was restricted to the Spirit Lake area and the peak.

Phase two of the pre-eruption activity came on March 27 when an explosion blew a hole about 200 feet across on the north side of the mountain, emitting some ash which then swept eastward.

After that, outpourings of ash became a regular phenomenon. A second crater developed which eventually merged with the first one to form a cavern, seven football fields long and two fields deep.

The situation remained status quo until April 3 when the first harmonic tremors, which heralded the movement of lava somewhere inside the mountain, occurred.

But the tremors were a false alarm. There was no immediate outward flow of lava.

What did happen, however, was the development of a sizable "bulge" which scientists viewed apprehensively. Would the bulge burst and if so, when?

Scientists got a partial answer to their questions on May 7. Although the bulge continued to grow, the peak erupted once more spewing ash. The quakes this time intensified to a 5.0 reading on the Richter scale. Hotspots and steam vents formed on the mountain's top and the crater kept expanding reaching the top of the mountain and continuing to eat down its sides.

On May 12, an earthquake shook loose a wall of ice on the north side of the mountain. Nothing out of the ordinary (if you can call the activities up to this point ordinary). It happened again until May 18 when the 9,677-foot mountain erupted in a mass of fury and destruction in one of the most spectacular and devasting natural disasters of our lifetime.

The mountain's eruption is only the first act in this incredible play.

Besides the destruction to St. Helens itself, a series of mud flows began racing down the mountain into two forks of the Toutle River, killing bystanders, sweeping away homes and collapsing bridges as if they were made out of matchsticks. The force of the mountain's explosion carved out a patch of forest eight miles long and 15 miles wide. Several feet of ash blew as far east as Montana, turning the morning sky into a pitch black cover of unnatural night. More than 200 forest fires, some enveloping thousands of acres of trees, were ignited and hot toxic gas began flowing from the crater.

Although it's difficult to estimate, officials have set the immediate dollar damage wrought by the eruption itself in the $1.6 billion range, and I understand that it's even higher than that now. That amount is based on estimates of more than $500 million in land destroyed in the Gifford Pinchot Forest, a loss to the region's fisheries of $200 million and $970 million in losses mostly related to employment, transportation, buildings, and roads.

But that's only a jumping off point. It's one thing to talk about the momentary consequence of the eruption on the region but an entirely different manner to begin assessing the current and long-term effects of the eruption on the water and related land resources of the Pacific Northwest.

Hopefully we will begin that task here today. Each speaker to address you today knows what the eruption has meant to his or her particular agency. Each one will, in the brief period of time allotted, trace the particular effect of the eruption on their individual sphere of operations, giving a comprehensive and complete picture of the overall effect of the eruption of water and its related resources in the region.

With regard to the presentations, I'd like to request that members of the audience hold their questions until the end of the forum in an effort to allow us to meet our time constraints. At that time we'll try to answer questions, time permitting, of course.

We've basically devided the forum into two parts or perspectives. The first part of the agenda will cover the federal perspective and activities pertaining to the eruption. I will moderate this part of the program and will be introducing representatives from a number of federal agencies.

Then we'll begin the second part of our program; the states' views on the eruption and its effects on their particular agencies. Vice-Chairman George Proctor will moderate that part of the forum.

Following the states' presentations, there will be a discussion and conclusion period when we'll take questions from the floor if we have time.

Before I begin the program, I'd like to announce that a complete transcript of the forum proceedings will be available within the next few weeks to anyone who has registered at the front table. So if you haven't registered, please do so before you leave here today.

At this time I'd like to call our first speaker who is Jerry Stephens from the United States Geological Survey. Mr. Stephens will discuss the series of geological occurrences that have resulted from the eruption.

Mr. Stephens.

GEOLOGICAL OCCURRENCES BY JERRY STEPHENS, GEOLOGICAL SURVEY

I would like to show some slides that were prepared to illustrate the events that took place from the standpoint of the volcano itself and the effects that it had on the local geology in the Mount St. Helens area. If I could get the slide projector turned on and maybe the lights turned down, I'll talk to the slides.

This first one is an index map locating Mount St. Helens and the other potentially active Cascade volcanos going all the way from Northern California up into British Columbia.

Mount St. Helens has been known for years to be potentially the most dangerous and most recently active of the Cascade volcanos. This indicates the location of the monitoring equipment that the Geological Survey had prior to the eruption on May 18. Many of these instruments were installed during the time period of the initial earthquake activity in late March. Some of them were destroyed at the time of the eruption. I won't go into any details of what kind of equipment, but basically this was geophysical monitoring equipment, gravity tilt meters, where we were trying to get an idea of just what was going to happen there. The hydrologic data sites were maintained by the Geological Survey, many of them in cooperation with state agencies.

This map was taken from a bulletin that the Geological Survey prepared which was released in 1978, and indicates, on the basis of geological studies made over many years, what we and our geologists had anticipated might be the future hazards from volcanic eruptions of Mount St. Helens. This bulletin, as I said, was published in 1978. The area in here was considered to be the greatest hazard zone. The peak of Mount St. Helens is right in the middle, the light spot. These would be the areas that would be most endangered by ash flows, mud flows and so on. The yellow zone around it is slightly of less danger because of topography and distance from the peak but still a major hazard area. It would be within this general orange and red area where we would have anticipated that the mjor danger from falling debris and so on, in the event of an eruption, would take place. The yellow areas down the North and South Forks of the Toutle and the drainages on the south side are areas where we anticipated, on the basis of evidence in the geologic record, would be endangered by mudflows. The green areas then would be mudflows further from the volcano, probably less extensive than the yellow areas. This is on the basis of what we could see in the record from not only the eruptions in the early 1800's, but also eruptions going back to the last 10,000 years or so.

After the eruption on May 18, we were able to document some of these things. This is a preliminary documentation. There is better information available now, but, basically these areas are where the debris flows took place when the north side of the crater was blasted out, the material was blasted out, dammed Spirit Lake and flowed down the Toutle as a massive debris flow. This area is one that we had not necessarily anticipated, that we had not projected on our hazards map that was shown on the last slide, simply because in the geologic record it's very difficult to find evidence of this kind of thing. But the area with the little lines in it around here is essentially the area where the blast knocked down the trees. The eastern margin at this time was undefined simply because it was cloud-covered all during that period and we couldn't get in. And, then the mud starting on the mountain side up above, but extending on down below the debris flows, also coming down the south fork of the Toutle, ended up leaving essentially a dam some 400 feet thick right at Spirit Lake tapering down to Feather Edge some 11 or 12 miles down the river. Then mudflows and floods carried that material down

depositing a channel fill several feet thick in the Cowlitz and dumping a lot of silt and mud into the Columbia which succeeded in blocking the channel there.

Going back and comparing this map with the preceding one, we didn't do a bad job of anticipating what might happen. On a photographic base map of the area, this is essentially the geology immediately prior to the eruption on May 18. These lava flows of various kinds, the dome and so on, are all old features from prior eruptions. Then during the period from late March until mid May after the first eruption large arcuate cracks some five kilometers long extending around the south side of the old crater right near the top were formed. One crack went through the crater area, the vent area, and one ran up on the side of the crater rim. And then, the famous bulge that caused so much consternation which we were attempting to monitor, started developing in this area on the north flank.

For a couple of weeks that bulge was expanding at the rate of something like four to five feet per day in a straight line and everyone was concerned. Normally, in a situation like that, you get some point at which failure occurs, and there's a change in the slope of the curve. We didn't know at the time whether we were already past that break in slope and on the verge of failure or whether we would indeed observe some change in the rate of expansion which would give us an indication that failure was imminent. It failed without any change in the rate. It simply exploded on May 18, with no change in our observations.

This is a little more detailed map of the geologic features that were created by the May 18 explosion. The entire north rim of the crater was blown out, the whole north side of the mountain was blown out, failed first by a massive landslide which created the debris flows that went down and dammed up the river, then the blast which wiped out essentially everything in this entire area where the green lines are superimposed. None of the trees are standing there. It went over the ridges and on the back side of the ridges the trees were knocked down, just as on the front side. The ash flows, which started later during the day on May 18 came out of the breached area on the north side of the crater, flowed down, and partially filled up Spirit Lake and raised a dam. This would be the 400′ thick dam at the end of Spirit Lake which follows down the river, then down somewhere in this area it tapers off to essentially nothing but thin layers of mud.

There were also some mudflows off the south side of the peak and over here in the Smith Creek. Apparently they got all the way down to the upper end of Swift Reservoir.

Here's a comparison of the volume of material that was ejected from Mount St. Helens during the eruptive episodes up through the 18th, with other volcanos. Mount Vesuvius up here compared to Mount St. Helens down here; it appears the material erupted from Mount St. Helens is considerably less than Mount Vesuvius, but one of the problems is the difficulty of calculating the exact volume of material. The scientists have several ways of doing it and I'm not sure that these are all comparable; but you can see that St. Helens in relation to some of the more famous ones of the past, including the Mt. Mazama, Tamboa, Indonesia, the famous Krakatoa explosion that blew up an entire island, was considerably smaller.

There's been a lot of concern expressed about the effects of the dust from Mount St. Helens on the climate and atmosphere. I think, some of these large ones undoubtedly created such an effect, but I suspect that the amount of material erupted by Mount St. Helens into the atmosphere is probably not of great significance in that respect. The May 18 eruption spread a blanket of ash downwind and this indicates the thickness of this material in the State of Washington going from—this would be 50 millimeters in this red area here—immediately downwind from the volcano, and you can see the prevailing wind pattern quite well at this time. Then a thinning in the center of that dust cloud occured over the Yakima area, and then increased in thickness again to a maximum of over 100 millimeters in the Ritzville area southwest of Spokane. That ash fallout has probably created more problems, at least economically, than the events right at the peak, at least in terms of the long run effects.

Here's the ashfall nationwide. The black spots are specific sites where measurements were made of the thickness of the ash, again ranging from more than 100 millimeters in Eastern Washington, and anywhere from a trace to as much as a millimeter over this entire area, clear over into Northwestern Minnesota, South Dakota, Nebraska, down into Northern New Mexico. Then for some strange and unexplained reason, a gap occurred in here, possibly the result of lack of data,

but we do have a couple of sites in here. There was a very slight accumulation down in Central Oklahoma. I'm not sure what the explanation of that is but I'm sure a meterologist might be able to explain it.

One of the local effects was the deposition of a thick layer of silt, mud, and debris in the bottom of the Cowlitz River. This slide was prepared from data that I think Chuck Collier will probably be referring to in a little while when he talks about the water resources impact. This particular slide shows a profile from Kelso upstream for 20 miles, the profile of the old channel bottom and the top of the ash area is the profile of the new channel bottom; all of the stripped areas in here would be the deposits that were carried down in the flood that followed the May 18 eruption. Normal flow prior to the eruption was 10,000 second feet and had a profile like this. 10,000 feet flowing down the channel now would have a profile like that, which is in most places higher than bank overflow before the new material was deposited. Bank overflow of 76,000 cu. ft. per second, which is essentially the initial flood stage prior to the eruption, was clear down here, and normal flow of 10,000 second feet now is higher than that. The new 76,000 cfs would put you clear up into the flood stage down the entire reach of that stream.

There are about three or four diagrams here that show diagrammatically what we think was happening to the volcano during this entire episode. This is a cross section which shows the situation prior to the beginning of activity in 1980. These are old deposits, the yellow from the 1857 flow, a dome formed in 1843 which is on the flank in the Goat Rocks area, and some ash flows which were deposited there. The light gray area here is simply showing that this is the area that was blasted out on the May 18 explosion.

After activity started in March with a relatively small eruption, this was the situation that existed. Cracks formed in the crater area. The vent was releasing some of the magma. The molten rock in the chamber was bulging out through these zones in the rock and was reflected in this enormous bulge that was forming on the north slope. Then, on May 18, it appears that an earthquake created a shock wave which caused a landslide, the entire bulge area failed and slipped down.

The next two slides are apparently in a sequence of just a few seconds. The bulge area collapsed and the pressure released causing the blast to take out the whole north side of the peak.

Now this one I probably shouldn't be showing, because it's based on what was later determined to be an incorrect interpretation; but a week or so ago, observers reported seeing glowing rocks at night in the bottom of the crater and the interpretation of that was that we were beginning to get at the top of the vent the formation of a lava dome, which would indicate that the gas pressures had decreased sufficiently and the rock was beginning to solidify. Based on that, and this is a prediction, but I don't really believe they meant that, the next logical step if indeed we are seeing the formation of a dome, would be that that dome would continue to grow and create a plug similar to the one that formed back in 1843. However, it was determined after a few days that the glowing rock that we were seeing was not the formation of a lava dome, but surface rocks around the vent which were being heated by gases coming up this column; and that the top of the motlen rock magma chamber did not reach the surface but was somewhere down in here, and that hot gases coming up this column were heating the rocks around the vent. So, there is no dome forming at this time. We anticipate that the dome will form, but we don't know what will happen next.

Here are some slides of the May 18 eruption, which most of you have seen on television. This one shows the back side of the area that was blasted out. The crater rim now has just this arcuate shape here and the other side is completely scooped out and gone.

Thank you.

ATMOSPHERIC EVENTS BY ARTHUR HULL, NATIONAL WEATHER SERVICE

Actually, I don't have too much of an overview to give. I came prepared to show the cause and effects on our agency, but my thunder has been stolen. I have a map in the back of the room and a handout showing the ash fallout from the two events that we had.

I'd like to start out by saying I'm not going to cry and whine about the problems of our agency concerning manpower, but it must be brought up and this is the time to do it. The mission of the National Weather Service is to protect

lives and minimize property damage from weather-related causes. We are entirely oriented to service to the public.

The purpose of this forum is to relate cause and effect of the continuation of eruptive activity of Mount St. Helens on the region's water supply and associated action programs. I'm going to limit myself in this overview to the handout. I will bring out some of the problems and illustrate what actions are being taken or may be taken by the National Weather Service during the continuing eruptive stage of Mount St. Helens, rather than talk of what we did in the past. Therefore, from this point forward, the impact of continuing eruption on National Weather Service programs relating to water supply will be mostly by inference.

First, the National Weather forecast service at Seattle issues twice a day, seven days a week, a plume trajectory forecast. We believe that this message is vital for planning purposes. In other words, we tried to turn it off once and we got stopped, nipped in the bud, and we had to turn the system back on again. Preparation of this message involves nine steps, including determination of the activity of Mount St. Helens at the time of message preparation. We get this from the Department of Emergency Services at Olympia who in turn are getting it from the command post or command center at Vancouver. So that's the first step to find out what's going on at this moment, and that's the lead sentence of the message. At that point in time, we extrapolate or cast the current winds at 6, 12, 18, 24, 30, 40, and 50 thousand feet above the mountain. Then, we also do a forecast of the winds at each one of these levels for the next 24 hours. Next, the trajectory of the ash particles at various levels and, finally, the envelope of the most probable fallout pattern or significant ash deposit if eruption takes place during the forecast period is done. Preparation of this message, we're talking one message twice a day, and dissemination of the final product consumes approximately 16 manhours a week.

Second, coordination between agencies and this included local, state, and federal, initially, I believe, was poor. It is now good, but meetings such as this will lead to an excellent level of coordination. A brief example of lack of coordinated effort was when we were trying to find out the depth of the water in Spirit Lake to see how much volume of water we had to worry about when we were concerned about flash flooding re-occurring. We found out by reading the newspaper that the Navy had gone in and done a sounding of the lake and found the lake bottom to be 75 to 100 feet below the top water level. We believe that with a greater degree of coordination, where each agency is aware of the needs of the others and exchanges data and information, we can do a much better job than we are at the present.

Coordination between the Forecast Office and other agencies is a function in our office of a man whose title is the Disasters Preparedness Program Leader. Since we are inadequately staffed for even fair weather situations, this individual is also the satellite focal point and stands routine rotating shifts. Thus, this available time for disaster preparedness programs is less than 10 percent of the full time he is available. The program is, therefore, run by committee, meaning whoever is available handles the program for the moment. This does not allow for continuity of a program. Considering the other routine catastrophes which regularly occur—flood several times a year; flash floods during the summer season; bridge-destroying wind storms; fishing fleets sunk by wave action; a drought thrown in for good measure; and, for God's sake, now we've got a volcano. It seems that a full time disaster preparedness focal point is at least indicated.

Third, use of weather radar at the Forecast Office at Portland for detecting and tracking ash plumes is new to the Weather Service. There is a demand, and I might add, a very strong demand, for continuous radar monitoring of the mountain. This requires, for continuous monitoring, five persons trained in radar that are not currently on the staff at WSSO, Portland. In other words, it takes five people to stand rotating shifts 24 hours a day, seven days a week. The National Weather Service will offer to train and provide the space to conduct continuous monitoring, but cannot take on the task without a five-man unit increase in station complement to cover three shifts a day, seven days a week.

Fourth, Hydrology—several people are going to talk on this subject, from many different viewpoints. Let me state, though, that the River District Office in Seattle is responsible for monitoring, data collection, preparation of river statements, issuance of flash floods, floods, watches, warnings, and bulletins for the entire state of Washington, excluding the Columbia River. The entire Hydrology Unit at Weather Service Forecast Office, Seattle, is composed of one man, the Station Hydrologist. Thus, in order to cover 24 hours a day when we have flooding situa-

tions, monitoring requires, at a minimum, two other personnel taken from some other duty. We cannot continue such monitoring for more than two or three days at a time, otherwise we have what we did have around May 25, an office full of zombies. We cannot continue such monitoring, as I stated, for more than two or three days at a time. I am crying and whining; I didn't mean to have it come out that way, but this is the way it appears. The Hydrologist's job is impossible to carry out now with only a staff of one; namely, himself.

The flood strip in the vicinity of Mount St. Helens due to heavy sitling of rivers was very well demonstrated a few moments ago. Considering the denuding of all the vegetation from the slopes and the consequent immense runoff problem and the annual rainfall pattern of the state of Washington, the flood potential will be in order of magnitude, more severe this winter than it has been in normal winters of the past. This is my own personal contention; it may be in error. We have the summer season to prepare contingency plans to handle the flood threat problem that will most assuredly be with us by October. We must coordinate a contingency plan for the installation of river and precipitation gauges, the timely collection of data, the exchange of this data between interested parties, and coordinated action plans for flooding or flash flooding situations.

Lastly, the National Weather Service believes in keeping the public informed. We have a teletype communication system called NOAA Weather Wire. This circuit is accessed by the Associated Press, UPI, and several radio and television stations throughout the state. Short, informative bulletins from any agency may be sent through our office to the press, if a proper press release is obtained from FEMA or their own agency. We will be glad to assist you in this area.

In closing, we have the expertise to carry out the mission of the National Weather Service. The impact of continued activity at Mount St. Helens on the two offices I can speak for, the Forecast Offices at Portland and at Seattle are due to inadequate staffing levels. (I'm doing the one for the Forecast Office of Portland, not because I have anything to do with it, but because I got together with that boss and we decided that I could speak for him as well.) I'm drumming on these requirements for us to continue just in our present activities. Hydrologic support is needed in the form of a Hydrologic Technician at WSSO Seattle. I'm only asking for one more man. This position is considered mandatory and urgent. A full time or, at a minimum, three-quarter time Disaster Preparedness Program Leader is needed to function as the primary coordination official with all other local, state, and federal agencies in matters of disaster preparedness, emergency communications, information, and data acquisition and exchange.

A radar unit is needed. Five positions are desirable, three positions minimum are needed at Weather Service Forecast Office at Portland to provide continued radar monitoring of Mount St. Helens and to track ash plumes in the event of an eruption. They would also function as radar observers for the more normal situation of tracking thunderstorm clouds, providing information which is called a local warning radar. These positions are also considered mandatory and urgent. There is no compromise position. We can either do what is required with adequate staffing or we cannot take on the additional new requirements brought about by Mount St. Helens-eruptive activity under our present staffing.

Thank you for your time.

HYDROLOGIC EFFECTS BY CHARLES R. COLLIER, GEOLOGICAL SURVEY

The violent eruption and explosion of Mount St. Helens on May 18, and the major eruption of ash on May 25 had a dramatic effect on the hydrology of the surrounding areas. Some effects are obvious, and their magnitudes have already been measured and evaluated; other effects are less visible and the magnitude of these is generally unknown at this time.

I will describe for you the immediate effects of the May 18 eruption on the streams draining the mountain, discuss some of the expected or possible long-term effects on the hydrology, and review the activities of the Water Resources Division, USGS during the emergency and for the mid- and long-term.

In addition to the massive amount of rock and mud blown from the peak and northern side of the mountain, the May 18 eruption destroyed the glaciers on the north slope of the volcano. It has been estimated by our Glaciology Project Office that approximately 140,000 acre-feet of glacier and snowpack water was removed from the mountain. Several ice blocks, some as large as

50 feet in diameter, are lying in the mud debris dam on the North Fork Toutle River. All of the snow pack and much of the glacier ice probably mixed with rock and mud debris and produced unprecedented flooding in the South and North forks and the main stem of the Toutle River, which empties into the Cowlitz River two miles upstream from Castle Rock.

Debris from the explosion and mudflow on the north face of Mount St. Helens filled the valley of the North Fork Toutle River to depths of 400–500 feet and extended downstream for about 15 miles. This is commonly referred to as the dam at Spirit Lake. It is not really a dam as you visualize a dam. Spirit Lake, at the head of the North Fork, is now about 200 feet higher than before the eruption.

The eruption triggered a mudflow and flash flood which arrived at the gaging station on the Toutle River near Silver Lake about noon, 3–4 hours after the eruption. The peak flow of this flash flood was about 47,000 cfs (cubic feet per second). For a few hours, this was the highest flow recorded at this site since records began in 1909.

A second mud and water flow which we believe came out of the North Fork of the Toutle River, arrived at the Silver Lake gage about midnight Sunday, and completely destroyed the station. Based on highwater marks, this sediment-laden second flood reached a stage of more than 53 feet, about 30 feet higher than the earlier record flash flood. Based on preliminary computations, the peak discharge is estimated to be about two to three times greater than the first peak, on the order of 100,000 to 150,000 cfs.

The flood wave passed into the Cowlitz River with probably little change in discharge. Early in the morning of May 19, the peak discharge at Castle Rock was probably in excess of 100,000 cfs and caused serious but not record flooding. Several indirect measurements of discharge have been surveyed. We are now in the process of surveying high-water marks and conducting a peak timing study throughout the Toutle River. Because of the uncertainty of the consistency of the mudflow and irregularities in observed high-water marks, it will be some time before we are able to finalize our discharge figures.

Most significant were the tremendous quantities of sediment deposited in the Cowlitz and Columbia Rivers. In the Cowlitz River, about 25.400 acre-feet of sediment is clogging the channel between the mouth of the Toutle River and the Columbia River. This volume of sediment would cover a square mile to a depth of nearly 40 feet. The new sediment is 12 to 15 feet deep throughout the channel and has reduced the channel's capacity to carry water by about 85 percent, from about 76,000 cfs at the previous flood stage to 10.000 cfs.

Mudflow also occurred May 18 on Muddy River and Pine Creek, which drain the east and southeastern flanks of Mount St. Helens and empty into Swift Reservoir. From records of reservoir levels, these flows amounted to about 13,000 acre-feet. This volume was determined from the change and stage of the reservoir operated by Pacific Power and Light Company. We are also in the process of measuring the peak flows at each of these streams.

The greatest immediate hazard resulting from the May 18 eruption is the flood potential on the Cowlitz River in the Castle Rock-Kelso-Longview area. The river is now at or near flood stage with only normal seasonal flows. Even moderate storms in the basin could cause serious flooding. The floodplain delineation maps and river profiles developed for the several HUD flood Insurance Studies in the area are now completely obsolete.

Beginning on May 19, the Survey began developing a new surface-water model of the Cowlitz River using data available from the previous HUD studies and field measurements and observations of the sediment deposited in the cross sections. Tudor Engineering was most cooperative in providing river-profile and cross-section data acquired for the flood-insurance studies conducted by them. Other data were furnished by the Corps of Engineers, and coordination of the Corps and Survey field parties speeded up the work.

The model was completed on May 24 and the first profiles and flood delineation maps were furnished to FEMA for distribution on May 25. This was a the new underwater sections being estimated. Detailed field surveys of cross-section with the sediment deposition in the stream and overbank were initiated on May 19 and completed on June 6. Again, coordination of the USGS effort with the Corps greatly facilitated and needed this effort. The field data have been applied to the surface-water model and a fully rigorous model was completed

on June 10. This model can be used to evaluate any projected flows on the Cowlitz and/or any channel changes.

FEMA has provided a priority list of the most critical areas and flood frequencies and has requested continuous updates if river conditions change, or as dredging progresses. The Survey will continue these efforts as requested by them and could make other runs for other agencies as needed.

The hydrologic characteristics of the streams and lakes in the 150-square-mile blast area will be drastically altered. This area is completely stripped of vegetation and has an ash cover of at least several inches. We expect the rainfall-runoff characteristics of these streams to be greatly different than before the eruption. Erosion of the ash and unprotected soil may greatly increase the amount of sediment transported by the streams. This, in turn, will affect the fish and benthic organisms in the streams. Ash fall over extensive areas of the State beyond the 150 square mile blast area may also have an effect on the hydrology of those areas. Changes in the water-quality characteristics of these streams could be significant and may also affect the biota.

When Mount St. Helens became active in late March, the Water Resources Division intensified its hydrologic-data collection activities in the area. Our first efforts were to obtain background water-quality and biological data of streams which could be affected by eruptions. At the Tacoma and Portland offices, we added 25 sites established for periodic sampling; four continuous recording water-quality monitors were installed and telemetered by GOES satellites, so we have a continuous readout of other changes which may be taking place in the streams.

The eruption and mud flows destroyed two of the continuous monitoring sites and the North Fork Toutle gaging station at Silver Lake. In addiiton, the Cowlitz gaging station at Castle Rock was slugged with mud early in the flow. These gaging stations were replaced as rapidly as possible. The Kid Valley gage on the North Fork Toutle River was installed May 24, with the river stage transmitted to the GOES satellite every three hours. It takes a reading every five minutes and transmits on three-hour intervals. If the stage goes up two feet, it will kick over to five-minute transmission. These transmissions are picked up automatically at the Weather Service offices. A minicomputer was loaned to the Cowlitz County Sheriff so that they can receive the data directly also. The Castle Rock gage was put back into operation on May 25. Similar gages for flood warning are being installed on seven other rivers or tributaries draining the mountain. These stations will be used also to measure the runoff and to provide the water-discharge data necessary to measure and interpret the sediment transport, water quality, and biological changes that are taking place. We are working closely with the River Forecast Center and National Weather Service office in Seattle to install flood-warning telemetry at the stations on those rivers subject to flooding where they need to provide flood forecasting. In addition, we have had coordination with the Corps relative to their gaging needs.

To measure the effects of the ash on sediment and river quality, eight water-quality stations and six sediment stations have been added to the existing network. The water-quality stations are being equipped with continuous recorders to measure any rapid changes in specific conductance, pH, or temperature of the rivers, and the analyses of periodic water-quality samples will include toxic metals. A network of about 30 observers throughout the Pacific Northwest was established to collect samples of precipitation and ash deposits for chemical analysis.

The sediment stations will be operated to measure the daily sediment discharges of the rivers and to determine the particle-size characteristics of the suspended and bed materials. Movement of bed material is a particular concern because the material in the North Fork Toutle debris dam and deposits in the Cowlitz River are angular and sharp rather than rounded particles of most river sediments. The erosive characteristics and the deleterious effects of this sediment on the fish populations are unknown. The Survey has worked closely with the State Departments of Ecology, Fisheries, and Game and with the U.S. Forest Service and U.S. Fish and Wildlife Service in selecting the sites for the water quality and sediment stations. Geomorphic studies are also being initiated in the Toutle River basin to document the redevelopment of river channels and movement of sediment on the debris dam and of the mud-flow deposits.

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The effects of ash on lakes across the State are largely unknown at this time. What effect will the ash deposits on the lake bed have on the bottom organisms and aquatic plants? What changes can we expect in the water quality of the lakes and what will be the impact on the fish and benthic organisms? Will ash deposits alter the lake-ground-water relationship? Fortunately, considerable background data are available for many of the lakes in Washington to aid these investigations. We are making a reconnaissance of selected lakes across the State to assess the immediate effects of the ash and to determine the scope of further and more complete investigation of the impact on lakes.

The effect of ash on the recharge rates to the ground-water system, and on the water quality of the aquifers is another area of unknown. We suspect that the infiltration rates and soil capacities may be affected, but by how much and for which soil types is another one of our unknowns.

With the Cowlitz River in the Castle Rock-Kelso area at a stage 13 feet above its normal level and remaining there for a number of weeks, recharge to the alluvial surficial aquifer should be accelerated. We are installing a number of shallow observation wells this week to measure the effect on the aquifer. We will also attempt to determine the changes, if any, in the water quality of that ground water.

This briefly summarizes the major efforts of the Water Resources Division, USGS in documenting the effects of the eruption on the hydrology of the area. Funding for this effort will be from cooperative programs with State agencies, from other Federal agencies, and by direct Federal funding. We have a very large affected area and a wide variety of unknowns. Hopefully, many of the effects will be minimal, and the impact of others can be lessened.

EMERGENCY MEASURES BY NEALE CHANEY, FEDERAL EMERGENCY MANAGEMENT AGENCY

To give you a fast rundown of what takes place when you have a disaster when the State, and that means the Governor, has determined that there is a disaster of a magnitude that is outside the capability of the State and local governments to handle, the Governor then makes a request through the Federal Emergency Management Agency to the President for a disaster declaration, at which time normally we would, in conjunction with the State and local government, send out an assessment team and look over the damage and make our recommedations and summarize the thing for the President.

In this particular case, it took hardly any time at all for both Governor Ray of Washington and Governor Evans of Idaho to make that request. We didn't send out the assessment teams, at least up in the Toutle Valley, because first of all we couldn't get up there, and second we'd already watched the disaster floating down the river and we knew it was there, and of course, the President made the declaration almost immediately.

The President then appoints a Federal Coordinating Officer who brings together not only the FEMA people but those other agencies that can offer some degree of relief to the people that have suffered loss and hardship from the disaster. That person then of course decides where he's going to put what is known as the disaster field office. In this case, it is located right here in the City of Vancouver. If it wasn't for that I don't think I'd be able to get these gentlemen, because at this time they're just too busy. The President appointed Mr. Bob Stevens, who is the Regional Director of FEMA in Region 9, lives in California, and had previous experience with volcanos, although I don't think one quite this big.

Another gentleman, Jim Kerr, heads up the Technical Information Network. Jim is from FEMA headquarters in Washington, part of the mitigation and research group. The Technical Information Network was put together through the efforts of the President and the Governor of Washington. It's a panel of experts. You don't normally find this activity because usually the disasters have to do with floods or hurricanes, the type of things that are fairly commonplace. This is different, and of course, the great question in everybody's mind is, "What is the effect of the ash—what does that do to your lungs and carburetor?" Jim's group has released 14 or 15 bulletins addressing these questions.

These gentlemen are here with me this morning and I am going to ask first Bob, and then Jim, to get up and give you a little summary of what they've been able to do in the three or four weeks we've been in business.

EMERGENCY MEASURES BY BOB STEVENS, FEDERAL EMERGENCY MANAGEMENT AGENCY

My task this morning is particularly difficult. Neale told me I could talk for five minutes and I really can't say good morning in five minutes, let alone get into motherhood and apple pie, and all of these other things. What I'm going to do is just very quickly tell you what has happened since the President was here the first time. We've opened an office, as Neale said, here in Vancouver, and we have about 50 people up there. They represent a number of different federal agencies and this is our principal field office.

In addition to that, we have a field office for the Idaho disaster over in Coeur d'Alene and we have a sub-field office for the Washington activity in Spokane. We also, very quickly, in fact on Friday, I think it was about the 23rd, which was some five days after the first eruption, opened our first disaster assistance center. We opened that in Kelso. We opened that in Kelso. Unfortunately we were only open a day and a half. We opened at noon on Friday, and were open Saturday. We had to close down for the second event, and we were closed down for two days. That center has since moved into the Centralia area.

We've had a total of 11 disaster assistance centers in operation. They're scattered all the way from St. Marys, Coeur d'Alene, and Moscow in Idaho, into Spokane, Richville, Colfax, Moses Lake, Yakima, and the ones already mentioned.

The big immediate needs, it seemed to us, were the needs for housing and to get relief for those who had lost their homes up in the area of the North Fork of the Toutle. That is why we concentrated in the Kelso area initially. Now, we think that our housing workload is going to be in the area of about 350 or 400 families, which is not a large housing workload as disasters go; but, of course, is important to those that were affected. Each of those families is entitled to rent-free housing provided by the Federal Government on a temporary basis up to one year.

One of the interesting problems we had with this was where we were going to permit the placement of these Government provided housing units. We try to use rental units to the extent we can and we were very concerned about the new flood plain. Obviously, we didn't want to be in a position of placing these people in rental units on the flood plain that might be flooded this fall. But through the cooperation of the USGS, we have gotten new flood plain maps and are moving forward on that. I think the figure is some 65 families that have already been placed and the rest of them should move fairly well.

There are a lot of interesting things about this operation that are very different. One that has cropped up right away, is the statistics on the Small Business Administration Loan Program. Normally we get about five or six home and personal loans for every business loan. In this case, we're getting about two business or farm loans for every home or personal property application and the SBA people are projecting that figure will go up to as much as four or five to one. It's a real reversal of what we normally deal with.

One of the big problems we had initially, which Neale has already alluded to, was the problem of defining the problem. We had a very difficult time and the situation is still evolving and will continue for some time.

A couple of other things that are going on here in Vancouver that you might be interested in—we have set up a centralized federal press activity. We have about ten federal agencies, plus the state, active in there. We are in business 24 hours a day. We run a hot line that is available on that basis, 24 hours a day. It's interesting, we start getting calls about 4:30 or 5:00 a.m. from the eastern media. The media is tremendously interested in this activity. We've had great support from the federal agencies in this and, I think, it has worked exceedingly well. You've seen a lot of comment in the press about it, but if you look very closely and read those comments carefully, you'll find the critical comments are not pointed at the Federal government. We also set up a hot line so that anyone in these affected areas can dial toll free and get information about the current conditions, about the centers, about the schedules, and so on. At the request of Governor Ray, with the concurrence of the President on his first visit, we've also set up a Technical Information Bulletin Network. The intent of this was to bring together, in one source, all of the different technical information that is important to all of us. Mr. Kerr will touch on that in just a moment. We've had about 4,700 people through our centers and think that is substantially complete.

I'll just quickly hit a couple of the high points I think you would be interested in. We've identified about 175 different state and local agencies that would be

eligible for reimbursement by the President's Disaster Relief Fund through Mr. Chaney's office. Our estimate is that the total cost of that to the President's fund for both Idaho and Washington will be about $114 million, of which Mr. Chaney's office will pay 75 percent or about $86 million, with the other 25 percent coming from a combination of state and local government funds. That does not include, of course, the work being done by the Corps of Engineers and the Federal Highway Administration, and so on. The Corps estimates something in excess of $200 million, primarily in this drainage we've already talked about. The Federal Highway estimates about $100 million.

One thing I should touch on very briefly, as you know, Senator Magnusen held hearings on Tuesday as to the initial needs of this from a federal standpoint. Although the Administration request has not yet gone to the Congress, or at least it hadn't as of last time I checked yesterday, the Administration spokesman at Senator Magnusen's hearing testified for the need for $917.9 million, almost a billion dollars. That does include some money in Idaho and some money in Montana. Broken down that is $430 million, a big chunk of it goes to the Small Business Administration for these subsidized loans. I think $215 million goes to the Corps. If my memory serves me it's $100 million for the Federal Highway Administration and about $86 million for the President's Disaster Relief Fund which is administered through FEMA.

I would like to express my appreciation for the tremendous support and cooperation we've had from the various federal agencies. Particularly noteworthy are the USGS, the Forest Service, and the Corps of Engineers. But there are many others, and without this support and cooperation, it would be impossible to do our job. That's one of the pluses of having a visit by the President out here. It's been just great and we very much appreciate it. Thank you.

EMERGENCY MEASURES BY JIM KERR, FEDERAL EMERGENCY MANAGEMENT AGENCY

The Technical Information Network was set up on my birthday, the 21st of May, and I'm not sure whether I'm saying thank you or what, exactly. Anyway it has gotten me out here from Washington, D.C., and that is a plus.

The network, as Neale told you, was established for the purpose of disseminating the technical information that everyone in the affected area needs. Now, it's kind of hard to tell what people actually do need, so our decisions on exactly what sorts of information to put out are based on two things. First of all, as Mr. Stevens told you, we have a pretty far-flung group of disaster centers and we have hotlines working, and the questions that surface most frequently are the ones which we attempt to address, in an attempt to respond to the public. On the other side. as soon as we feel well-enough informed to address other technical matters, whether or not we've been asked specific questions about them, we put together a technical bulletin. Number 18 went out yesterday. It addressed health matters.

Most of the bulletins have talked about the ash, as Neale said—what it is, what it does, what its effects are on the water supply, what the health aspects are, what the effects are on automotive equipment, and so on down the line.

Because this is a unique event and a unique disaster as far as the 48 states are concerned, we can see that the interest in this, in the scientific community, is very high and is going to continue to grow, I'm sure. Managing this sort of question becomes a little tricky. Neale mentioned the first difference from most disasters; that is, everybody knows all there is to know about floods already, so from the technical standpoint, you don't need an information center. But the other thing about it is, the flood is over.

In this case, we don't know when the eruption is over, or at least the series of eruptions; so we have to be prepared to look at the technical side of it over an extended period of time. And the questions keep coming in; for example, late yesterday, a specialist in nuclear weapons who specializes in predicting where the fallout would come from an enermy attack called up and said, "What time did the ash arrive downwind?" I'm hoping that our colleague, Dr. Hall, is going to be able to answer that question. We all know how much ash was finally deposited at any given location, but we don't know when the first bit of ash got there. It would be very interesting to trace that across the projectory of ash, and you can see why people in that field of endeavor would be asking that sort of question.

To go to another end of the spectrum, we've had a number of people who have wanted to know what to do about the records for their stereos. Is the ash going

to gouge the new grooves on all their records? Well, it might not be quite that bad, but we are attempting to respond to both types of requests, and we are also attempting to have researchers in the scientific community, whether they be physicists or sociologists, keep us posted as to what they're studying, and keep us posted as to their results. That way we can serve as an information center for them as well.

I would invite you all to take note of the fact that the bulletins are available. Neale put several copies of the most recent one back on the table. Help yourself to that. As I said, there have been 18 of them, and there are a dozen or so more in the making. It's easy to get on the distribution list for them; you simply have to give us your name and address, and once you're on the list, you will get all the back issues as well.

I would also invite you to call in on any of the well-publicized numbers if you do have some information requirement. If you have a question that is bugging you; if it hasn't been addressed in the previous bulletins, we will either attempt to answer the question on the phone, or, if enough people care about a big-enough question, we might even make it a subject of a bulletin. So feel free to call in. The local number is 696–7801, and the hot line numbers are plastered all over the place. Thank you.

WATER QUALITY AND MUNICIPAL WATER SUPPLY BY LYMAN NIELSON, ENVIRONMENTAL PROTECTION AGENCY

The initial effects of the major eruption of May 18, 1980, are two-fold. First, and most direct, is the mud flow/flood debris devastation on the Cowlitz and Columbia Rivers. Public water supply intake structures and waste discharge outfall structures along the Cowlitz River were swept away or buried in debris and mud. The other main problem, high turbidities, was handled by closing intakes and operating from storage or alternative ground-water systems. The Toutle community water system was wiped out; buried in mud. The City of Longview water supply intake was buried in mud for several days, during which time, use restrictions were imposed, alternate supplies tapped, and a temporary intake utilized. Castle Rock lost its intake structure and is operating with limited capacity from existing wells while drilling new wells as rapidly as possible. The warning is clear: systems located in drainage basins heading on dormant volcanos—even those systems at considerable distance from the volcano itself—need alternative sources.

The secondary effects related to the ash fall are three-fold. First, we are fortunate that the chemical properties of the ash are relatively inert from a toxic point of view. No reports or analyses received to date indicate soluble chemical contaminants at concentrations great enough to exceed the MCL (maximum contaminant level) at any public water systems. A comparison of analytical results indicate approximately the same distribution of elements in the volcanic ash as would normally be found in the earth crust itself. Physical problems caused by the ash fall, such as high turbidities, at surface-water systems located in the area covered by the ash fall were more prevalent. Some community and non-community systems have experienced periodic high turbidities although these have returned to normal in a few days. During periods when turbidies in water distributed to customers were over ten units, "boil water advisories" were issued. The third, and perhaps the most critical, was the problem of water quantity. Many systems experienced exceptionally high demand as property owners used water to clean up the ash and control dust. In fact, several systems experienced the highest water demand in their history, and severely compromised their reserves.

The third area of concern is the future effects of the ash already deposited. The dark-colored ash which fell on snow-covered areas may well increase the rate of snow melt at the higher elevations, reducing the snow pack more rapidly than normal, and possibly contributing to flood conditions. At the same time, any increased flow regime in the affected streams will lead to higher turbidities resulting in normal high-flow erosion and/or resuspension of ash.

Samples of the ash from different locations have been sent to EPA's research laboratory in Cincinnati. Early investigation indicates that there is no standard treatment which will work for all cases. Techniques based on addition of soda ash to raise the alkalinity to 30–40, followed by the addition of 15–25 mg/l of alum will usually produce a good floc. Standard filtration procedures can then be used by systems operating full treatment facilities. Additional work is being

done, with emphasis on "low technology" processes for application to or in open reservoirs. A major problem is the change in physical ash characteristics, with the average particle size decreasing as distance from the mountain increases. The extremely small particles tend to remain in suspension and are extremely difficult to remove.

We had considerable problems in Yakima, for example, which has a combined sewer system where much of this material was washed both by the public and by the people trying to clean up the ash. This caused the plant to be taken out of service with many hundreds of thousands of dollars of damage done to the equipment. Trickling filters, for example, have to be stripped of the media and have been placed out of operation entirely. Materials settling into the clarifiers have put the clarifiers out of operation, and materials pumped into the digesters will require cleaning up. All of this will cost considerably. However, in those systems, where they had a separate sanitary sewer system, we have not had any damage or difficulties in operation.

Thank you.

NAVIGATION AND FLOODING BY DONALD LAWYER, CORPS OF ENGINEERS

I'll just try to briefly summarize some of the Corps' activities. I think the preceding speakers have pretty well delineated some of the problems we are looking at, and I'll direct my talks toward three general areas: one, the Columbia River; two, the Cowlitz River; and three, the Toutle River.

Our estimates now are that the mud flows that came down the Toutle and the Cowlitz and hit the Columbia River happened to hit it at an incoming tide, so what happened was that the sediment-laden water hit the Columbia and dropped its load. This built an underwater dam, and with tide coming up, we carried more material upstream from the Cowlitz on the Columbia than went downstream. We estimate about 22 million yards were deposited in the Columbia River. On May 19, we had a channel-depth of 14 feet where it's normally 40 feet.

We immediately activated our hopper dredges which were working in other locations. The BIDDLE was down at the mouth of the Columbia. It immediately came upstream and had some problems with all this floating debris that was going down the Columbia. They got on station on the 19th. The dredge PACIFIC had been working on Coos Bay. It came up and started on the 21st. The dredge HARDING was in Humble Bay in northern California, and it got up on the 22nd. We had the dredge OREGON, which is a Port of Portland dredge, under contract. It was working down below Longview, so we packaged that up, brought it up, and got it here by the 22nd. By the end of the week, we had four dredges working.

We now have under contract some additional dredges that are on station or will be coming in. The MC CURDY started work on the 6th of June, the WASHINGTON on the 7th, the MISSOURI will be here the 19th, and the OLLIE REIDEL will be here on the 23rd.

As of yesterday morning, we had about 2,100,000 yards of material that had been dredged out of the channel, and we have kept a channel opening through the efforts of the Coast Guard. They have been able to establish windows at high tide, twice a day so we can get ships up and down. The last record I have was about 60 ships have passed through here, including some of the Rose Festival Fleet. Hopefully, by the 30th of September, we will have nine million yards of this material moved.

One of the problems we're running into is the material is much heavier. The void-space ratio in the material is a lot lower than normal, and it's very abrasive. It looks like we're handling only about half of what we normally handle.

We estimate that on the Columbia, by the 30th of September, we will have a 40 by 300 foot channel open and, by the 30th of November, we'll have the full 40 by 600 foot channel. This is for a total distance of five to five and one-half miles. The problem is that when the material was deposited, it was mounded up, so as you get deeper, the length of the cut that you have to make is longer.

Now, in the Cowlitz River, as was stated earlier, the hydraulic capacity of the river itself was very severely impacted. Figures I have are that at River Mile 7, which would be just upstream from the Longview-Kelso area, the capacity was 70,000 second feet. It's now down to 13,000 second feet. And up at River Mile 17, at point 3, which would be in the Castle Rock area, it was 66,000. It's now down to 13,000.

In the first seven miles of the Cowlitz, we estimate we have about ten million yards of material that was deposited into the channel. The ART RIDDLE dredge started on the 10th, the ANDERSEN will be on station on the 16th, and the HUSKY on the 18th. We're looking for three more dredges by the end of July.

What we're trying to do is to reduce the amount of sediment in this first seven miles so that any waters that we have come down will not overtop the levees. The levees prior to the eruption gave us about a 500-year flood protection, but because of all the sediment in the channel, now we don't have near that amount. We estimate from River Mile 7 up to River Mile 25, which is 5 miles above the mouth of the Toutle, that there's 14 million yards of material in there. Now the same thing happened on the Cowlitz as on the Columbia. When the debris from the Toutle came down and hit the Cowlitz, it deposited, and we had a backflow of debris and sediment up the Cowlitz River. So there are problems above the mouth of the Toutle River.

Our actions that we are taking now, or will be taking, on the Cowlitz are a combination of dredges and of using land equipment. We're trying to, hopefully this week, have equipment in to dredge out some settlement basins so any further sediment that is coming down will be deposited in these and not get out into the main channel of the Columbia River. So we're looking at a combination of dredging out the channel, of levee protection, and of flood plain management.

During the flood fight that we were in for the first two weeks, we did do some levee raising along the Castle Rock area. We have raised a BPA access road in the Lexington area to provide some protection. We have also done some other levee protection work.

On the Toutle River, we had a different problem. We don't have high-density people and things that will be flooded if the water comes down. But we do have a huge amount of material in the Toutle River, both the North Fork and South Fork. I haven't heard any estimates of how much material there is. The plug from Spirit Lake downstream has been discussed. The figures on that are, it's 400 feet deep at the Spirit Lake end and then tapers downstream 12 to 14 miles to near Camp Baker, and so you can just imagine how much material is in there. It's a whole new valley floor.

Our plan of action on that will be starting, hopefully, in a couple of weeks; we're doing the plans and specifications now to get contractors in. We will be building five debris retention structures. These will be about 20 feet high and will have a spillway section in them. The object is to build these at certain spots. There will be three at the North Fork of the Toutle, one on the South Fork, and one on the main Toutle just downstream of the confluence of the North and South Fork. These will require maintenance because we anticipate that the material will fill in and, when it fills in to a certain point, then we'll go in and take equipment to move this out. We're doing all this to keep this material from going on downstream.

Some costs that we're talking about: we estimate $44 million to do the dredging on the Columbia River, and we're talking about $171 million or $172 million on the Cowlitz and the Toutle. Funds for this were submitted to OMB and are in the appropriations bill that Mr. Stevens was just talking about. Hopefully, the money will be coming in shortly.

This is one of the problems we have within the Corps' Emergency Revolving Fund. We do have some funds, so we're able to initiate this work without additional funding from Congress. But very shortly we will have expended all those funds, so it's very critical to us that we do get the funds from Congress.

In addition to these three things, we do have Corps staff working with FEMA. They're making damage survey reports in the Kelso-Longview area to find out what damage was done from the flood, such as debris cleanup, housing, subdivisions, and water-systems intake. We also have teams working in Eastern Washington and Idaho on the ash problem, and last Friday, I did make a count, and the Corps had 375 staff working full time on this disaster.

Thank you.

MARINE ACTIVITY BY LT. COMDR. HARRY DUDLEY,[1] COAST GUARD

When the volcano, Mount St. Helens, exploded on Sunday morning, May 18, 1980, severe mud slides caused almost instantaneous flooding of the Toutle River which swept large amounts of debris and logs down the river before it. The

[1] Lieutenant Commander Dudley was introduced by Commander Jack Holmead of the Coast Guard, a member of the Pacific Northwest River Basins Commission.

Coast Guard initiated Notices to Mariners early Sunday afternoon to warn ships in the Columbia River of the expectation that there would be hundreds, perhaps thousands, of logs emptying into the river from the Cowlitz River, into which the Toutle River empties, and recommended that vessels not transit the river at night.

This immense influx into the Columbia River of logs, trees, and other flotsam caused numerous outages of down river aids to navigation. The Coast Guard Buoy Tender BLUEBELL and an aids to navigation team were dispatched on Monday morning to check aids to navigation on the Columbia River and make necessary repairs. At the same time a Coast Guard HH/3F helicopter was directed to assist in evacuation operations and to survey the conditions of the Columbia River. It's interesting to note that the first day's evacuation effort resulted in removing 22 people, three dogs, and one boa constrictor. We had to change our operational mode for the guys in the helicopter kind of quickly to accommodate that passenger.

Sometime in the early morning hours on Monday, May 19, unexpectedly, tens of millions of cubic yards of fine moraine type sand were swept into the Columbia River from the Cowlitz River. Interestingly enough, in spite of the fact that there was an ebb tide at the time that it came into the Columbia River, most of the sediment moved upstream. Channel depths over a nine-mile stretch were reduced with the minimum depth being opposite the Cowlitz River confluence, where it was 14 feet deep, normally a 40′ deep channel. The resulting channel blockage had trapped approximately 18 ships in the Portland/Vancouver and Kalama areas until such time as the channel depth increased to accommodate their draft. This influx of mud and silt also prevented at least 22 ships from coming up the river, resulting in numerous vessels anchoring in the Astoria area.

Shortly after five o'clock Monday morning, the Norwegian Motor Vessel HOEGH MASCOT, upbound in the Columbia River, grounded in mid-channel at river mile 67, just downriver of the mouth of the Cowlitz River. This was the first knowledge that the navigation channel had filled.

Before continuing a discussion of the Coast Guard's action, it is appropriate to address the Coast Guard's concerns and mandates under the Ports and Waterways Safety Act. Under this act we are charged with the supervision of vessel and port operations to reduce the possibility of vessel, cargo or property damage, loss of life, or damage to the marine environment. This act contains authority for the Coast Guard Captain of the Port to create a safety zone and control shipping when necessary. This authority, codified in 33 USC 1224 and 1231, was used in this emergency to set up a Safety Zone between miles 67 and 70 in the Columbia River with vessel traffic controls in the Zone, and in issuing several Captain of the Port Orders.

The CG was notified of the grounding, at about 6 o'clock Monday morning, and it immediately became apparent that major silting had occurred in the river since the M/V HOEGH MASCOT was only drawing 18 feet forward. While continuing the precautionary warning regarding debris in the river, the Columbia was closed to all vessels with more than a 10 foot draft in the Longview area. At 0615 the Corps of Engineers was requested, and shortly thereafter dispatched a survey boat, to evaluate the situation. From that point on until today, the Coast Guard instituted the control of shipping in the Columbia River just upriver of Longview. This Safety Zone was established with the aid of selected personnel from the Vessel Traffic Control System in Seattle, Washington, and then was carried on by local Coast Guard individuals on specific, dedicated assignments. Regulations establishing the Safety Zone were published in the Federal Register on June 2. These controls will probably continue into September or November, at whatever point the channel is completely cleared. While this may seem a simple matter it involves the collection and assimilation of data from a number of sources. The Corps of Engineers daily furnishes the Captain of the Port with dredged depths of the channel as they remove the material with dredges. This information has to be modified by the river height caused by not only the tide but by water releases from the upriver dams also. Water level predictions are furnished by the National Oceanic and Atmosphere Agency, commonly called NOAA. From this data, the Coast Guard sets a window, or time span, during which vessels may transit the safety zone, and calculates the predicted maximum draft of vessels which may safely pass. We must emphasize the word "predicted." To assure that the predicted depth is reached, we receive the actual river level reading just before the window opens to confirm the predictions. In one case, the predicted

level was not reached at the opening of the window and vessels scheduled to transit had to anchor, and they were actually down bound which is the most hazardous situation. As inconvenient as this was, it demonstrated that the checks and balances for safety actually worked. Also, vessels must give us 24 hour advance notice of intent to transit. All of these procedures are done while maintaining constant liaison with the Corps of Engineers and the River Pilots.

Our efforts have been twofold—to coordinate vessel movements so as to use a minimum time for transits so the Corps of Engineers could have maximum dredging time—and to facilitate safe transportation.

Besides setting the window, the later effort has involved the repairing damaged Aids to Navigation, setting and resetting of five temporary buoys, and the installation of two ranges to assist the pilots in navigating the 200 foot channel.

Today, we are allowing vessels of 34′ 9″ foot draft to transit the safety zone. 65 upbound and 55 downbound deep draft vessels have transisted the area since the eruption. This is approximately 60% less than the same period last year. In addition to the deep draft vessels there have been numerous shallow draft vessels that have transited the area south of where the dredging is taking place. Our predictions indicated that by the end of June vessels of approximately 38 foot draft will be able to return to Portland, Vancouver, and Kalama.

ELECTRIC POWER BY STERLING MUNRO, BONNEVILLE POWER ADMINISTRATION

The massive explosion of Mount St. Helens on May 18 and the lesser eruptions a week later have posed a strenuous challenge to BPA and utility maintenance crews, but resulted in no unplanned service interruptions on the BPA system.

This is not meant to downplay the crippling effect of the localized utility power outages which did result from the fallout of volcanic ash on electrical facilities. Our society today is immensely dependent upon the uninterrupted flow of electricity. We do not readily adapt to its absence. So if you are a farmer who lacks power to milk your cows or to pump water for your stock, even a relatively short duration power outage can be a serious matter. In that context, the St. Helens eruptions did result in hardship and economic losses for some electricity consumers.

In terms of the power grid itself, our experience to date is one of formidable stress, but not severe jeopardy. We could, however, be faced with a long-term maintenance problem even should St. Helens remain passive. Like many housekeepers throughout the Northwest, we find that the recirculation of the existing volcanic ash is a continuing vexation. Any additional large eruptions of ash would compound the problems of keeping electrical equipment clean and operational.

Now, you have seen as very well described the extent of the blast-affected area and ash-affected area in our region. Luckily, there were no major transmission lines located in the blast area. If there had been, for example, major east/west transmission lines, such as are located in the Snohomish Pass area or the Stevens Pass area, our system design requirements call for sufficient alternate paths for electrical power transmission to prevent a collapse of the electrical power system in the Northwest. A major interruption of that kind, however, would require curtailment on a relatively sizable scale, in the neighborhood of several hundred megawatts of load. Luckily that did not occur.

With regard to Bonnesville Power Administration, the fallout of ash encompassed about one-third of our four-state transmission system. We immediately undertook emergency measures. Maintenance crews were dispatched to 54 BPA substations, where they set to work dusting, sweeping and blowing the ash from electrical equipment. And I can tell you that in many cases a lot of people who work for the Bonnesville Power Administration and who had never come in close proximity to the high-voltage electric power system gained some experience in housekeeping work around those substations. Meanwhile, dozens of local utilities were tackling the same work on their distribution systems.

Bonneville laboratories had sampled and tested the ash from the earlier minor emissions from Mount St. Helens and continued to sample in many different areas and to test the ash fallout from the major eruptions. There is a diversity in the characteristics of the ash, but from the standpoint of our concerns it appears that the dry volcanic ash is not a serious problem, but when exposed to mist or light drizzle it can become highly conductive. That is, the ash can react to the moisture by "arcing" or bypassing insulators and shorting out electrical

circuits. We have also found that low-voltage distribution facilities are more vulnerable to this sort of trouble than is high-voltage transmission equipment.

Although intensive cleanup and maintenance were required, the BPA high-voltage system did not suffer any extensive damage as a result of the St. Helens fallout. Many of our utility distribution system customers were not so fortunate. Several of those with lower-voltage distribution lines mounted on wood poles experienced pole-top fires as a result of the electric arcing caused by the ash. In some cases, ash-laden tree limbs collapsed on power lines and disrupted service. While most of these incidents were fairly localized and of short duration, they did pose inconvenience and in some cases serious secondary consequences.

Some of the power outages were the result of deenergizing substation equipment in order to clean away the ash without endangering workmen's lives. In the case of BPA, we were able to perform this work, for the most part, without service interruption because of our various backup facilities. Many of the smaller utilities do not have secondary circuits, and closing down a substation leaves their customers at least temporarily without power, and that occurred in many cases.

On the brighter side, there have been no reported incidents of the volcanic ash having any adverse effects on power generating units. There is, however, a continuing concern with regard to possible mudslides or flooding as a result of the earlier eruptions and any future volcanic activity. Pacific Power & Light Company operates three hydroelectric dams on the Lewis River downstream from St. Helens. We understand that it has been necessary to maintain additional capacity for storage in these reservoirs as a flood control measure. This could result in some loss of generating capability next winter.

The Trojan nuclear plant near Rainier, Oregon, has not been affected by the St. Helens eruptions. As a precautionary measure, Portland General Electric, which operates the plant, installed some temporary filters over its air-intake system to prevent the ash from getting inside the plant.

In summary, the regional power supply system has survived the Mount St. Helens blow-out remarkably well. That it has done so is a tribute to the utility and BPA maintenance personnel who worked round-the-clock to protect operating equipment and restore interrupted service with minimum delay. Power consumers throughout much of the region owe a debt of gratitude to these dedicated individuals.

In the darkness of the ash fallout, for the most part, the lights were on and the pumps and other equipment that we are so dependent upon were working. I think we should recognize that the challenge was even greater to a great many of our colleagues and those in the federal, state, local, and private agencies who had to deal with some horrendous problems and I think we all ought to be grateful that we have folks like that who are serving us and are continuing to do so.

Thank you, Mr. Chairman.

AGRICULTURE BY GUY W. NUTT, SOIL CONSERVATION SERVICE

My presentation this morning will deal with the impacts on agriculture as a result of the mudflows and ash deposits. Mr. Duane Tucker, Deputy Forest Supervisor for the Gifford Pinchot National Forest, will discuss effects and impacts on the forest resource.

An area of major concern is the Cowlitz River floodplain. Approximately 5,000 acres have been inundated by mud and debris rendering the cropland useless and inflicting damage to wells, irrigation systems, farm equipment, and structures. Hundreds of acres of farm woodlots in the valley bottoms are inundated with mud and debris and many trees will die.

The ash problem, although a major impact, is apparently less significant than first thought. Hay crops appear to have been damaged more severely than some other crops. A considerable amount of the hay crop will have to be plowed and reestablished.

Of major concern is the impact of the ash on the soil, although the effects are not totally known. When wet, it has a sealing effect severely reducing water penetration, forming a barrier for irrigation. It also will increase the problems of flooding from all lands. An anticipated impact concerns the water supply from snow pack; it appears that a deep layer of ash on the snow pack tends to insulate and slow the melt, while a shallow layer will speed up the melting process. This is an area that will be monitored.

Tests to date indicate a fertility problem when ash is incorporated in the soil. Recommendations by Oregon and Washington State Universities indicate that 300 lbs. per acre of 10–20–20 fertilizer should be applied.

Other impacts of concern are ash deposits on fruit crops such as apricots and peaches that have fuzzy skins. Both beneficial and adverse effects result from the loss of various insects; for example, grasshoppers won't be missed, but bees are extremely important for pollination of various crops.

The ash has an adverse effect on the growth in ponds, reservoirs, and wet land areas affecting fish and wildlife habitats.

Other anticipated concerns include livestock production setbacks and the long-range effects on equipment during farming operations.

Emergency funds have been requested to provide floodwater outlets for the lower valley areas draining into the Cowlitz River. Also, debris removal on the mud flats and reestablishing vegetation is being planned. These activities are also being examined in the Toutle River drainage. Seeding of damaged areas on both public and private lands is also included.

Soil samples are being collected and analyzed for evaluating the effects of the ash in relation to the soil and plants. An ash deposition assessment is underway to determine how much can be incorporated into the soil. Rangelands are being evaluated to determine the need to incorporate the ash into the soil and reseed.

A long-range plan for rehabilitation of the total damaged area is needed: 3,000 miles of channels need evaluating for shaping, stabilization, and vegetative programs. Seeding and tree planting on barren land to reduce the erosion potential. An extensive monitoring program is needed to determine effects on water quality as well as land quality. The replacement of snow survey equipment is also needed.

At this time I will call on Mr. Tucker to discuss the impact on the forest resource.

FORESTRY, BY DUANE G. TUCKER, FOREST SERVICE

Well, they say that a picture's worth a thousand words. I'm not going to say very many words today, but I brought along some pictures that the Forest Service has been able to gather in the last few days. Not very many people have seen what really happened up there as a result of the explosion and eruption on May 18. I'm going to be reporting just on the effects to the National Forest land so these statistics that I'll be referring to are just within the National Forest.

I'll speak first about streams. There are 35 miles of perennial stream that have been destroyed by the mudflows down the North and South Fork of the Toutle River, Pine Creek, and Muddy River; 350 miles of perennial stream have been severely to heavily damaged within the Spirit Lake basin and the Mt. Margaret backcountry area. These have long-term watershed impacts; 3,000 miles of perennial streams have been moderately to lightly damaged by ashfall north of the Lewis River, and these we anticipate to be short-term watershed impacts. There large debris jams have been observed in the lower Muddy River above Swift Reservoir that have high potential for moving into the reservoir during high flows. Pacific Power & Light has reported 11,000 acre-feet of sedimentation or storage loss from the Muddy River and Pine Creek modflows and 80 acres of debris floating at the upper end of swift Reservoir.

This is a picture of the mudflow in the South Fork of the Toutle River. You can begin to see the scope of the mudflows that resulted from the eruption.

Streams over much of the forest have had some water quality degration as a result of the ashfall and we anticipate that there's going to be high turbidity and suspended sediment during the rain events that will follow. Long-term downstream sedimentation will occur on the Toutle River and in Swift Reservoir as the rivers go through channel forming processes in these mudflows.

Now, I'd like to talk a little bit about damage to lakes. This picture really doesn't show up too well, but you can see that it is a picture looking from the north back to the south at Mount St. Helens and you can see the crater, the mudflow that went out of the crater, and the thing that used to be Spirit Lake. It's still there, but I think you can begin to see some of the moonscape type appearance that it now has. Spirit Lake was 1,262 acres and it's been totally devastated. There are also two small lakes that were completely destroyed by the mudflow down the Muddy River.

I don't know how many of you have taken the trip up into the Mt. Margaret backcountry which was north of Spirit Lake, but there were some rather sig-

nificant and beautiful lakes in that area. One of the most highly used was St. Helens Lake. That was the lake that flowed directly into Spirit Lake and set up on a ledge above Spirit Lake. This is what St. Helens Lake now looks like. It's been totally racked by the explosion and all the timber and so forth that was surrounding this beautiful spot was just completely leveled and gone; the lake is full of ash and partially covered with debris. We estimate that there were 26 lakes heavily damaged in the Mt. Margaret backcountry that will have long-term aquatic impacts. In addition, 140 lakes were moderately to lightly damaged by ashfall which will have short-term aquatic impacts.

Just in summary about activities that are currently underway and about what we expect to do in the future. We are awaiting better watershed damage assessment for completion of high elevation U–2 and low elevation photographs, and some on-the-ground reconnaissance. Funding will be requested for removing debris jams in the Muddy River and other streams and for other watershed rehabilitation work. A water quality monitoring program was implemented in April in coordination with the U.S.G.S. and the Washington Department of Ecology. Twelve stations are active and several others were destroyed by mudflows or are within the Forest Service "RED" closure area that I'm sure you've all heard about. In addition, we have a Mount St. Helens Regional Recovery Team headed by Arvid Ellson from the Regional Office, who has been assigned the task of developing short-term and long-term recommendations for this devastated area.

Actual watershed rehabilitation work will not occur until it is safe for the crews to enter the closed area, and these things are going to have to wait until the "RED" closures area become a little bit more safe for people to enter.

I appreciate being here and sharing with you some of the impacts to the Gifford Pinchot National Forest. Thank you.

UPSTREAM FISHERIES AND WILDLIFE, BY GARY SHAW, FISH AND WILDLIFE SERVICE

On Sunday morning, the 18th, about 8:30, I was just leaving my house and I looked up at the mountain and saw it at the instant it blew. It was a sight I'll never forget the rest of my life. I feel very fortunate to be participating on a team of biologists investigating this event. As everyone is aware, it seems that the data are changing daily on the effects of Mount St. Helens. Just a few minutes ago, I got some more information on the potential impact on streams going into the Yakima drainage. The handout which I provided this morning has some changes in it, even though it was made yesterday, so I'll attempt to point out those changes as I go through and maybe expand on a few other items.

The Fish and Wildlife Service's Olympia Area Office overseas all Service programs in Washington State. This includes National Fish Hatcheries, National Wildlife Refuges, fishery assistance programs, and animal damage control, among others. Primary coordination of our response efforts is handled through the Area Manager, Gil Blum, who unfortunately, due to a prior commitment, was unable to be here today. In addition, a task force coordinated by the Lower Columbia River Refuge Complex Project Leader Jack Kinslow, who many of you know. has been delegated authority to respond to concerns involving dredging and disposal of sediment in the Columbia, Cowlitz, and Toutle Rivers.

The service operates nine National Fish Hatcheries in the State of Washington. Currently none of these facilities are reporting any damage that would affect their operations; this means their equipment or fish slots. This is primarily due to the location of these hatcheries. They did not receive that much of an immediate impact as yet. Much of their water system is coming from spring water. so they are not being contaminated.

The Fish and Wildlife Service is not presently directing any efforts on evaluating impacts of the eruption on fishery resources within the immediate area of the mountain. Present evidence indicates that aquatic resources in the Toutle and lower Cowlitz Rivers have been devastated.

In the immediate and near term, the Service is focusing efforts on assisting the Corps of Engineers in locating sediment disposal areas. Emphasis is placed on identifying spoil sites where the least long-term damage to wetlands will occur. Habitat losses are being documented in the spoil sites and this information will be used in developing rehabilitation programs, which at the present time look very promising. I'd like to say that, in working with the Corps on this they have demonstrated a high degree of professionalism and sensitivity to

the protection of habitat wherever possible, while keeping in mind their number one priority is, of course, the protection of the life and property of the people of the Lower Cowlitz area.

In the mid and long term, the Service will provide assistance to both federal and state agencies in evaluating impacts of the eruption and developing rehabilitation programs. As an example, the Service's Fishery Assistance Program which is headquartered in Vancouver, has been investigating fishery resources of the Columbia River and tributaries since the early 1970's. They have the expertise and equipment to gather basic biological and chemical data to determine fishery impacts.

Before I go onto wildlife, I might comment about some of the data that I just received this morning from a team of biologists looking at some of the Washington Department of Fisheries' index of streams which feed into the Yakima. Preliminary results of that data indicate they do not see any immediate effects.

The majority of wildlife species in the immediate blast area was resident and therefore managed by Washington State Department of Game. The Columbian white-tailed deer, which are on the federal endangered species list, are found primarily on Columbia River islands. There was no apparent direct impact on these animals by the blast, but ash fallout and its potential impact on critical habitat of this species is being monitored. Bald eagles, which are federally listed as threatened in Washington State, were known to nest around Spirit Lake. It is doubtful that any survived.

Preliminary data indicates impacts from ash have had a wide variety of effects on waterfowl and other wildlife on our National Wildlife Refuges in eastern Washington. Although some refuges are reporting little apparent problems, other refuges have had considerable impact. When the ash was falling out, the birds went into a state of shock. They were not disturbed by the presence of humans or other predators and, therefore, were more susceptible for predation. We look primarily at mallards and redheads. There was a high mortality of newly hatched ducks, but geese and goslings were apparently not as severely affected. This was primarily because the goslings hatched earlier than the ducks and were of a the earlier slide where it was showing where the ash fallout was the greatest, did report the most severe impacts. There the nest desertion was estimated at 100 percent. The mortality of the newly hatched was estimated at 100 percent, too. What our refuges are reporting about duck renesting is that they have found nests on top of ash which, once they dug under the ash, they found additional eggs. The ducks are nesting on top of their old former nests. Aerial insect feeding birds were noticed to exhibit abnormal behavior. By abnormal behavior, we mean they were running into the buildings and coming very close to humans which they would normally not do. This occurred about one week after ashfall, and a dieoff of some swallows was noted. Aquatic insects in the pothole areas were in the process of emerging when the ash settled into the ponds smothering larvae. Another item which I noticed was that the ash apparently acted like a precipitant, and what were once muddy ponds cleared up; but when they went down through the mud, they found that the insect populations of those potholes were completely gone. One of the earlier speakers had mentioned that one of the benefits could be that the grasshoppers were gone. I'd just like to point out that grasshoppers are, of course, a major food source for upland game birds. Vegetation appears to be germinating and growing through the ash. In the handout it states that observations have indicated small mammals do not appear to be affected at the present time. Data coming in yesterday indicates that this is starting to change. We're talking, of course, of the small mice, rabbit-type size of small mammal. We don't know the extent of this change. We don't know if it's going to be severe. We don't know if it's going to be long-term or short-term.

Concern is now focusing on availability of food for migratory waterfowl which will be coming down from Alaska and Canada this fall and winter. These birds spend a great deal of time on the Columbia Basin. Our refuges provide essentially a sanctuary for these birds to come in and rest, but they go out and feed in the agricultural lands, primarily the irrigated agricultural lands. If agricultural production is down, the food supply is going to be down, and until we know what is going to happen to those agricultural crops, we cannot make predictions on what will happen to the waterfowl. Some of the more speculative predictions would be a possible shifting of the birds through the fly line.

If the previous information on the small mammals proves to be true, then we're also going to be dealing with the problem that the rafters—these are birds of prey coming down from Alaska and Canada—will also be potentially impacted. These birds numbering in the thousands come to the Columbia Basin during the winter to spend the winter resting there. Eighty percent of these birds feed on the small mammals associated with irrigated agricultural lands. As I have been making qualifications all through this, I'll do so one more time. We cannot make any predictions concerning effects on waterfowl until we know what will be happening in the future.

In conclusion, the Fish and Wildlife Service would support formation of a biological task force of appropriate federal and state agencies to coordinate research and evaluation efforts, and to make recommendations on rehabilitation programs as they become feasible. Yesterday, I was directed by the area office to state that the Fish and Wildlife Service will take the logistical lead today to put this task force together.

DOWNSTREAM FISHERIES, BY DALE EVANS,[2] NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

One of the major impacts of the May 18 eruption of Mount St. Helens on fishery resources was the scouring of the Toutle River by the flood of mud, ash, and debris. Other members of this panel will describe effects in the Columbia River, the estuary, and the ocean. I will limit my remarks to the impact on the Toutle River salmon hatchery.

The Toutle River hatchery, constructed and funded by the National Marine Fisheries Service, under provisions of the Mitchell Act, is operated by the Washington Department of Fisheries. The hatchery is situated on the Green River, which is the hatchery water supply, about one-half mile above its confluence with the North Fork of the Toutle River.

I've not seen any assessment of effects on the Green River watershed. It's about 10 miles north of Mount St. Helens, but I assume that there is some large degree of ash fallout and perhaps blowdown. We were up at the Toutle Hatchery last Friday, where we took these pictures. The Green River is running quite turbid and one of the unknowns, of course, is how that watershed is going to sustain itself in terms of being a hatchery supply.

This is the view of some of the rearing ponds. These were all overtopped by the flood which left from a couple of feet to a few inches of silt and ash on the bottoms. Looking on down toward the hatchery building and one of the shops, the deposit of debris can be seen that came into the hatchery area after flowing up the Green River from the Toutle.

Apparently this is a backwash, the depths of mud and water on the Toutle when it went by the mouth of the Green River were considerable. The Green River was diverted and flowed right through the hatchery complex. This is the inside of the freezer shed where, of course, all the electrical equipment was off, and which contained a considerable amount of Oregon Moist Pellet, which really doesn't smeel very good after it has laid out for awhile.

This slide is the area between the hatchery building and the machine shed, one of the channels of the river when it went through. You can see the mud line on the building. This is adjacent to the shed, again part of the diversion where you can see it flows back into the Green River on downstream. Again, showing the mud line on the building and the kind of debris that's going to have to be moved out of there if the station were again to become operable. Inside the shop you see the water line just above the green paint there above the bench.

Below the rearing ponds where the channel that flowed through the hatchery is now returning to the old river channel, the Washington Department of Fisheries moved in just as soon as they could and made a partial diversion to put the river back where it's supposed to be. That's one of the hatchery residences in the background. We consider that one completely lost, I believe. Here is part of a logging truck that was carried up the Green River from the Toutle. Although I don't show it, there's also a bridge girder about 30 feet long, about a 12 or 15 inch steel bridge girder, that was carried up and dropped in front of the hatchery. Here we were standing on four to five feet of mud at one of the adult holding ponds, looking back up toward the hatchery complex. When the ash and silt

[2] Mr. Evans' comments were accompanied by a slide presentation.

begins to drain, it solidifies and becomes quite solid, except as you walk across there you find spots that are just about like quicksand, a considerable cleanup job.

The last rose of summer for what was a very short summer for the Toutle hatchery. The gutters on the building are completely filled with ash that ran off the roof. This is from above the hatchery looking downstream. The hatchery buildings are behind the trees on the right and this is the point at which the river diverted and flowed through the hatchery complex. The same kind of problem that was discussed earlier for the Cowlitz exists here, of course, on a smaller scale. That material has to be moved out of the Green River channel or else the high water this fall and winter is going to be right back into the hatchery complex, and we'll be suffering further damage. The question is, "What do you do with this stuff when you move it out?" You can't just go pile it on the banks or it's going to run right back into the river and create a recurring problem. There is no way of getting it out right now.

This is the highway crossing of the North Fork just above the confluence of the Toutle. You can see here the mud and ash left on the approach to the bridge settled out at a fairly sharp angle of repose. It's not comparable with your normal kind of mud. Those are the abutments of the railroad bridge. Both the highway bridge and railroad bridge were sheared cleanly off their abutments.

The heavy layer of silt can be seen on the river and again on up to at least 40 feet above current stream level. The contribution of mud and silt to the river is going to be a recurring event every time you get a little bit of high water or heavy rain. You can see the gravel bar of the old river bed here. There is four to six feet of overburden on that now.

There is not much left of what used to be a very productive salmon producer. The production of the salmon and steelhead below Bonneville is about two-thirds from the hatcheries, and the production from Toutle River about ten percent of this total during these kinds of generally depressed runs. This will have a significant impact on the fisheries.

Depending on your economic method, how you calculate the values of the fishery and the assumption you make on the distribution of the Toutle River stocks among the ocean and river, sport and commercial harvests, this could be as much as a $6 million annual loss to the fisheries.

That's all I have on the Toutle River. Now I'll turn this to Terry Durkin who can speak of some of the effects on the estuary.

DOWNSTREAM FISHERIES, BY TERRY DURKIN, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

First of all, I would like to point out the location of our research stations that are downstream or in the vicinity of the lower Columbia River that were actually collecting data shortly after the volcanic explosion. The only map we have is up here and those of you without very sharp eyes may not be able to pick them up. Here's the entrance of the Cowlitz to the Columbia and the Prescott Facilities at River Mile 78, approximately 6 miles upstream from the mouth of the Cowlitz. The Clatskanie office at Jones Beach is at roughly River Mile 46, the last constriction of the river before it empties into the estuary. Our Hammond station is at, roughly, River Mile 7 near Fort Stevens State Park. We had ongoing charter purse seining going on off the mouth of the Columbia at the time material emptied out into the ocean. I'm going to save my remarks for essentially the activities of the Prescott Facility and the Hammond Facility, and if there are some additional questions, I'll have data and information from the sampling going on at Jones Beach and at the mouth of the Columbia.

On Monday May 19, various water-quality parameters were monitored in the: (1) Columbia River upstream of the Cowlitz (2) Cowlitz River and (3) Columbia at its confluence with the Cowlitz. Water temperature, turbidity (JTU), dissolved oxygen (D.O. in mg/l), and pH were among the factors measured.

Initially (May 19) turbidity in the Cowlitz River exceeded 5600 JTU; the Columbia at the confluence was 3500 JTU compared to a background of a 3 to 10 JTU range. (The Toutle River was reported to be half water half silt late on May 18). Water temperature in the Cowlitz was greater than 30°C while the Columbia at the confluence was 20°C on the bottom (which translates to 68°F which was approximately 7°C above Columbia River background) and 14°C at the surface. D.O. in the Cowlitz on May 19 was approximately 5.6 mg/l while the Columbia at the confluence remained at 10.6 mg/l, the same as river background. pH in the Cowlitz reached a low of 6.5 while the Columbia ranged from 7.7 to 7.2.

By Tuesday p.m. (May 20) turbidity in the Cowlitz had decreased to 1800 and the Columbia to 700 JTU. Cowlitz temperature had dropped to 14°C, the Columbia was 14°C top to bottom. Turbidity and temperature in the Cowlitz slowly decreased to 480 JTU, 8.9°C, respectively. D.O. stabilized at 9 mg/l. pH equilibrated at approximately 7.0. With the exception of turbidity, the Columbia at the confluence has returned to near normal water quality.

Turbidity levels of 3000 JTU or greater can be directly lethal to fish; the mode of action is gill damage. Coho, chinook salmon and steelhead trout juveniles have been held in Columbia River flow-through water at the Prescott Facility since before the eruption. The highest turbidity recorded was on May 19 at 1800 JTU and has since decreased to 6 JTU. No mortality has occurred; however, small sharp particles were noted in the gills of some test fish. Although the gill irritation was not directly lethal, it could affect the animal's ability to operate efficiently in the environment, ultimately leading to a decrease in survival. The nature of the newly formed material from the eruption (ash fallout and earth washed down Toutle drainage) could cause direct mortality at much lower levels than reported in the literature; e.g., it is not aged and smoothed but has sharp edges. Tests indicate a certain amount of the material will not settle from the water column and could be a source of chronic gill irritation which could lead to hypertrophy or hyperplasia of gill lamelle and secondarily by affecting the organisms on which fish feed.

Filter feeding organisms could be affected by the particles that will not settle from the water column. Some invertebrate filter feeders are a source of food for recreationally and commercially important freshwater and marine species of fish. Tube dwelling invertebrates would be affected by fine particulate matter settling on the bottom of the estuary.

To assess the overall effect of settleable and non-filterable residue, we feel as though our CREDDP efforts should continue well past the 1981 deadline now in effect; Dungeness crab distribution and abundance studies should be resumed; inriver and offshore monitoring of migrating juvenile salmonids should be continued and increased. Monitoring of riverine and estuarine turbidities should continue until "normal" levels are reestablished.

Comments of Dr. Blahm are in a handout and may be available. By the way, our coordinator for these particular research facilities mentioned above is Charles Koski.

Here are our comments for the estuary. This is also in a handout form entitled "Preliminary Evaluation of Mount St. Helens' Impact on the Columbia River Estuarine Finfish."

Distributional and diurnal investigations of Columbia River estuary salmonid and non-salmonid finfish species have been underway since February 1980. By diurnal, I mean 24 hours steady. We start at mid-noon and continue until the following day making trawl and purse seine tests every two hours. NMFS Hammond and Prescott research personnel have been conducting studies for the Pacific Northwest River Basins Commission through the Columbia River Estuary Data Development Program (CREDDP). Systematic monthly samplings were made at 63 estuarine sites using trawls, purse seines, beach seines, and traps. Prior to the May 18th volcanic explosion, over 250 distributional baseline samples were collected. This data base provides a means for comparing finfish and species abundance before and after the influx of volcanic debris in the estuary.

I'll point out some characteristics of this particular 92,000-acre estuary. This is Grays Bay. This particular mark here essentially indicates the fresh water area. This mixed area, essentially could be marine down here, but it has salt water intruding on the bottom through this point up to Astoria.

These small figures are pretty well condensed in the handout, but indicate our sampling sites, and there's roughly 63 of them. The open squares are purse seine sites. The small straight lines indicate trawl sites. These dotted lines are trap net sites. We also have beach seine sites throughout.

Noticeable changes were observed in the number of bottom fish found at freshwater sites in the upper estuary above Tongue Point following the explosion. There was a 90 percent decline in finfish abundance from the previous month of May. This catch reduction would have been even more distinctive if 33 fish taken in a tow near the mouth of Deep River in upper Grays Bay were not included in the June total. I mentioned that up in Grays Bay we had one trawl station. There would have been 13 fish caught with 8 trawl samples in the upper area above Tongue point. I should caution, these are just bottom fish, they are not pelagic fish. We did this work last week and it's as up-to-date as we have.

June bottom fish catches in the lower saline portion of estuary west of Tongue Point showed no change in abundance or species (Table 2). However, a close examination of each tow catch revealed a high proportion of fish were found in Grays Bay, Youngs Bay, and Desdemona shoal. Normally, about 50 percent of the fish were captured in these four shallow sites. Tow catches at these four sites in June provided over 80 percent of the total finfish catch below Tongue Point.

June pelagic purse seine sampling had not been completed, but a preliminary review indicated a substantial numerical decline in salmonid and non-salmonid finfish captured above Tongue Point. We haven't completed our purse seine below Tongue Point at this point.

The June trap catches which were made up in the sloughs and the mouths of the tributaries in the upper estuary are also incomplete, but indicate no obvious change in species or numbers at tributaries or sloughs in the upper estuary. There was neither a reduction in numbers or an increase of fish which seems to indicate little movement of fish into these areas.

Diurnal or 24-hour purse seine and trawl sampling was conducted at a single location in April prior to volcanic explosion, and again on May 21 and 22nd several hours after turbidity and debris had reached the area. We were able to successfully complete both surveys. The diurnal sample site was at the Washington side of the Interstate 101 highway bridge in 40 to 70-foot water depths and varying salinity concentrations.

May purse seine catches increased dramatically with the increase in turbidity. A total of 19,835 fish were captured in eleven sets compared with 942 in April. Surges of schooling pelagic fish were encountered during different sampling periods. Nearly 1200 shad were captured at noon, over 2200 longfin smelt at 2:00 p.m., 1500 shad at 4:00 p.m., and 1500 herring at 6:00 p.m. At 10:00 p.m., over 1000 anchovy were captured. Reduced catches of finfish were taken at 2:00 a.m., but thereafter, shad, herring, and longfin smelt were common to abundant in the remaining sets.

Yearling salmonid catches (coho, sockeye, spring chinook, and steelhead) were comparatively low though over 800 subyearling fall chinook were captured.

Many bottom-associated species usually not found in pelagic gear such as a purse seine were taken during the 24-hour survey. Over 1000 starry flounder were captured and some appeared in each purse seine set. Sand sole, English sole, Dungeness crab, sand shrimp, staghorn sculpin, shiner perch, Pacific tomcod, and snake prickleback all appeared in purse seine catches. Their presence in the pelagic catches is unusual.

May diurnal trawl catches were 21 percent less than observed in April. Over 67 percent of the fish were captured between midnight and 6:00 a.m. Longfin smelt and snake prickleback comprised 72 percent of the total bottom fish catch.

There were no dead fish observed in the diurnal surveys and no apparent hyperactivity was seen with fish held in the highly turbid water. The most obvious behavioral changes were the surface movement of bottom fishes, the apparent confusion of schooling pelagic fish, and the drop in catch of yearling juvenile salmonids.

Collection of juvenile salmon, starry flounder, Pacific herring and Dungeness crab were made on May 29th, and these were held for five days in ambient estuarine water at the NMFS Hammond boat house. Each day a few of each species were sacrificed for examination of gill tissue. This effort is being funded through a suplemental fund provided by CREDDP, No apparent gill damage was noted, though lab analysis is not complete.

We propose to continue our regular monthly distributional and diurnal samples. We will be comparing food items consumed by dominant species before and after the volcanic explosion to determine if dietary changes are occurring.

We propose that prior NMFS baseline studies of benthic infauna, sediment size, and epibenthic crustaceans be reactivated to provide further comparative assessment of the effects of volcanic debris in the estuary. Present studies do not have the scope or historic background data to adequately make comparisons.

DOWNSTREAM FISHERIES, BY HERB CURL, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Pacific Marine Environmental Laboratories is one of the three oceanographic laboratories that NOAA maintains. We're located in Seattle and actually have operations all over the Pacific Ocean. We were on an oceanographic cruise, as

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it turned out gratuitously, just after the eruption of Mount St. Helens and were at sea during the second eruption on the 25th of May.

Our original purpose was to look at water properties with respect to trace metals and trace organics as part of a long-range effects program on pollutants in the ocean. However, we added an additional 18 days working off the mouth of the Columbia because of the volcanic material coming down the river.

I'll briefly summarize our findings to date. We made measurements of salinity and turbidity distributions, of chemical composition, and of the physical state of the material that was coming down the river. The plume itself, which is the fresh water lens lying on top of the salt water, is about half the normal size for this time of year. Normally, as this would be the maximum period of runoff, the plume would be much larger than what we found. The plume, at this time of the year, would normally occupy an area like this, and it would move down along the coast of Oregon. It was only half that size.

The suspended load was much higher than had ever been recorded. It was four times larger than any previous records would show and equivalent to the normal suspended load of the Mississippi during flood stage. In other words, we're not setting any records, but there was much more material in the river than we normally find. The chemical composition of the material is very similar to the normal suspended load of the Columbia River. In other words, it is feldspar-type minerals but, in this case, small particles that are glassy. They're glassy shards with a lot of bubbles so that there's less of a tendency for this material to fall out. But, chemically, the material is almost identical to what normally comes down the river. We saw two distinct turbid layers, one at the surface about ten meters deep which is quite normal, and also two tongues of turbid material near the bottom. This is, as far as we can tell, an unusual situation.

We plan to have two more cruises, one at the beginning of July and one in August. We were able to obtain some additional ship time for this purpose and will go back and take another look at the suspended load, the material coming down, its concentration and distribution, and the effect on light penetration. We will also determine whether or not there is any material being deposited on the bottom which might be unusual. Based on the figures given today about the total amount of material that has come out of St. Helens, we wouldn't expect to find a layer of ash similar to that deposited during the Katmai eruption.

It's my guess that the principal effect of the material coming down the river and entering the ocean will be an increase in turbidity and a decrease in the amount of light penetration as long as this material is coming in. I would guess that the river will be continuing to flush this volcanic material for some time, so there will probably be an effect on primary production of, for example, phytoplankton, at least near the mouth of the river, and a possible effect on fish on the bottom if they are influenced by increased turbidity.

COLUMBIA RIVER ESTUARY, BY DAVID KENT, COLUMBIA RIVER ESTUARY DATA DEVELOPMENT PROGRAM

The Columbia River Estuary Data Development Program is a six-year, $6¼ million investigation of the physical and biological processes of the lower 42 miles of the Columbia River, funded through the River Basins Commission. Our study area, if I can pause a moment and point it out on the map, is located roughly 40 to 46 miles along the river. If you notice, this is the area immediately below the mouth of the Cowlitz River, which is right at this point.

Our program began, the field portion of our program, in September of 1979. We have approximately 22 separate field research contracts and a number of others not directly involved in field research. This research program began in, as I said, September, 1979, and we are conducting a comprehensive survey of this estuary. We're studying the food chain from the primary productivity through the consumers up to the higher level of mammals and birds. We're studying the physical effects in the estuary, of currents and salinity intrusion, sediment transports and depositions, and geology of the sediments. We had approximately eight months worth of data field research prior to the eruption.

Again, very fortuitously, we were in the field and operating when the eruption occurred. In the weeks immediately preceding the eruption we had collected data on the organisms that lived in the sediments and immediately on top of the sediments. Terry Durkin from the National Marine Fisheries Service has already

talked about the extensive fisheries research being conducted with CREDDP funding. At the time of the eruption, and in the week immediately following, we already had scheduled a number of researchers. As a matter of fact, this is the most intensive period of research during the field year. We had primary productivity work going on the week immediately before and immediately after the eruption. We had groups measuring the organisms that lived just on top of the bottom, and in the bottom, immediately prior to the eruption.

The scenario following the eruption went something like this:

On May 20, two days following the eruption, the research activities of the CREDDP program were reviewed by the staff and on the following day, on the 21st, an emergency contractors meeting was called to discuss whether and how we should alter our program to take into account this unique event. On May 23rd, which was five days following the eruption, the meeting was held. A number of the contracts were modified with approval of Mel Gordon, the Chairman, that afternoon, to slightly alter or expand our program to cover areas which were uniquely associated with the input of ash into the Columbia River system.

What follows is an outline of the additional work that's being performed by CREDDP contractors to assess the damage caused by the Mount St. Helens eruption:

The Envirosphere personnel, who are with a consulting company, began an intensive field program on the 23rd of May. Water quality parameters were assessed from Bonneville Dam to the estuary using mobile lab equipment. Samples were collected, also for future analysis. This program is being coordinated with water quality work being done by the Geological Survey above Bonneville.

Three work units have coordinated their efforts to conduct an aerial survey of the estuary. This includes the Envirosphere work on log storage, the Washington Department of Wildlife work on marine mammals, and another contractor, Jones and Stokes, work on the avifauna. They have flown over the estuary and assessed the impacts of the flood on these three aspects.

Oregon State University has a contract to study the benthic infauna, the organisms that live within the bottom. They've received the additional funding to go back out into the estuary and conduct an intensive survey throughout the study area to determine what the impact of this additional sediment is going to have on this very important community.

The University of Washington is currently conducting a program of research on the zooplankton and larval in the estuary. They also received additional funding to add on special equipment and to increase the number of sampling trips. As a matter of fact they are on the estuary today and will continue to be so on a weekly basis, for about the next month.

We've already mentioned the National Marine Fisheries Service research that is going on the salmonid and non-salmonid fishes. They are also deploying flow-through turbidometers to determine how much suspended sediments are being carried in the river. Terry also mentioned the additional work that they are doing with this funding on potential gill damage and other effects on the fisheries.

Starting next Wednesday, the 18th, we're going to have a very intensive three-week field effort being conducted by a number of our contractors. This will be going on 24 hours a day. They will be studying the current, the turbidity, the productivity of the estuary, the number of the organisms in the estuary, the zooplankton, and the benthic organisms. It happened that this had been scheduled from the beginning of the program and fortuitously occurred immediately after this eruption. Other work units are also responding to this eruption within the scope of their contracts. Because of the design of this particular resource program, many of the aspects of the eruption are already being covered by existing work units. As I said, this is a very unique opportunity. We have an existing, comprehensive, scientific research program in play just a few miles below where this cataclysmic eruption has occurred. We anticipate gathering data which is not only unique, but that will undoubtedly be referred to for years to come.

The Pacific Northwest River Basins Commission will continue to serve as an interagency coordinating center for all assessment work done on the Columbia River estuary. We might add that, undoubtedly, we will become more involved with the 20 or so miles between the upper end of our study area and the confluence of the Cowlitz. There are already some sampling stations up there and, as I mentioned, we are expanding our effort into that area.

As far as recommendations go; certainly we should continue to assess both the short- and the long-term impact of this volcanic eruption on the Columbia

River and estuary. We should assess the impact of the sediment input to the river and we should certainly determine any changes in the sedimentation pattern or raise in the estuary or the ship channel. We should continue to monitor and assess the impact of this eruption on the biological system of the Columbia River.

At this point, it's too early to make any firm assessment of what the impact has been. Terry has already mentioned that we are getting some evidence of impact; that there has been a dramatic decrease in the number of fishes that are captured out there. Our productivity research units have found a deeply dramatic decrease in the level of productivity in the estuaries. Over the long-term, if this continues, there will undoubtedly be significant impact on the systems in the river.

The funding for continued investigations of volcanic ash in this system is currently non-existent. Like all of you who run programs, we manage to spend everything that we've got. Right now our funding is stretched so thin you could read a newspaper through it. Money for long-term effects as well as the short-term investigations is sorely needed for this study. That concludes my remarks.

INTRODUCTORY REMARKS BY GEORGE PROCTOR, VICE-CHAIRMAN, PACIFIC NORTHWEST RIVER BASINS COMMISSION

I certainly appreciate the presentations that have been made by the Federal agencies today. As often as I leave Klamath Falls and drive to Portland or Vancouver, I drive up and see Mt. Shasta to the South, drive by what's left of Mt. Mazama and see the scenic beauty that we all appreciate in the Pacific Northwest through the Sisters, Jefferson, and on down through Mt. Hood. Always as you swing down by Mt. Hood you hope to see in the distance Mt. St. Helens, but as usual, for various reasons it was not there.

What I think we need to realize, of course, is the beauty of the Pacific Northwest has its origin in what we have seen, to a large extent, in the activities of Mount St. Helens. And, for example, like Mt. Mazama in my area, we continue to have a daily residue of the volcanic effect which was over 6,000 years, even activity up to 1,000 years ago which is an overriding effect in the area. The Cascades, of course, in the 1800's were active and Mt. Lassen, of course, in 1915. So, I think we need to realize that well over half of the Basin's area is overlaid with volcanic material.

I have a particular interest in this area because I've spent considerable time in geothermal development and have had opportunity, for example, to fly the circle of fire from Chili to Japan and to visit many of the active sites along that route. You can appreciate the event that took place here, but really, you can't appreciate it unless you're in the front lines as many of you folks have been.

I'd like to suggest and offer one additional perspective to this forum as it relates to planning, particularly to the mid-term and long-term effects that we see here in this area and in the basin. As you folks are aware, the River Basins Commission has just completed the regional plan—the CCJP, and obviously, did not direct their attention to this type of an event. There isn't any question what the status of St. Helens is today, tomorrow, or the next day. It's unknown. And there is no reason to believe that what has happened in the past over many years may not continue in the future at some point of time within the Basin. It just seems to me that we need to take a look from the planning standpoint as to what is the effect of this type of natural phenomenon on the environment and, more particularly, how do you live with such changes that may occur to the environment as a result.

Naturally, as you folks have reported earlier here today, by emergency efforts, immediate efforts, and money, you can minimize the effects to persons and to property. But nevertheless, we're talking about an event that over the long-term, we need to put in perspective. Often Jim Hill, as many of you remembered, would say, "At times we need to help Mother Nature but also we need to understand Mother Nature." I think as we talk about how to live with the environment that occurs from this type of event, I think we need to recognize how we may need to minimize the effects of it and how we can aid, as I indicated "Mother Nature," and, thirdly, how we can take advantage and benefit from those events that occur to our environment as a result of it.

To me we have an event here in St. Helens that probably, on a world basis, occurs once in a decade. And there is information available, not only in the Basin, but world-wide that is available to address the planning questions that seem proper and that we need to address as we look down the road in this regard,

after we get through the immediate impact as to just what areas that we can address and what area that we can work within the environment that we find ourselves in.

I think at this time I would like to introduce the gentleman who probably considers that over the last few weeks, he has been in the core of the volcano, a gentleman from the State of Washington, Web Hallauer.

WASHINGTON, BY WILBUR G. HALLAUER, WASHINGTON DEPARTMENT OF ECOLOGY

Considering our mayday of May 18, I think that the first thing I want to do is thank the many agencies at the federal level who were so responsive, so helpful, and in coordination with our efforts at the state and local level, in the State of Washington in responding to that great emergency. It was an outstanding effort, and the people of the State of Washington are sincerely appreciative.

I'd like to look back to the time when, in March of this year, the mountain first showed evidence of renewed activity. In the course of that time, people were wondering whether this would be an event of any consequence or going to be a kind of murmur and then dissipate and go away again. I recall that Governor Ray put together a task force called the St. Helens Mountain Watch and asked the people from USGS to come to Olympia and give their version of how they viewed the mountain's activities.

Of course, we got into questions at that point and we were asking the USGS personnel just how they rated the odds book in the St. Helens horserace—

personnel just how they rated the odds book in the St. Helens horserace—

whether we could expect anything major on an odds scale of 10 to 1, or 1,000 to 1, or 1,000,000 to 1—just what were we looking at? And, I have to give all the credit to the USGS people. They were responsive directly to the question. The odds they quoted were probably 200 to 1 against anything major, 2,000 to 1 against anything like Krakatoa or Mt. Pelee, where the entire mountain blew up back in not too recent times, maybe 50 and 100 years ago.

But, then the question was, when you're looking at an odds book of 200 to 1, just how seriously do you treat it? And, I'm glad, in view of the events that have come about since then, that all the agencies at the federal level and at the state level were serious. They didn't look at 200 to 1 as being, oh, let's forget about it. They went to work and did build a structure of how we should coordinate if the time came about when that cataclysm arose. And, of course, as you all know, here we are today.

There are some events that I'd like to talk about in a bittersweet vein because I think that at the agency level we had a magnificant response. There are some stories that came out of the event that are kind of intriguing in looking back at it in the light of about four weeks' experience since the mountain blew. On the day of the eruption, on May 18, over in Yakima the fallout was starting to come down rather terrifically along about mid-morning. One of the radio stations over there, the manager, of course, had come down to handle the program himself, and after giving the usual line of stay inside, keep the curtains drawn, try to avoid exposure to dust, don't do any unnecessary driving, if you do have to go outside wet a cloth and keep it over your face—if you really are confronted with that kind of a necessity, he went on and said, "There's nothing to get excited about—we should all keep our cool—but folks, it does look like the entire Cascade Range is blowing up."

Another incident that came to me, I think Monday afternoon, when I got a call from a lady over in Yakima Indian Reservation. She happens to be the wife of a minister to the tribe over there and in a mission situation. Her problem was that she had been listening to the radio and there was a story on it that the city of Yakima was about to start dropping its sewage, raw, in the Yakima River. Well, she was very upset by this from the standpoint that the salmon resource of the Yakima River was something that the Indians had depended on in all history and that the state should not be a party to that. It shouldn't be done. It should be stopped.

Of course, I tried to tell her what the facts of the situation were. That, if we did not allow the city to go ahead with the procedure of putting the sewage in the river, the situation would come about shortly that the machinery wouldn't work. Then we would really be fouled up. The sewage would be going in untreated anyway. Even if the machinery was still there and we were running the sewage through the plant, we wouldn't be getting any treatment on the sewage as it went through.

Well, she didn't understand that really, and then I tried to tell her the river was running at 6,000 cfs and the effluent from the Yakima plant was of a range of 10 to 20 cfs. Very evidently, she didn't understand what a cfs was, or how much volume that amounted to. I asked her, finally, "Just how much sewage do you think that is?" She said, "Oh, you ought to be able to move it in about two truckloads in a day."

Well, of course, we were looking at something more like one 5,000-gallon truck per minute. To try to find that kind of trucking capacity was totally unrealistic. We were looking at the history of the Yakima drainage where, for many years, Yakima and many other communities in that valley had previously, before environmental clean-up times, put sewage directly in the river for decades. It wasn't all that novel a situation.

But she was serious enough about it. In fact, she said that this was a plot and what it really amounted to was genocide committed against the Indians. It's a little hard to be rational in responding to that kind of an attack.

Oh, we had another interesting little incident in connection with the Lewis River power dams. On Sunday night, following the May 18 cataclysm, we wanted to get people in there to manually open the gates and start lowering the reservoirs. What happened was when the people got up to the roadblocks, the sheriff wasn't going to allow them through. There was about a three-hour delay there that could have been rather important, but it all got worked out. People see matters of this kind in their own perspective and don't see the larger picture often times.

From the standpoint of the Water Quality Agency of the State of Washington, what we were doing at the time in May when the eruption occurred, we had started a water monitoring procedure in conjunction with other agencies. We had that going on and the water level at the Lewis River dams, the three power dams, had already been reduced by 50 percent by the time of the eruption, so only 50 percent of the normal pool was still in the reservoir. Almost immediately we went to work with Pacific Power for a rational lowering of that remaining pool, so that over a week's time the residue of the water in the reservoirs was largely lowered. I think it's just about up to the point now where it's at minimum pool level.

The next thing we did after the big blowup on Sunday was to get right down to analyzing what the ash consisted of so we'd know what we were dealing with. We would then be able to forewarn the sewage plants in eastern Washington, where the ash fallout was occurring, what their problems were going to be and be able to tell the agricultural people what we thought the end result of the fallout would be on agricultural crops. Of course, these were rough measurements to begin with, as to acidity and alkalinity, so that we could get a rough handle on it. Later on, of course, we got into more refined analysis.

Then, of course, we got the sewage problems that we immediately dealt with by telling the local communities they had to make up their own mind as to what they should do with their raw sewage. If they felt they had to go directly to the rivers with it, we weren't going to stand in their way and quote them any regulations simply because we felt that it was the necessity of the moment. There were some agricultural problems in connection with this because there were crops in the Yakima Valley, like asparagus and other things of that kind, where there could have been questions about bacterial contamination of the crops. Fortunately, with the analysis we made along the river, we didn't get into a situation that was all that difficult.

Now we're at the point where we're starting to look at long-range effects. One of the stories that has me a bit concerned right now is the area over the wind-blown soils of eastern Washington where dry-land wheat farming occurs. These are rather fragile soils that got there by wind deposition. Now we have a rather light, very fine grained material—in some places up to 3 and 4 inches deep—deposited over wide areas, particularly around the community of Ritzville. Farmers in that area are raising the question that, if they continue their normal soil practices of working that material in through their stubble mulch farming, which penetrates probably a maximum of 3 inches or so, are they going to change the average of that soil and make it lighter and more subject to wind erosion. This is a real concern. Back in the 1930's, for example, with the old time cultural practices of that day, there was a lot of wind-blown movement. Almost, at times like the dust bowl back in the Midwest that occurred at about the same time. With the shift to different tillage methods and different cultural practices in the

wheat belt of eastern Washington, they have largely gotten away from any problem of that kind. Now, here all at once, with the addition of this new material, wheat growers in that area are fearful that they are going to experience blowouts in their fields because of the change in the soil condition. In just how many ways this type of long-term affect from the eruption may be felt, we don't know. It's going to be decades, probably, before we settle all the quetsions. But that's the next stage of it.

Just one more little story, before I close. Oh, a few months ago, shortly after the first activity on the monutain, I happened to be reading a book entitled "Memoirs of Nisqually." It was by a farmer who was under contract by the Hudson Bay Company at Fort Nisqually, which is just north of Olympia. He had started farming about the turn of the year 1845. Along in this diary, reproduced as his memoirs, was a story that on a Sunday in April 1845, he heard rumblings like guns during the night. Then the Hudson Bay people brought the news a few days later saying it was Mount St. Helens in active stage. Now, Ft. Nisqually is about 80 miles away from Mount St. Helens and, of course, if they got enough noise so that in pioneer times during the middle of the night, people were awakened by the racket, there must have been quite an explosion at that time too. It was loud enough so that he thought it might have been the rumble of naval guns off the Fort.

Thank you.

IDAHO, BY SCOTT W. REED, IDAHO WATER RESOURCES

We noticed last night that there was a place on the program where the states were supposed to give some comments. That was a minor disaster, compared to the other sort of thing. We did turn out some newspaper clippings that I noticed managed to get eaten up like all the rest of the papers on the table in back, which constitutes our official report.

I think I would like to make some perosnal comments. If I am correct, it appears to me that I'm the only person so far who's been on the speaker's platform who actually ended up underneath the ash as it fell. Coeur d'Alene was the beneficiary, to a minor degree, to what happened out here. I had little experience to prepare us for that. I grew up along with George and my wife down in Klamath Falls. One of our notable events, at an early age when we were all in high school together, was the production of some kind of commemoration out at the fairgrounds in which they gave the Indian version of what happened when Mount Mazama blew up. I remember that my wife, Lou, played in that extravaganza. All I can tell you is that whoever wrote the script had no idea what it was all about.

As the ash came over us that particular Sunday and started falling, I, given as I am somewhat to profundities, observed very solemnly that this was a very unique occasion; and I thought we were certainly, in a way, blessed in that we would have gone through something that no one else that we ever knew had ever gone through before—the exposure to a volcano's fallout. My wife, who is given to puncturing profundities, noted that everyone else we knew would also be going through that same experience. In a way it's kind of nice to come over here and find someone who hasn't, even though we're all hearing about it.

We've been trying to figure some remedies for this. One of the reports was that part of the mountain belonged to Burlington Northern. I don't know if this is true or not, but there's an old principal of law that says that if you use your property in such a manner that it comes upon another person's property, they have a right for some damages. My thought was not so much as claiming damages, but to simply to ask Burlington Northern, and perhaps the Federal Government to the extent that they own it, to please come and pick it up and take it back. We would be most appreciative.

The area of fallout in Idaho conformed, naturally, to where that map ceases. That map is a Washington State map. In general, it went from Moscow north to Sandpoint. There was a slight fallout up along Bonners Ferry and a slight fallout down in Lewiston, but the major impact was right in the center of that area. In the St. Maries/Plummer area there were up to, maybe, two inches. Other areas didn't have anything like that quantity. Initially, after the fallout, there was a great deal of measurement and talk about what was there. I can only tell you that there were a great number of depth measurements that were made horizontally. We had maybe a quarter of an inch in our particular area and

that isn't very much, except a quarter of an inch on everything does kind of mount up. It does really begin to do something.

I think you might be interested in what the local reaction was in terms of response; how did the agencies respond? Perhaps that's one of the things we could talk about as a state. Civil Defense was a total farce, a non-existent entity. A report that came out immediately noted their existence. From then on, we never heard anymore about them. I'm sure if there were any dire need for anybody to eat K rations in the basement of the courthouse, there were boxes of them there for those who wanted them. Other than that, it simply served as the normal political place where you put people who can't do anything else and need a job.

The other agencies responded very well, locally. The local health district and the State Division of Environment people, who were monitoring air quality, proceeded to put in 18-to 24-hour days monitoring the air quality and giving reports. The Fish and Game people put in long hours to do the testing to find out the quality of the water. They did some testing on the fish and found that the fish were surviving in the tanks that they had already set up without much adverse impact. The Fish and Game people tried to keep track of what was happening to the animals out in the forest, to the degree they could. The water quality tests were made. We had a rather quick and prompt response that gave the same sort of assurances you've been hearing; that the stuff isn't going to kill you right away and probably not in the long-run. All of this was good.

Most of the good work that was done, in the terms of alerting people, was, just like was previously mentioned, done by the radio stations who managed to organize and correlate and put everything together. I think, for the first time, a lot of us had good feelings about disc jockeys who managed to keep track of disasters when they occurred. It was probably just as well that these were private individuals trying to keep listeners on the radio rather than, perhaps, some formalized government response.

We had quite a difference of opinion and difference in the reaction just within the states. Coeur d'Alene is just 30 miles from Spokane. Spokane's sheriff became a hero, unjustifiably I think. He declared a state of emergency, shut everything down, and was extremely active in terms of quieting the traffic, putting speed limits in, issuing all sorts of directives, obtaining masks, and all that sort of thing. On our side of the line there was a political contest going on. A lot of people were running for sheriff and none of them really had time to do much about that, so it kind of went by the board. In the long term of doing things, it didn't matter too much.

We presently have a dispute still existing over whether it's safe to breathe the stuff or not. Idaho is now taking the official position it's perfectly safe to breathe it and Washington is not quite sure it is. We hope we're right, but it doesn't seem to matter because you're breathing it anyway. It's just a matter of how to cope with it as best you can.

The schools, of course, closed down immediately and stayed closed for the rest of the week. They then re-opened, stayed open for one day, and then closed again. In doing such, it was rather not a reaction to health hazards, as a reaction to the mechanical problems of running the busses and that sort of thing. Again, I think this is what my wife calls a janitorial theory of world operation in which if the janitors and mechanics say that you can't go, you don't go, and they're far more important than the doctors and other people. In any event, the janitors and the mechanics closed the school system and that's fine. No one is really complaining too much. We'll just skip the last two weeks of school. Most kids do anyway. It was giving some problems to the teachers over how to grade them. They found that they could just do it the usual way, passed or failed. They did whatever they could to get them by.

We had considerable problems, we had three days of good weather which terminated with rain. I'll tell you that there has never been so many joyous faces looking at a cold rain in May as there were looking at the one that finally poured down upon us on Thursday. Rain in May is not welcome in north Idaho, though it's frequent, but it was extremely welcomed then and it's been welcomed ever since. Every time it rains, things look a little bit better than they did before it rained.

We've had considerable problems, not problems, just interesting confrontations, I guess, with media events. That's what you'd call them more than anything else. About three weeks after the event, a week ago Sunday, the Idaho States-

man announced on the front page of the newspaper that there was a fish kill on the level of 200 thousand fish in Coeur d'Alene Lake and 6 million fish in the Salmon River drainage. It attributed this to the Idaho Fish and Game Department. Since up there where we are, next to Coeur d'Alene Lake, the Fish and Game people had told us that there hadn't been any fish kill, why this was kind of a shock. The next day, the most marvelous resurrection occurred. It turned out that there were no fish kills, either in Coeur d'Alene Lake or anywhere else, and it came again from the same source. There was just some little mix-up in there, but the fish all came back alive and are well, as far as we know.

As a matter of fact, the fishing, at present, is pretty good. That's a little pitch put in because right now our politicians are going through total schizophrenia. They have to talk out of both sides of their mouths and it's absolutely mandatory. They first have to make sure that the place is declared a disaster because only in that way can you be eligible for all the funds that we heard about this morning that are so vitally necessary to keep the businesses going, provide money for the farmers, and so forth. But, on the other hand, calling your area a disaster at the commencement of the tourist season that's the major business of your area, is not really good public relations. So, having secured the Federal Disaster Designation, the Governor and a troop of cohorts went around northern Idaho for a week last week announcing that it wasn't a disaster after all, that the fishing was good, that the streams were running clear, and that we had the streets cleaned up. All of that is pretty much true. We perhaps have gone through the same sort of resurrection, and will continue to, unless somebody tries to take the disaster designation away and cut off the loans. Then I'll assure you that it will really be a disaster and we do desperately need that.

We had a little problem with the response from the southern part of the state. It took Boise about a week to find out that something adverse had happened in northern Idaho. That's not unusual, that's about par. It just happened to be a little more necessary this time than usual because we kind of needed some help. The kind of help we needed was a couple units of National Guard that had come out of Moscow and Coeur d'Alene and gone to southern Idaho for training. The State National Guard Commander said that it was very important for them to continue their training down there in case some disaster occurred. It took a while to finally get the message through that maybe this was one. Eventually, they did manage to lumber forth, come north, and bring their trucks along, and they did provide some minimal assistance for our problems.

The problems will continue in certain areas. The agricultural situation there is not as serious as it is in eastern Washington ; and I think, in general, you're not going to have much of an adverse affect as far as anyone knows at the present time, subject to the sort of things that were talked about in changing our soil consistency.

Real impact, I think, is going to be in the logging. The problem there is mechanical. Our country ends up looking a lot better and our scientific values are right up there. When it rains, it's green, and when it quits raining, it's still green because the trees have absorbed all this. But then, when you get out to chop the trees down or saw them down, all that stuff comes down upon you. It's dangerous to the loggers. They can't see trees when they're in the process of falling. The chainsaws end up just blunted, if they continue to run. The dust, of course, picks up immediately and goes into the engines of the trucks, tractors, and the rest of the equipment that are going. It's all opertaing in dry, dusty country when it can operate, and it's going to be a tremendous maintenance problem. This is the sort of thing, of course, that the lumber industry did not really need at this time. They seem to have enough afflictions from exploding interest rates not to have to handle explosions of this sort. But it is going to be a continuing problem, certainly through this year, and maybe longer than that, to the exent where, in certain areas, the trees are simply not going to be logged. I don't think that there is any question about that.

Right now, we're engaged in the process of second guessing, but this goes on all the time. There is sniping at the people who said that it was a problem and then sniping at those people who said it wasn't a problem. The letters to the editor abound, ranging from whole gamut, all the way down to the current controversy over whether or not the mayor of Spokane should have worn a tie when he greeted Jimmy Carter at the airport. This seems to be one of the major controversies in Spokane. He came out there in a hurry and he was doing something where he didn't have a tie on. That's not something you do even if you're not in Jimmy Carter country, you still wear a tie.

Anyway, we have survived, and I think we have a rather profound wish from our state, from our part of the state. I must say, parenthetically, that when the second eruption occurred and it went this direction, there were many dry eyes over on our side of the line. I don't want to wish you ill, but we'd like to share; and I think that our first wish is that there be no more eruptions. Our second wish is that there be no winds from the Palouse for some long extended period of time, at least until they manage to plow it under and see whether it grows things or not.

I can summarize it by saying that, as far as the State of Idaho is concerned, it would be just fine if we had no more input from the State of Washington.

MONTANA, BY JACK E. ACORD, MONTANA DEPARTMENT OF NATIONAL RESOURCES AND CONSERVATION

Much of what Scott has related to you can be related as happening in Montana, perhaps on a lesser degree. You notice I say lesser, not smaller, because of the size of the State of Montana, it may be greater, because it did affect basically the whole state. We did have an emergency air quality notice put out by the Governor's office, which, in effect, closed everything down in the state for a period of two days. For the western part of the state, that extended for a period of about four days in some areas, particularly in the area of Missoula and up around Superior.

The depths of the ash, as Scott pointed out, varied widely, at least depending upon whether you were measuring vertically or horizontally. I think Missoula may have gotten an inch or better. In Helena we got, I would guess, at the maximum an eighth of an inch. I have heard stories that Superior got considerably more than Missoula did, but I have no documentation of that.

Our concerns in regard to the effects of the fallout on the water and related land resources were immediately with the water supply. There were indications that, at first, there could be the possibility of acid fallout—that the ash contained oxides which could cause acid conditions in water supplies; and, in the case of Helena, our surface water storage was shut down for about 48 hours anticipating that there might be problems with water quality.

Thanks to the State of Washington, it was soon pointed out that it was very slightly acidic and that it wasn't at all harmful, so they restored that surface water supply. In the meantime, we were drawing from the Missouri River which is also a surface storage. The river was, of course, a lot bigger volume, so dilution did play a part. We've had reports that, at most, there were increases of maybe five to ten Jackson Turbidity Units in turbidity, but this rapidly settled out.

We have had no reported effects on the fisheries, but there is some speculation among our fish and wildlife people that there may be some long-terms effects on fish populations—on the fish themselves, through damage caused by the particles, and perhaps on spawning areas.

To date, our major efforts have been in cleanup and, as Scott also pointed out, there were some fortuitous rains that came along in the succeeding four or five days. We don't welcome those cold rains in May anymore than the people in northern Idaho do, but we were very tickled to see them this year.

We anticipate that there may be some long-term effects in agriculture; on fish and wildlife; recreation; and, particularly, logging. These, again, are spectulative, and we won't know for many months.

In closing, I would like to thank the State of Washington and Web Hallauer for the advance information they provided in terms of ash consistency, chemical makeup, pH effects, etc. They really helped Montana anticipate the problems because we were not getting information from any other source. However, I'll reserve giving any thinks to Web for the soil additives until we find out whether they really do help.

Thank you.

WYOMING, BY PAUL SCHERBEL

I didn't really plan to say anything, because all that Wyoming had was a little dusting. We had to wash our cars. They probably needed it anyway.

When Scott was talking, I did remember about this Civil Defense business when I was involved in it. We were told very carefully that if someone dropped an atom bomb on Portland or Seattle, that none of the fallout would come over to Teton County, Wyoming. We know, now, that that information is incorrect.

The other thing that I wanted to say, and I notice that the Department of the Interior is not involved in this session today, is that somebody needs to put all the land lines back, all the property lines back, after this little explosion that you had. If someone would care to engage our services, I would be happy to look into that. But that is quite a problem, putting all the land lines and property lines back that have been destroyed in this.

Thank you.

OREGON, BY CHRIS WHEELER, OREGON DEPARTMENT OF WATER RESOURCES

Oregon, by the winds of chance, also lucked out like Wyoming, and, by comparison, has had only a minimum amount of effect from the eruption. If it continues, ultimately, those winds will change and we could, or would, experience some of the more severe problems that Washington, Idaho, and Montana, particularly, have that we've heard about. As I think most of you know, we did get, from the May 25th venting, some significant problems in the Portland area and particulate levels that were irritating, although, probably not significant health hazards.

The most significant impact that Oregon has had to date has been the dollar value involved in the shipping loss resulting from the partial closure, and the continued partial closure, of the channel that you've already heard a lot about.

We have had, for some time, a major emergency operations plan geared to supposedly cover disasters, but we have no specific, detailed lengthy plans to cover each type of disaster you can think of: wind storms, fires, floods ,etc. We have had those. But it's more of a procedural one that, hopefully, will cover all. We do have an excellent statewide communications network as a result of that, and it has been tested in the past and, hopefully, would respond, or will respond, as needed in the future.

There has been some updating specifically for the consideration that we would have further venting and would have wind patterns that would cause significant problems to Oregon, and to its residents. The plan has been updated for that purpose.

There have been the usual comments that you've already heard here; don't breathe any more of it than you have to; all those usual good responses, but the same end result in terms of the expected effect.

Something we have to continue to live with and which we are concerned with is what the effect is going to be on our water supplies for industrial, municipal, and fishery concerns. Again, to date, we have no major effects on our side of the Columbia River. We are vitally concerned, though, about the overall effects upon our water supply.

I think, Mr. Chairman, that there's all we need to say about Oregon's concerns.

CONCLUDING REMARKS BY MEL GORDON, CHAIRMAN, PACIFIC NORTHWEST RIVER BASINS COMMISSION

Let me begin by thanking all of the speakers who've made presentations today. The wealth of information that has been presented here is very impressive, indeed.

I think that in summing up what's happened here today, I would start off by saying that a lot of work has been done in a truly efficient and cooperative manner to deal with the immediate effects of the eruption. It's clear that federal and state agencies from a variety of perspectives have joined forces to react as quickly as possible to the situation as it existed immediately following the eruption.

But the effects of the volcano's eruption can't be limited to immediate impacts only. The other important thing to look at is how the eruption may affect the region's water resources in the future. This is of vital concern to us all.

For summary purposes, let's divide the mid- and long-term effects of the Mount St. Helens eruption on water into three categories.

The first would deal with the long-term impacts of the eruption on the Cowlitz Watershed and Stream system. A minor portion of that section would involve the Lewis River system, too.

Secondly, we need to take a look at how the mountain's activities will affect the Columbia River and its estuary below the confluence of the Cowlitz River.

The third major area of concern centers around the effects of the huge quantity of ash fallout on the northern and eastern portions of the Columbia River system.

Several observations can be made concerning the first area of concern—the Cowlitz and Lewis River drainages. Briefly they are:

A vast portion of the Cowlitz's upper watershed has been virtually destroyed. At this point, we don't know what it's going to take to build up the watershed again, but it's important to coordinate those rehabilitation efforts.

We know anadromous fish will be impacted, but the question is to what extent have or will these fisheries suffer.

Flooding potential has been greatly increased. The U.S. Corps of Engineers will have to spend a lot of money this summer to help avert the flooding potential that will come with winter rains.

We've lost thousands of acres of prime agricultural land in the area and can expect a high degree of mud to remain in the water system for the foreseeable future. What that means in the long-run is hard to say now.

Finally, erosion in the Lewis River system is quite possible.

Our second summary area concerns the lower Columbia and its estuary.

The major impacts there seem to be:

Aquatic life and environments in the estuary have been adversely affected by the layer of sediment which landed in the river as a result of the eruption. Again, the extent of that devastation is not fully known at this time.

Dredging operations must continue in order to keep the 40-foot navigation channel open.

We're going to have to monitor the entire gamut of estuary and river conditions for some time to come, in order to try and anticipate future problems before they get the better of us.

In the area of ash fallout, we have learned that:

There's been an increase in turbidity from the ash fallout. We're not sure of the total ramifications of the fallout, however.

Ash fallout will affect irrigated lands, but to what extent, we still are not sure.

Snowpack areas don't appear to be affected by the ash. A big question remains though, on how the ash will affect snowpack runoff.

In conclusion, I would say that the key word is "monitor." We will have to keep studying the effects of the eruption for quite awhile to come. That's the only way that we can develop successful rehabilitative efforts. If we monitor and work together, the long-term impacts of the Mount St. Helens eruption on water should be reduced.

We at the Commission vow to assist both federal and state agencies in their efforts to deal with the effects of the eruption on our precious resource, water.

Thank you all for attending today.

Mr. THAYER. Senator, one other thing I want to emphasize is the dual lock at Bonneville or either an expansion of the single lock.

Senator PACKWOOD. That is getting to be a lock and dam 26 problem in terms of an absolute jam on the river.

Mr. THAYER. I might say, though, if we can work out that rail-barge program, we might not have the court case with the rail suing us. That is one of the points we are trying to make right now and where we could get a cooperative effort with the Union Pacific, say, on that problem.

Senator PACKWOOD. We are familiar with that problem.

Mr. THAYER. Yes, indeed.

Senator PACKWOOD. This will conclude our hearings today.

Thank you very much.

[Whereupon, at 1:13 p.m., the hearing stood adjourned.]

[The following information was subsequently received for the record:]

STATEMENT OF HON. WARREN G. MAGNUSON, U.S. SENATOR FROM WASHINGTON

The eruption of Mt. St. Helens is a natural disaster of an unprecedented magnitude in the United States. The fallout from the volcano has literally spread around the world.

The impact of the volcano has been most severe, of course in Washington State and the Northwest. Many lives were lost and property and natural resources destroyed in the area adjacent to the mountain. Thousands of people in Western Washington live in fear of flooding during the fall rainy season. Eastern Washington's farmers and local governments are faced with the continuing problems posed by the blanket of volcanic ash.

This natural disaster has caused equally worrisome problems in the Columbia River area. Of primary concern are the impacts the eruption has had on the two industries so important to this region—commerce and fishing.

Following the eruption, tons of debris flowed through the tributaries of the Columbia, much of it settling in the Vancouver-Portland area, where it trapped ocean going vessels. The authorized navigation channel in the Columbia shoaled to a controlling depth of only 14 feet, forming a nine-mile wide bar at the confluence of the Cowlitz and Columbia.

The Army Corps of Engineers is moving rapidly to restore navigation on the Columbia River, which will also restore its flood carrying capacity. Already, the Corps has removed over 1.5 million cubic yards of material from the river. The Corps estimates they will need to remove another 22 million yards of material to provide adequate river capacity at a cost of roughly $45 million this year.

The impacts of the eruption on our fishing resources are of great concern. Unfortunately, very little information is available at this time.

We do know that all fish in the Toutle River and its major tributaries have been killed and the river is uninhabitable. In addition, the lower 20 miles of the Cowlitz will not support fish life and is presently a barrier to fish moving in the stream.

Of particular concern is the potential effect of the turbidity of the Cowlitz on chinook and coho which will return this fall. We know juvenile salmon are now being killed by the sediment in the Cowlitz. However, there is also evidence that fish from the Cowlitz are returning to the Kalama. Obviously, there is a very real need for further study of the volcano's effects on the fish population. NOAA has assured me they will move rapidly to study these impacts and hopefully answer many of the questions which remain concerning our vital fish resources.

Tuesday, the Senate Appropriations Committee, which I chair, heard from officials from a variety of Federal agencies involved in the Mt. St. Helens relief effort, including representatives from the Corps of Engineers and NOAA. Our job now is to assure that those agencies have the money—estimated to be $820 million by the President for the first stage efforts—to continue the emergency clean-up and relief efforts. The House Appropriations Committee has already approved some $898 million for seven agencies. Once this measure reaches the Senate, you can be sure I will do everything I can to speed adequate funds through the Congress and out to the Northwest.

STATEMENT OF HON. WARREN G. MAGNUSON, U.S. SENATOR FROM WASHINGTON

Mr. Chairman: I appreciate the concern you have shown for the communities of Oregon and Washington that have been impacted by the eruption of Mount St. Helens. I am pleased that the Senate Commerce Committee will have this opportunity to consider the problems that face the Pacific Northwest.

Mr. Chairman, Mount St. Helens poses two problems: First, we must accumulate the enormous requirements needed to restore health, safety and commerce to our communities. Second, we must recognize and prepare for contingencies that may yet affect the lives of our residents, our transportation networks and our ports and river systems.

I hope that the testimony presented to this committee will frankly assess the damage already done by Mount St. Helens as well as project as accurately as possible the potential damage from future, unpredictable volcanic activity. We must be properly prepared for what may be in store for us from our mountain. Your efforts, Mr. Chairman, will be of great assistance in this endeavor.

Again, I appreciate the attention this committee is giving to the problems brought to the Northwest by the eruption of Mount St. Helens. I look forward to considering the testimony received by the Committee today.

PAUL C. PAULSEN,
Portland, Oreg., June 10, 1980.

Senator ROBERT PACKWOOD,
Portland, Oreg.

DEAR SENATOR PACKWOOD: Enclosed is a statement approved by our membership on June 7 regarding Mt. St. Helens.

We understand you are having a hearing regarding the effects of the eruption on Congress, fishing, and shipping. Our members were involved in all phases of this, and I believe our President, William Larkin, 3205 Butterfield Road, Yakima, Washington 98901, (509) 248–2888, would like to present testimony to you. Some of us would also appreciate the opportunity to attend and listen to the testimony.

Yours truly,

PAUL C. PAULSEN,
Legal Counsel, 4-Wheel Drive Clubs.

Enclosure.

MOTION RE MOUNT ST. HELENS DISASTER AREA BY PACIFIC NORTHWEST 4-WHEEL DRIVE ASSOCIATION CONVENTION IN HOOD RIVER, JUNE 7, 1980

It was moved, seconded and passed that we oppose any designation of the Mt. St. Helens area as a wilderness national monument, or any other designation than real multiple use. We approve the salvage of timber and mineral resources and approve restoration of rivers, streams, and recreational opportunities in the Mt. St. Helens area.

We request that our members and officers notify the press, the governors and the congressional representatives of the states of Idaho, Oregon and Washington of this decision.

The above stand on the Mt. St. Helens eruption disaster area was taken by the Pacific Northwest 4-Wheel Drive Association at its convention in Hood River on June 8. This was unanimously approved by delegates repesenting over 250 clubs in Oregon, Washington and Idaho. Over 100 of these clubs are in the eruption and fallout area and their members have been working long hours to aid in clean up, repair, and disaster relief.

Our rented site for our summer convention on the Toutle River is buried under three feet of mud and debris. We need approximately 300 acres in northwest Oregon where we can hold this convention in the middle of August. We expect over 5,000 people to attend this convention with campers, trailers, motor homes, and tents for our annual get-together and 4-wheel drive playday.

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