

HARNEY COUNTY HISTORY PROJECT

AV-Oral History #211 - Sides A/B

Subject: Water Meeting 1985

Place: Harney County Courthouse

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Interviewer: Pauline Braymen

DALE WHITE: ... get a report, preliminary report on the reconnaissance study that has been done by the Corps of Engineers and some of the studies that they have commissioned towards the--- accomplishing that end. Before we do that, I'd like to introduce a few people that are worthy of introduction tonight, and then there will be several others that will be introduced as part of the program. First I would like to introduce my colleagues Earl Tiller and Frank White, and then Bud Hammack from Malheur County. I seen Bud someplace, where you at Bud? Stand up. We have a pretty good contingent here from Malheur County tonight, which we're sure appreciative of their interest. Lynn Hardy, Lynn, Director of Emergency Services for the State of Oregon. And next to Lynn is Mike Hanna, representing Bob Smith's field man. And then I'd like to call on Floyd Hawkins. Malheur County has formed a committee to work on this problem with us, and maybe Floyd can introduce those people, or have them introduce themselves. I can't even remember a name when I get up, have to introduce anybody, so Floyd, why don't you ---

FLOYD HAWKINS: Thank you Judge White. We're glad to be here today and get what information we can. There are so many here that are scattered, I'd just like for them to stand. If you want to introduce yourselves you can, but would all of you from Malheur

County please stand so the people will know who you are.

DALE WHITE: Why don't you just stand and tell us who you are. Stand up. Shooting don't start until after the meeting, so no problem with standing now. So why don't we just start over here and go around, ZaDean, and go around.

ZA DEAN ARYER: Za Dean Aryer ...

BUD HAMMACK: I'm Bud Hammack, the Malheur County Emergencies Services ...

FRANK ELFERING: Frank Elfering.

...

GARY SCHNIEDER: Gary Schnieder, County Agent.

GERALD STANDISH: Gerald Standish.

HERB FUTTER: Herb Futter, Soil Conservation Service.

JERRY WILLIAMS: Jerry Williams.

DALE WHITE: Okay, thank you for coming. We're going to have, as I said --- it's a fairly detailed and lengthy program and we want to give some opportunity for you to answer and ask some questions, and get answers on those this evening also. But when the various components are presented tonight, why don't you hold your questions until --- there will be a question and answer time, and so that we can try to go through this as rapidly as possible. And if you let the presenters make their presentation, maybe some of the questions will be answered as we go along. One other person I forgot to introduce, stand up Senator, Senator Timms. My name would have been mud if I forgot him. (Laughter) ... I knew something was ringing in my ears, but I wasn't sure what it was. And then maybe that can help us get through this in as orderly manner as possible. So I think many of you previously had the opportunity to meet Dale Smelcer, he is from the Corps of Engineers from Walla Walla, and is the person assigned to this project. And so Dale will kind of give us an overview of what's happened to date, and what we can expect

in the future as well as introducing the next person on, and we'll just kind of flow through this Dale. It's all yours.

DALE SMELCER: Good evening. Well as Judge White said, we're here to bring you up-to-date on the status of our reconnaissance report. We don't have any answers tonight. We want to let you know where we are in the study, what's been accomplished, and what is yet to be done. We've looked at a number of options such as through this canal through Malheur Gap. We've looked at a canal in the tunnel at the head of Crane Creek. Canal and tunnel through the Owyhee Basin, and to the Alvord Desert. Storage site on the Silvies River, and we're looking at a storage site on the Malheur River. All these options, the only one at this point that looks at all feasible is the canal through Malheur Gap. So that's essentially where we're concentrating our efforts at the moment.

We're going to have reports tonight on the economic study of, as far as we are --- it's really an assessment of damages that have occurred, or will occur, and the benefits if we can pencil in the project. The studies that will be completed by April, are studies when completed are essentially the hydrology, fish and wildlife studies, and the environmental assessment. So at this time I'd like to introduce Paul Fredericks, a hydrologist on the project, and he will take it from there.

PAUL FREDERICKS: Thank you. I'll just make a few introductory remarks, and then turn it over to Bruce Prenguber from Northwest Economics Associates who actually made the economic studies that we're going to be looking at tonight. First let's --- there are two categories of potential benefit from the project. One is the prevention of flooding in the future. That is the prevention of flooding of all the lake stage, when a project goes into operation, or prevention of flooding from a recurrence of the situation that you have now, sometime in the future.

And then the other type of benefit is the reclamation of land and use as a lake level

has gone down, so you can get back in and use the land, and put the railroad back into operation. So there are those two general categories and benefits. Prevention of future lake stages, and then allowing results from the normal use. And that's generally the way we asked Northwest Economic Associates to evaluate damages and benefits. We asked them to evaluate damages at various lake stages, and then from those damages at those stages we can draw a curve and be able to estimate the damage at any lake stage in between there, to a point.

And then we've also asked them to evaluate the benefits of drawing the lake down to various stages, and so on. And Bruce will be talking more about that and present his information.

In looking at the damages and benefits, there are several things you need to keep in mind. First, as Dale alluded to, the damages and benefits we're presenting here tonight are not in a form that are comparable to project costs that you can put together a project benefit to cost ratio. There is another step involved, and that is the hydrologist will have to make an estimate of the duration of flooding, anticipate the duration of flooding at various lake levels, and also the probability that various lake stages will be experienced. And then we'll crank that information into these damages and ... a stage where we can prepare an appropriate cost. So that's what Dale will ... to when you don't have final answers, and another step involved in converting these numbers into something you can compare to benefit costs ...

Another thing that needs to be kept in mind is that we're primarily trying to determine the feasibility of an investment that will be made sometime in the future. That is the way we're looking at it now. The earliest the project could go into operation is in the fall of 1987. So we want to see if that investment would yield a return greater than cost. So we're interested --- the damages that have occurred in the past, and a relevant --- if

they will be prevented by a project in the future. What I'm getting at is that if the damage has occurred, but won't occur again, then the project will not get any credit for preventing it. An example would be a road that has been raised and would no longer be subject to flooding at heights below its new level. This project that we're contemplating is not going to prevent any damage to that road. The fact is that it has been raised earlier could have prevented a future damage.

Another thing that we're going to have to be careful about in estimating damages, is that there is usually more than one way of estimating a particular damage. And we want to be careful not to count the same thing twice. An example here would be loss of rail service. That could be measured by the cost of repairing the rail line, or it could be measured as the increased cost of trucking products. But, it's not both. It's either at the same time. It's either one or the other. Bruce will touch more on these things as he gets into his, and I'll just turn it over to him now.

BRUCE PRENGUBER: Well I want to first of all say I'm glad for the opportunity to be here tonight. Our company, Northwest Economic Associates is by --- by getting some background for you, is an economic, research, and consulting firm in Vancouver, Washington. And we've been working with the Corps of Engineers since September of last year. Taking a look at damages as Paul has indicated, as well as benefits that would accrue to a project if it were put in place. Our company, I guess, if I were to talk about what our background is, is really to do economic impact studies. And we also have done a fair number of water resource types of studies. So this is the kind of background that we have. We have put together a preliminary report --- there is a few copies here in the county court that are available. It is a preliminary study. You need to understand that, and that's why we're not broadly disseminating the report at this point. But you're welcome to come in and take a look at those reports if you want to familiarize yourself

with any of the details that we are going to discuss.

As I mentioned we started in September of last year, and that's a fair number of months ago, and we have three of us, basically, that have been working on the project. Not full time, but just a very complicated subject and issue, and we've gotten into a lot of things. So there'll probably be some questions left in your mind tonight that we'd like to answer, but if you don't hold me unto them perhaps the report will give you a little bit more background.

I'd also like to introduce Dave Ricks who is here tonight. Dave is one of the other people that work with us, and he is here to help answer questions and help with the presentation. I'd also like to say, before I get into really a discussion of how we approach this subject, I'd like to say that we really appreciate the cooperation from a great many people here locally that we've been working with. I hesitate to start naming anybody, because I'd surely leave somebody out. But this study has very much been a locally based study where we try to develop the facts and information from you people here. And I think we really couldn't have done our job without that kind of input, so we appreciate it very much.

As Paul mentioned, the scope of our study, we're going to look at benefits and damages that could be prevented if the project were put in place. And just to follow up a little bit on what they said, we're really not addressing the cost of construction on this particular kind of project. That is being done by the engineers, and the Corps of Engineers. But our work is really to look at what are the cause and effects that a project would have. So that's what we are confining our discussion to tonight.

The other thing I guess that also bears mentioning a second time is that we --- the numbers --- and I am going to give you some numbers tonight as to what the benefits or the damages presented are. Those numbers are not, as Paul said, something that we

can directly compare to some total cost figure that the Corps of Engineers could come up with. And I think you need more estimation as to why that's the case. I'm sure we can get into that during the question and answer period.

The two components of our study that we looked at are the --- are the damages that we prevented, or would be prevented I should say, from any future floods if the project were in place. And those damages are basic, because when we look at, as water levels are rising. The numbers that we have on those damages are not simply the damages that have been incurred up to this point in time. Because as Paul also has indicated, there are simply some costs that the project itself can do nothing to mitigate, and therefore we're not counting those. But anything that would recur in the future and can be prevented by this project, we are counting.

The other component of our study is to look at the benefits as the lake has gone down with the project. Some examples of those things are the agricultural income that comes back to the county because land is brought back into production. And also the transportation costs. Our analysis is also very much based on elevations. And that was -- - those elevations were given to us by the Corps of Engineers through graphs. Dave, you want to turn on that first slide. Basically what we did was we started with what we can call the base, which is approximately the elevation of 4,093. And against that base, we can make a number of comparison, the first of which is an elevation of 4,098 feet, which in fact is the elevation that the lake reached in mid 1983. And then the next elevation that we looked at was 4,102 feet, which was reached this last year. The next intermediate elevation that we have been looking at is 4,107. And finally 4,112 feet, where the water would flow out of the basin.

In drawing off floodwaters, that second task that I was referring to, we looked at three different sets. I think --- we had a different project ... Anyway continuing on about

the elevations that we were looking at, on draw down, there was three, three sets of elevations. The number of peaks of flood waters from that peak of 4,112 down to 4,107. The second draw down state we looked at was 4,107 down to 4,102. And then the last one was from 4,102 to 4,098. Now we looked at those three. The Corps of Engineers is going to have a fourth step, which can take it from 4,098 back down to 4,093, which is the base no flood condition basically. Okay, we'll wait a minute here Bruce ...

The other thing I wanted to mention that hasn't been brought up yet, is that we followed the, what are called the principles and guidelines of the U. S. Water Resources Council, and those are guidelines that the Corps of Engineers and every other federal agency that deals with water projects has to follow. When we talked about --- there are certain costs that we can evaluate, and certain that we can't. Those are determined by that set of guidelines, called the principles and guidelines. And those are to insure, I guess, that federal funds are spent effectively.

The second reason that those are --- have been put together is that there is consistency of analysis. That is if we were doing an analysis here in Harney County and there was some, some kind of flood evaluation project in another county, or another state, it would basically be done in the same way. So that the evaluation could be carried on within the Corps of Engineers in a consistent manner.

And the third very relative point about all of this is that we have to follow these methods of evaluation in order to really have consideration, serious consideration be given to the results of our study.

Okay, I think we're finally ready for that slide. What we have done is listed the types of damages that we have considered in this first task. And the first damage that we've looked at is the value of property improvements that were in the flood impact zone. What we did was to extensively work with the assessor's office records as to what the

improvements are, and their location. And we also drew boundary lines; I should say elevation lines that follow those elevations that I mentioned earlier. And then based on the number and type of improvements, we used replacement costs which are ... what the value is and the improvements are.

The second type of damage that we looked at was the net annual agricultural income losses. And basically what we did there was we looked at farm budgets which we put together, again with a lot of local impact --- input as to what budgets, what the costs are, and the returns are here in Harney County. And we used farm income from here to having the flood conditions, compared to without the flood conditions. And the main place where the loss of income occurs is the assumption of the information that we use to purchase feed and forage products at higher costs than you would if you had your own land base to work from, your flood meadows or your other grain or hay products that you're producing. The third item of damage that we looked at were the non-agricultural ... And we found that the flood zone area we looked at there were about 25,000 acres in small ownerships that are not agriculturally oriented. They're too small to be of ... And on those lands, we valued them at, had to value them again on income producing basis. So we used our budget for that purpose also. The next item of damages we looked at were increased transportation costs. The two forest products firms in this area have experienced a considerable increase in their transportation costs, as a result of the loss of the U. P. Lines. And in that case we worked with them to estimate what the additional trucking costs were versus if they were using rail shipments for their products. And we'd be glad to give you our estimates.

The next damage that we looked at were lost timber revenues. The U. S. Forest Service appraises timber at the nearest rail dump, and that was no longer Burns. That basically decreased the value of timber sales the purchasers were willing to pay for the

timber sales. That impact, that loss of revenue is felt by the federal government, and the county government because there is some sharing on the total revenue. So we have included those.

The other --- the next item of damage that we looked at was the telephone and electric utility losses. Pacific Northwest Bell and Harney County Electric have both experienced, as you know, a considerable increase in their operating costs. Their capital expenditures to maintain service, as well as decreased revenues from the loss of sales of electricity or telephone service. We worked with both of them to determine what operational changes they would come up with, and elevation to keep them working, and then we counted those expenditures as they recur in the future as well as the lost revenue.

The next item of damage that we looked at were the county and state and local maintenance and construction costs. The repair and replacement costs have been very substantial. And they will be even more costly at higher elevations, if the floodwater were to continue to rise. So we have estimated what the repair costs would be, and looked at the re-routings that took place at 4,107 and 4,112 if the water were to come back up, and made our evaluation again on what the benefit would be if having those roads --- maintain the service.

By the way, I should mention we didn't, in talking to the state highways, we did not find any conclusion at this point that there would be any abandonment of either of the two state highways. So we've included the cost of ... which would be re-routing on both those cases.

The next item we looked at were the wildlife refuge losses. The refuge has been impacted in similar ways as other landowners have been in this area by the flooding factors. The fences that have been inundated by the floodwaters, and their replacement.

The buildings have been flooded ... and just generally higher operating costs. And naturally that would be the rental of office space here in Burns ...

The next item we looked at is travel and court fighting costs. And in this category, the method that we had of getting this information was sending questionnaires out to the ranchers who have been impacted in the flood zone and find out what kinds of costs they have incurred in terms of moving personal property, increased transportation expense ... in their operation, and that sort of thing.

One thing that came up today that we're going to go back to on this item is BLM costs. The property overlooked in this case, some of their operational ... we we'll be contacting them ...

As a result of going through and looking at all those types of damages, we have come up with estimates of total losses that could be avoided from future flooding. That first elevation range of the unflooded condition up to 4,098 feet, our estimate of loss of 2.7 million dollars. At the next elevation range --- well, all of these go back to an unflooded condition up to, up to that elevation. So going back to unflooded, up to 4,102, the estimate of loss is 5.6 million dollars. And then finally if you were to look at the entire range of going from no flood condition up to 4,112, the loss rises substantially to 46.5 million dollars. The basic reason that that loss grew, as much as it did, is that last case. It jumped from 5.6 million up to 46.5; we're in three categories. One was the transportation loss, which added significantly to the year. The other one was electric utility losses are much more substantial at higher elevations. And also the state highway repair costs would be very much greater than it had been up to this point, the floodwaters run.

What I want to do now is go on and talk about that second graph that we were talking about. The benefits the floodwaters brought back down from a higher elevation. In this case we looked at again a series of a higher percentage base to look at. First in

restoring that agriculture income. Again we're using income as the basis for the damages to agriculture. And what we did in this case was we looked at land reclamation costs that would have to be undertaken assuming that the land had been flooded for a significant period of time. And we worked with Oregon State University and the County Extension Office and other people who evaluate what kind of measures you would take to bring this land back into production. It would take several years to do this if flooding were for a number of years. So we prepared a multi-year budget from three to five years and calculated what the income would be to agriculture after variable costs. Not whole costs, fixed costs, but just after variable costs. We included that net income as evident to us. Basically what we did, we looked at twenty years of that net agriculture income ...

The next type of benefit that occurs is availability of this rural tract land for development. If we have a flood protection facility in place, land that has very little value retains its higher prior full market value because it's protected and buildings and so forth can be put on it without the present flooding as ... So we look at the value of the lands full market value to bring that back.

The next source of benefits that we found were the net savings in transportation costs. And the key point here is when the Union Pacific repairs the branch lines that is currently out of service, we assume that they would replace or repair the branch lines at an elevation of 4,102 feet. We've had conversations with these two, and they've not made any public statements about what their actions would be. They're apparently still evaluating internally what the economics of that line is to them. So we do not assume that it would be abandoned at 4,102 feet. So in that case we can then evaluate what the cost savings are of this, of using the rail line with the lower cost community service for the forest products industry versus the trucking costs. Those cost savings are to be considered.

We also looked at restoring the electric utilities as they are ... some timber revenues ... Okay, all right. And we intend to talk about that too. Obviously as you bring agricultural land back into production, people move back into the area and electrical service comes back. Okay, that's included net of the costs that are going to be incurred by Harney County Electric to bring that service back. The one that I missed was the restored timber revenue. And on that one, it's the reverse of what I was talking about before. If the rail line is brought back to this point, appraisals of federal timber is increased, therefore revenues pull back, accounting to the federal government for the loss.

The next item down is savings and travel costs. That simply is landowners and others return to their land they ... increased cost of being incurred at the moment for higher, greater commuting problem also.

As a result of doing, evaluating all those sources of benefits, we came up with the following set of numbers. Evaluating that highest elevation range we looked at, at the point of 4,112, and dropping the water level down to 4,107, the benefits are 7.9 million dollars. If we go then to the next elevation range of 4,107 to 4,102 the benefits increase and are 32.5 million dollars. And then finally from 4,102 down to 4,098 we estimated to save about 38.9 million dollars.

What I'd like to do is stop here. We've covered an awful lot of ground, and I guess what we'd like to do is to take some questions at this point for a few minutes. Is that right?

Is that still what you wanted to do, and then we'll go on with the other part of the program.

MAN: I was curious, 4,198 the actual meander line is 4,003 or so, what about lowering it back to the original meander line?

BRUCE PRENGUBER: Okay, from what I was just talking about?

MAN: Yeah.

BRUCE PRENGUBER: Okay. The Corps of Engineers is going to study at that last interval. We have not studied it, but they are going to include what the benefit would be if their project dropped the water down from 4,098 to 4,090.

MAN: Does your study include the loss of the benefits downstream?

BRUCE PRENGUBER: The loss of benefits downstream?

MAN: Right. Below --- when it goes over at 4,112.

BRUCE PRENGUBER: That's a good question, and the answer is no, we didn't evaluate it. Maybe Paul or Dale ...

MAN: How do you treat that?

BRUCE PRENGUBER: Bob.

BOB ? : Yeah, we will be evaluating those damages in the Malheur drainage. The thing that remains to be done by our analysis engineers and hydrologists, is to describe how that is going to happen, you know, if it comes down there in a surge, or if it comes down -- - you have to have some idea how it's going to go before you can estimate the damages. But we will get maybe ... downstream.

BUCK TAYLOR: Did you, I didn't understand, you estimated that the cost of the utilities getting back into say after 4,098, after you know, their cost of getting back into a --- to use. Did you estimate the cost of the ranchers, of their rebuilding the fences if it got back to 4,093, which the actual meander line was? The ranchers themselves still have the cost to foot --- you said refuge and you didn't say anything about the local ranchers rebuilding their fences and getting back into their homes, did you take that into consideration?

BRUCE PRENGUBER: Well okay, I think what you're referring to is what that last slide was explaining about benefits and drawing water down. And what I think what you are partially referring to is what happens, how do we treat the costs that have been incurred by ranchers at that lowest elevation who were flooded out. And that was in that first task,

which were damages that can be preventable by the project. And yes, we counted improvements. The value of improvements at the replacement value. Those were part of that first set of damages prevented that was put up. And that included that range of from 4,093 to 4,098 as well as the others ...

MAN: ...

BRUCE PRENGUBER: Yeah.

SENATOR GENE TIMMS: I'm a little hazy on the state highways. Now you mentioned, what was it, damages passed. Now the highway at 4,107, 205 would be under water again, so we would include the damages, the total cost of raising that highway originally which was around four million dollars, right?

BRUCE PRENGUBER: Four million dollars. Okay. Dave, first of all do you want to put that slide out that shows the state highway. We talked to the state highways people at Salem ...

SENATOR GENE TIMMS: Well the first time it was raised, it was raised with federal money. It still cost that much money.

BRUCE PRENGUBER: Right.

SENATOR GENE TIMMS: That was state highway money.

BRUCE PRENGUBER: Okay. Well I think there are two parts to your question. One is, how would you calculate the damages at the higher elevation 4,107 when they re-route the highway.

SENATOR GENE TIMMS: Right.

BRUCE PRENGUBER: A significant cost. And in the second part of this, did we count the four million dollars that --- whatever that --- I think it was between four and ---

SENATOR GENE TIMMS: Do you count all the monies that have been spent?

BRUCE PRENGUBER: Okay, the answer to that is no. We did not count the past federal

expenditures that were made to raise the road to 4,102 feet.

SENATOR GENE TIMMS: 4,103?

BRUCE PRENGUBER: Well 4,102 plus ... Yeah, 4,102.

SENATOR GENE TIMMS: Even though the water goes over the highway, and the highway is no more --- isn't useable. Which would be case in a year.

BRUCE PRENGUBER: Well okay. We count at an elevation of 4,107 or 4,112, we count the cost that the state highway department would take, this is Highway 205 from Wright's Point down to The Narrows. The state highway people told us that they would plan to alter that route to these higher elevations. If the water was at 4,107, they would take this route, and if it was at 4,112 they would take this route. We estimated, and they told us the cost would be about thirteen million dollars --- well I'm getting ahead of myself, because there is also this other state Highway 78 across the top. And there would also be some re-routing up here. They told us they would spend about thirteen million dollars to re-route both of those highways to get above 4,107 elevation. And they would spend about fifteen million dollars if they were to do a little bit different routing, a little bit more distance ... to get above the 4,112. We counted as the damage that the project could prevent at fifteen million dollars. We assume, and that assumption was, that you know, if the water got to the point that it threatened them, and they had to move the highway to above 4,107, they probably would take on the extra two million dollars and move it above 4,112. And those costs we counted. But the fact, at the lower elevation of 4,102, at that flood elevation we would not count the four million dollars that had been spent in the past. Because that road had been raised to the point that the project wouldn't --- wouldn't save any of that cost. There would be no further cost to be saved by that. That's a good question, because it really points out, you know, how we could and couldn't treat some of the costs.

MAN: You included in that the ... loss of farm income. Do you also take into consideration the loss that that income creates in Burns and Hines, the loss of jobs?

BRUCE PRENGUBER: Okay, that question was asked of us in September when we had a public meeting to talk about the project. One thing about these principal guidelines that I referred to earlier is that they talk about national economic benefits. The national economic development and the --- one of the things that they considered is that if a loss is faced by a community like Burns, replaced --- is your loss somebody else's gain essentially. In other words, if the people are put out of livestock production and other kinds of economic pursuits here, does somebody else pick that up, you know, because somewhere else in the State of Oregon or somewhere else in the nation is livestock production increased to handle the loss that has happened here. And so we did not count the loss in Burns or Hines, the secondary economic impact. Because of that principle that they follow ... Yes.

MAN: Would the impact of the thirty thousand plus ... a year at the refuge and also visited at Steens Mountain. Is that taken into consideration of the economy of the area?

BRUCE PRENGUBER: It was not taken into consideration in our study. However, there is another study that will be done by April that is a fish and wildlife study. I can't say --- I can't speak as to whether that is included in their study. Is that --- is that part of their study?

MAN: ... Right, yes. Visitor days will be evaluated. The loss of visitor days, this is how it's accounted for.

BRUCE PRENGUBER: Yes.

CHARLIE OTLEY: Let's go back to what you were talking about a little bit ago, before you brought up this. Talking about a national and a --- and the economic level, by the governments own admission, they say that for every dollar that is spent here, it turns over

seven times. Now a rancher out here that is flooded out that was spending a hundred thousand dollars, the community is deprived of seven hundred thousand dollars worth of economy. And now you just got through saying that you wasn't going to take that into consideration.

BRUCE PRENGUBER: That's right, and that multiplier of seven, I guess, what the principle here is that if some other community, their livestock ranchers make up for the losses of livestock production here in Harney County, they're going to spend that dollar in their community, and it's going to generate that seven hundred thousand dollars.

CHARLIE OTLEY: Not in this community.

BRUCE PRENGUBER: Not in this community.

CHARLIE OTLEY: We're talking about this community.

BRUCE PRENGUBER: I know you are.

CHARLIE OTLEY: So why don't you understand what's that got to do with picking it up someplace else, when you're studying this community?

BRUCE PRENGUBER: Well we're studying this community with a project that is a federal project. That if federal dollars are put into it, and they're talking about what happens --- what's the total gain. And they're not talking about Harney County when they talk about total gain.

JETT BLACKBURN: Well, if that's the case, then it appears to me that you're going --- by studying on how to, financially affects the United States, not Harney County.

BRUCE PRENGUBER: They're talking about national economic development. So ---

JETT BLACKBURN: So it didn't make any difference what our loss is in this area, as long as we're replaced someplace else. Is that a fact?

BRUCE PRENGUBER: Yes. If it's not a net loss. If your loss is not replaced somewhere else, then it should be analyzed. But if it is offset by increased economic activity

somewhere else, then it's not accountable.

JETT BLACKBURN: Well that sounds to me like a poker game. For every five hundred dollars you win, is a wash, and I'm all right. Is that right? (Laughter)

MAN: By the government's own admission right now you're losing ranchers all over the country that weren't replaced yet.

BRUCE PRENGUBER: Yeah, that's a good question. You know I think we could really look at that issue. There may be a fact, you know, fact is with a depressed livestock economy, and you people in Harney County are the lowest cost producers, and it's not being replaced somewhere else, you know, then it would seem to be legitimate.

MAN: So why aren't you including it then if this is a known factor right now. This is a known factor by the government's own admission, we are losing them, so why aren't you putting it in?

BRUCE PRENGUBER: Well --- I guess we could certainly, you know, put it in, the question is will the reviewers at different levels of this project legitimately count those, or let the benefits be counted.

MAN: Well if you don't put them in, they're not going to look at it. So you're the first one that's got to start putting it in. Because we're putting it to you, now you got to put it to them, because it looks to me like a chain of command. And somebody has got to put it there. If you're not going to, what good are you doing? You're wasting our money as taxpayers. So you might as well throw your project out.

BRUCE PRENGUBER: Well I, you know, I would just have to defer to how long, how great those benefits are going to be. I think we've caught the bulk of the benefits ... but ...

MAN: ... what you call it after. If Charlie is right with his own deal and you're saying that you're not picking it up someplace else, by your admission, and if Charlie is right, and you're right by your own admission, why don't you go ahead and put it in?

BRUCE PRENGUBER: I'm not saying that it is --- necessarily shouldn't be added. I think there is a legitimate argument that he is making. But the livestock industry is depressed but, you know, there are people, you know, could make up, I should say possibly make up some of the losses in the community.

MAN: Could --- but they're not. Now by your own admission you said they're not --- that, that right there we're depressed nation wide, statistics prove it. Then why aren't you putting it in? You're doing the survey; you should be representing us a little bit. You're hired to do that.

BRUCE PRENGUBER: I don't know, Paul, maybe you want to address that.

PAUL FREDERICKS: We could identify those as regional damages, regional benefits that occur to this community that will be offset someplace else. But they're considered differently. Well the material, when the congressman gets up to the support of the project, okay, they're not considered in the same way in the ...

CHARLIE OTLEY: How can you talk about the other benefits here, without considering them here, because someplace else, why they haven't had the depression that the people --- I'm talking about the people up town. We keep --- every time we pay our oil bill, why we keep a man here in Burns that's got two delivery trucks and a couple hired men, now this is the economics in this county we're talking about. We're not talking about nationwide.

BRUCE PRENGUBER: Yeah, I realize that. But you know ---

CHARLIE OTLEY: It isn't only the ranchers that I'm talking about, it's the community.

PAUL FREDERICKS: The viewpoint that we have to take is from the overall country, this standpoint. And, you know, the damages that we're assessing are that you will have to purchase replacement feed and forage. And you'll replace that, and whoever you replace it from, they get the multiplier. It offsets the multiple loss here.

MAN: Your example then is that the \$100,000 like Charlie gave you as an example there, it's lost in this community, that ... will go somewhere else, and start up the same business, and produce that \$100,000.

CHARLIE OTLEY: No, somebody else is going to have to take up the slack that way.

MAN: That \$100,000 is lost here, the people that I would of hired from the money I would have gotten from Charlie is also lost. And it's lost to this nation; it's not lost just to Harney County. That --- \$100,000, or whatever figure you want to pick, is gone. It's not going to come back to Malheur County, or anywhere else, it's gone.

PAUL FREDERICKS: That's --- we're assuming that Charlie goes out and buys a \$100,000 worth of feed, and to keep his operation in business.

MAN: Who's going to want it when you're under water.

PAUL FREDERICKS: Wherever he buys that, that goes into that community.

MAN: But it's gone, and what I --- the problem ---

SIDE B

... (Noise on tape)

DALE SMELCER: ... the only way that it's going to be made up, is the consumer is going to have to pay a higher price for a product while you're going down the road someplace. The consumer himself is going to make up the loss.

DALE WHITE: Okay, I think we've --- they've got the point, and I'm quite satisfied with that. (Laughter) But, to get to the easy part. It really gets interesting after this. (Laughter) So don't waste it all on these guys. There is some more of them that'd like to get their share of this too. So, I think we'll go ahead, there will be an overall question and answer period at the end so if we shut you off with some questions on this, you will get another opportunity before it is over. And then if we start running out of time, these

people will be glad to stay as long as necessary. (Laughter) So Dale, why don't you just go ahead and go on talking ...

DALE SMELCER: I'd just like to make one comment on that last subject. By policies, we are required to evaluate only what we call primary benefits, which is what we covered here. Now we all realize there are secondary benefits to the community. And this has been argued from day one, because they need to catch these essentials and divide them both ways. I wouldn't say they wouldn't be counted, but in our analysis, we can't use them. But your congressman can use them. And for these benefits, hopefully might be considered. But we can't, by law, consider them in our primary analysis. That's the rule, we can't consider it, even though it may be very real, and very legitimate, according to the law we can't do it. But when we come to the --- a project to congress it would have an effect. At that time it would all be different. The interest would probably come into a capability study, but we get more in detail on economics then will deal with some of these aspects.

Okay, the water quality, this study has been contracted out to the U. S. Geological Survey and the Oregon Department of Environmental Quality. And Dick Nichols and Tom Edwards --- Tom Edwards from U.S.G.S. and Dick Nichols from D.E.Q. will present the information that they have to date. This study, again, isn't complete but it is an evaluation of the sampling that took place in 1984. So Tom, would you like to ---

TOM EDWARDS: If I can --- Well since everyone that has preceded me has got the audience warmed up --- (Laughter) I feel fore-warned, so we'll try to cover it fast, and keep it to that. As you all know, for the past few years we have been at higher than normal precipitation, resulting in higher lake levels inundating probably more than --- some of the estimates I hear in the excess of 40,000 acres or something like that. Before me, Dick was called in to develop a plan, and attempt to alleviate some of the problems.

As part of this plan, the G.S., the Geological Survey initiated a water quality-sampling program, cooperatively funded by the U. S. Geological Survey, Corps of Engineers, and the Oregon Department of Environmental Quality. Initial sampling by D.E.Q. was done in June of '84, the U. S. Geological Survey made their initial sampling on the lake and on the enclosed two lakes, in September of 1984. Findings that I have tonight are preliminary findings, but I think we can gain something from them and see some comparisons from place to place.

I have several slides here that are kind of introductory. Anyone that is familiar with the area has seen the problem. These photos were taken during my initial look at the problem in July of 1984, by air reconnaissance. One of the local ranches has been inundated. ... property loss. And this is an overview of Malheur Lake as it was in July of this year, of '84, '85. A look from Malheur Lake into Harney Lake and through The Narrows. Again you can see the amount of land that has been inundated from both the original lake bottom. In a view towards Harney Lake, some --- several ranches flooded out. This is a view of The Narrows, the road that existed in July. There's a lot of tractors on it. They didn't stay long though!

Okay, our initial look at the data --- realize that this is going to be very hard for you to read in the back. I'll go quickly through it, and point out primarily the constituents that we'll talk about tonight on an introductory basis, and go from there. These are the ranges of concentration that we found in Malheur Lake, Harney and Mud Lake area. Any inflows that the geological survey samples, and where we had data from D.E.Q. from the June sampling, I included those also for the South Fork of the Malheur and Malheur River. Then I've included a sampling from Sod House Springs as maybe a comparison of the deep ground water system.

Tonight we'll look at specific conductance, the second one from the top, and

Malheur Lake that ranged from about 506 micromohs to 813. And Harney Lake and Mud Lake ranged from about 1340 to 3250. You'll see a drastic difference from the concentration from Harney Lake to Malheur Lake. The inflow ranged from about 136 to 329, that happens to be the Donner and Blitzen River. This happens to be the East Fork of the Silvies River. Then the South Fork of the Malheur, and the Malheur region, rivers, ranged from about 191 to about 730 micromohs. The Sod House Springs falling --- oh mid-range, maybe between the inflow from what we find in the latter, about 41.

We also looked at total dissolved solids, you've heard of T.D.S. Again, the same types of ranges that we ... to resist conductance in that we had a range of 354 to 433 milligrams per liter, or parts per million. And the Malheur Lake, Harney and Mud Lakes we found 841 to 1980 parts per million. So again you see the difference between Harney and Mud Lake, and Malheur Lake about water quality. And in the inflows it went from a 100 to 249, the South Fork of the Malheur, and Malheur is 159.97 and again the water in the Sod House Springs, ground water fell somewhere in between the inflows and the --- what we found in the lake.

Okay, we also look at total alkalinity and again it would be somewhat the same distribution, and go through all the numbers here. We kind of --- We look at specific conductance, total dissolved solids, total alkalinity. And we'll talk some about carbonates, bi-carbonates, and sodium silicate. Give you a generalized idea of some of the comparisons between the basics, between the different kinds of basics.

These are also values for metal samples that were taken, most of these values are reported in micrograms per liter, rather than milligrams per liter, so it is a much smaller number, a much smaller portion, even though the numbers look big. That's all ... at 100 micrograms per liter, that is about one tenth of a milli-gram. So that gives you an idea of where we're coming from ... Don't really see any particular thing that really jumps out and

shows ... the real terrible problem.

Okay, kind of our sampling scheme, and again I realize it is really hard to see once we get to the bar graphs, looks --- kind of jumps off the screen at you, you can get an idea of what we're doing. This is basically to show you where we sample, we set up a sampling grid using a ... an irrigational instrument. On a boat out here we get a nice grid. These are all prefixed by the letters ML. These are all prefixed by the letters HL, and then those in the Mud Lake, Narrows area are prefixed by ND. I mention that, because when we get to the bar graphs we'll refer back and maybe see where, or determines where these numbers fit.

The Department of Environmental Quality sampled on the Silvies River up here at Highway 78, U. S. Geological Survey sampled here on the West Fork of the Silvies, and here east of the Silvies. The D.E.Q. sampled one time on Silver Creek, and Harney Lake. The G.S. sampled on the Donner and Blitzen River and Sod House Spring here. D.E.Q. in their June sampling, sampled two sites on the South Fork of the Malheur from one near Juniper, and one at the mouth of the South Fork. And then several sites on the Malheur River, below Warm Springs. I only saw one site here that has --- the map is already cumbersome, there is several sites on down to the mouth at Ontario that flows into the Snake. I'll try to point these out when we get into the bar graphs so we can get some idea of where these things fit. We can go through it two or three times I'm sure it will strike home.

Okay, this is the specific conductance ... purely to show distribution of values of again Harney Lake. The highest values, these three particular sites, they were running from 3210 micromohs to about 3240 micromohs. They fall off down at the Mud Lake area as it goes into The Narrows, and 1340 micromohs, and getting to Malheur Lake the highest values as you would expect is 813 close to The Narrows. As you get away from

The Narrows, the values get smaller. However, as --- if you were to go around the perimeter of the lake most of the values in this area are between six and seven hundred. Most of the values in the middle of the lake here are five to six hundred. Somewhat indicating where there's --- maybe Malheur only ... whereas Harney Lake appears to be more so than that.

On the inflows we run anywhere from 136 micromohs up to 329. On the Silvies River, and Donner and Blitzen, Silver Creek has an exceptionally high concentration at 730. However, the amount of flow that comes down Silver Creek compared to say Donner and Blitzen shows that you look at lows of total dissolved solids, you see a vast difference between the two just because the magnitude of flow here is so much more than it is at Silver Creek. So this is actually more of an impact at a lower concentration than this is at a higher concentration. On the South Fork of the Malheur and the Malheur River, we see an increase from about 350 to 570 here. Probably some irrigation and return flow through that reef. On the upper site on the Malheur River we see 153, and --- which is somewhat increased there probably due to irrigation return flow.

Okay, this is the same data put on a bar graph and it really shows you where the high concentrations are relative to where the lower concentrations are in other places. Okay, these three --- these three bars right here all are in these two. This is Harney Lake, Mud Lake, and Malheur Lake ... and see again that Harney Lake is, has the highest concentration, Mud Lake slightly less, and then Malheur Lake even less. Again, as I told you, Silver Creek receives high concentrations, but if you look at that in terms of low constituents coming down the stream due to the low flow in that particular tributary. This does not have as much of an impact as this 136 as Donner and Blitzen at the higher flow.

These from left to the right, all these to the left of these lines, Harney Lake values are all values taken from tributaries coming into the lake. These values from the Malheur

Lake value on the right are all values that are downstream. The values here, the South Fork of the Malheur River at Juniper. This is the South Fork at the mouth; you see an increase between those two. You go into the Malheur River, this is the mouth of the Malheur, this is the first upper, upstream site and an annual, a steady increase ... ways. And then here you see a lot of irrigation principles to this area of the concentration that's relative.

Okay, this is the last one of these maps that we have to look at, so at least you'll be able to see everything else. Okay, this is total alkalinity, just put on the same format as we had the specific conductance. Basically show you the same type of distribution to the area. The higher values in this area, the slightly larger values in the Malheur Lake through this area, and lower values in this area. Those lower values probably reflect the influence of Donner and Blitzen and Sod House Spring coming in right here. Whereas the higher values up here probably reflect the influence of the Silvies, East and West Fork of Silvies coming in up here. The higher values here, and here, probably reflect the flow from Malheur Lake into the Harney Lake and the surging back and forth depending on the wind conditions.

Okay, again we see the same distribution of progress for total alkalinity. The highest concentration in the lakes, lower concentrations downstream, and lower concentrations actually coming into the lake, where we're getting the evaporation and concentration situation in there. Again, as I said before, large values for Silver Creek is actually less of an impact than the lower value for Donner and Blitzen, due to the difference in flow.

The carbonates, the carbonates are only found when p.h.'s are above 8.3. The geological survey did carbonates, bicarbonates. D.E.Q. samples did not provide that data. So out of the sites that the samples provided by the geological survey, only the

water in the lake with high enough p.h. value to give us our carbonate value. Again you see, just because of the very large difference in alkalinity between Harney Lake and the other lake constituents there, you see a tremendous difference between the carbonates than one might ... Bicarbonates, the other half carbonates, simply these are the --- all the sites at the sampling sites, the geological survey have values from all these particular locations on bicarbonates. You see a reversal here in what we had between Harney Lake and Mud Lake. This is kind of similar of a misnomer, tricks you could play with statistics here. This 750 only came from one sample. This 730 came from an average of about three. The high value was 760. So still Harney Lake acts as, has the higher concentration. Again see the lower concentration in the tributaries ...

MAN: On these could you give the people an idea where the danger zone is on these graphs, give an idea where the beginning and ...

DALE SMELCER: Yeah, I've got --- can I address that question when I get finished here? I've got some concentrations and stuff on a SCS publication, and another publication that will give you some idea I think, where ... concentration as far as hurting crops.

MAN: Which part of the graph in June, and which part of September, or are they combined?

DALE SMELCER: Okay, any samples that were taken from, or by the D.E.Q. are June samples. Any samples that are taken by the Geological Survey were September samples. The June samples are the Silvies River, Highway 78 --- the Silver Creek and all of the Malheur Lake and South Fork, and South Fork, Malheur River, and Malheur River samples. Any sample taken in Malheur Lake, Harney Lake, Mud Lake, Sod House Springs, or the West Fork, East Fork and Silvies, Donner and Blitzen were taken in September. I went ahead and combined these data so that you could get some kind of comparison. I realize that there is a time difference there, and we have to consider that

ultimately. But I think we can still draw some minor conclusions there and get a comparison where we have high concentrations versus where we have lower concentrations. I think at the time that D.E.Q. sampled, we were past the major point of polluting factors from somewhere else. I think that we were beginning to get into a period where things were evaporating off the concentrates. I think there is some comparisons from one time to the next.

Another thing that we have to consider here is that all the values that were taken from the tributaries ... I represent one value, taken at that site. Whereas in the lakes, we had so many sampling points that I had to take an average of what was in the lake and compare that to a single point, and consider that single point as an average. Okay, this is total dissolved solids, it simply shows you the same type of distribution that was seen on all the other constituents, and probably comes pretty close, or really close to mirroring, the distribution of ... specific types. Okay, this is sodium ... ratio, the numbers are smaller; again you see is simply the same type of distribution. The higher values in Harney Lake - -- Mud Lake and Malheur Lake trailing off a little bit. Lower values on down the stream and the tributary flows.

Okay, the first question I'll try to address is the one on the concentration. I want to see what kind of influence we've had ... I was going to get here a little bit early today and do some homework, and make sure I really had my ducks in line, and I saw fit to have a wreck on the way here, and ...

I ... specific conductance, the high alkalinity. I only have high alkalinity. See if I can make a comparison here. Okay, these alkalinity values were given in milligrams per liter. I believe these are also given ...

Okay, essentially we're already utilizing the water from most of these tributaries coming into the lakes with the exception of Sod House Springs, for irrigation at some

point. Likewise we're using water that is running down the South Fork of the Malheur, and the Malheur River irrigation is there also. At the present time we aren't taking water out of the lakes, is that right? ...

MAN: I don't think there is a person in here, including myself ...

DALE SMELCER: One of major problems in putting together a presentation was to try to get it so that I could get the point across. Apparently I haven't done that. I thought that by putting it in bar graph form here, so you can see where the big bars are, and where the little bars are, that it would be easier to get the concept of what we're looking at in comparison from one place to the next.

MAN: ... Are you going to tell us what's good and what's bad?

DALE SMELCER: Okay, well that's ---

MAN: What affect does the salinity in the lakes have to do with the salinity of the river?

BRUCE PRENGUBER: ... Then maybe we can answer some of these questions.

DALE SMELCER: Okay. That may be the best move. Dave does have a federal model that addresses some of these problems that I'm having problems with.

...

MAN: Who is this guy?

PAULINE BRAYMEN: Let's see, this must be --- yeah that must be Tom, this is Dick. Dick is going to talk.

DICK NICHOLS: ... Department of Environmental Quality out of Bend. I think one of the questions that's consistently popped up here is not only what is the water quality of the lake now, but how is that going to impact the Malheur River. And how is that going to change over time as the lake starts to drain and other factors start influencing the quality of the river. I put a little, very simple model together on the Malheur --- Malheur Lake and Malheur River to get a first track look at what are the things that influence the water

quality on the Malheur Lake and the Malheur River. And this is a very simple drawing. It is a first cut, and as time goes on and we make our iterations into the process we'll take a rather simple thing and make it more complex, and make it fit into the actual situation. Right now, it's a first cut, and the things that I'm going to show you are mostly intended to draw comparisons under different scenarios rather than give you numbers. At the end, I've got some numbers that I think are close to worst-case water quality at Vale. And I hesitate to show them on the screen for the fact that some of you may quote them. And it's kind of like I've been sitting up here thinking--- it's kind of --- if you can compare my job to fixing a wrecked vehicle, nobody wants to have the picture of his --- of his repair job taken while he's got the thing apart. And that's about where I am on this thing. Wait until I get it put back together and painted and then you can take some pictures of it.

Okay. There is a number of assumptions, and I don't really want to go into the computer program of how I put this together. And as you'll see, I have picked the worst case; hopefully get the highest numbers I could. Now I'm not getting the highest numbers I can to put the kibosh to the project. My idea was on the first iteration was to come up with the highest numbers and hope that they would be low enough that everybody would be happy. And then I wouldn't have to worry about it anymore. But as you'll see, that is not likely the case, and what that means is where I have made simplifications and assumptions, hopefully being conservative in that where I've made those simplifications the numbers will be higher or worst case than what they'll actually will be, I'm safe. But as you'll see later on here, that's not going to happen, unfortunately.

Well as you can see, one of the problems with a bottle is there is a number of different variables. I simplified this. The Silvies and the Donner and Blitzen River, Harney Lake, I didn't paint it red because it's that bad, I didn't think it was going to show up that good so I tried it and then I ran it on the screen. There's some other factors that I've made

on my model that aren't shown on it --- but what I wanted to show you was essentially what you can do if you know the quality of the water going in, and you know the water quality of the water in it, over time you can predict what's coming out. And that's essentially what my model does. And as you go through the model you find out that there are things that you need to look at a little closer.

And one of the important things to consider with the Malheur Lake is what's the influence of Harney Lake as you bring up Malheur Lake, or you lower it down. Because Malheur Lake is a lot saltier than --- Malheur Lake, and as you drain Malheur Lake water is going to flow for a while, anyway, into Malheur Lake and then out the other side. What that influence is, we don't know. But I've got some computer graphs that kind of shows the influence of that, and I've also tried to consider what effects evaporation will have. Now before everybody starts jumping on my case about evaporation, I know there isn't a whole lot of evaporation going on out there, or we probably wouldn't be meeting here. But evaporation is considered, considered in the model it's conservative. Where water evaporates off, the salt stayed. And so what I've tried to do is to get a feel for what effect evaporation has had on the lake. And to start off with, I've used total dissolved solvents. Total dissolved solvents is essentially a measurement of the salt or the salinity, and it's a good number that I can use, because it fits into my model. If I used conductivity which you probably weren't aware of, it doesn't work right, it's a measurement of the electrical capacity of the system, and you can't put that in pounds per day. So I've gone to total dissolved solids. I've got a graph that shows the relationship, if anybody's interested in that. But I think that's probably over most of your heads. (Laughter)

Total dissolved solids, let me just explain quickly what it is. You can, to get total dissolved solids you filter, in a very fine filter, the water through it, and then you evaporate off what's left. And that's the total dissolved solids. So it's that, that you dissolve in the

water. Okay. This, hopefully, this is a --- about a three year run on Malheur Lake, with no outflow, maximum inflow from the Donner and Silvies Rivers, with evaporation. Take a look, as you can see the --- this is the volume in the lake, and as you can see over time it comes up. This is the concentration that suspended solids, or total dissolved solids --- total dissolved solids. And as you can see it fluctuates with evaporation and with the flow of the Silvies. But, it goes up, starts out at 500, which is where I started out, and ends up a little over 540. So if you consider evaporation, the stuff goes up. If you ignore evaporation, it's quite a bit different. The concentrations go down. And the lake comes up a heck of a lot faster too. The conclusion from that is, and I believe that's the total from ... You can see that with evaporation it's ... without evaporation it's gone down. That's no big deal. Somewhere in between here is what's actually occurred. And that's when we take our next iteration on the model and that's what we've got to decide is where we're going to go on this.

Okay, the next case I ran is also with dissolved solids, total dissolved solids, to try and get an idea of what the effect of Harney Lake on Malheur Lake is. This --- one of the problems at this time, not having all the data, we don't know how much of Harney Lake is going to flow into Malheur Lake. In this particular case, I set it up to where I was flowing a thousand cfs on the Malheur Lake, down to Malheur River. And 500 cfs from Harney Lake into Malheur Lake. And as you can see, the total dissolved solids comprises really fast, and it really doesn't drop very much at all. The other case if you compare that is with a 100 cfs coming in from, from Harney Lake. And as you can see, the quality of the water stays about the same. It fluctuates almost on the side, on a sight occurred and that's because of the evaporation and the pollution effect of the Silvies from the Donner. And I have one more graph that will compare those two. This is with 500 cfs comes in from Harney Lake and with 100 cfs. So obviously the quality of Malheur Lake is going to

depend a whole lot on what comes in from Harney Lake. And at this point, we don't have the data to show how that flow is going to vary. And that's something that the next generation is going to have to work on, in trying to come up with that. And as I understand the U.S.G.S., Corps is working on that.

Now, for the numbers you have probably all been waiting for, and I hesitate to show you. Not that they're so bad understand, it's just that it's a rough draft. Let me explain a little bit how I monitored the Malheur River. It's the same as if I had a big trough, the Malheur River, and I know the quality of that water. And I take a 1,000 cfs out of the Malheur River, and I know the quality of that water, and I combine them. And then I've measured down below where they're completely mixed, so I've just added those two flows together and mixed them up and sampled it again in my computer model. And that's what these numbers will show you. The data that I took for the river was at Vale. I don't have very good flow data on the Malheur River, and so I took the flow at Little Valley. We need to have better data on the Malheur River, particularly as it goes to flow, and well ---

I was interested in the total dissolved solids, and I can calculate kind of --- taken from that, and use the relationship. I was also interested in Boron, and sodium absorption rates --- ratio. So I ran my Malheur Lake models, the worst case, and came up with this as the worst parameters I could get coming out of the lake, was a 100 cfs coming out of Harney Lake. This is the background data at Vale. If this is flowing out at a 1,000 cfs, and this is the mean flow of Little Valley for each month, starting with January, February, March, on down through December. In each month I'm combining a 1,000 cfs of this stuff with a 168 cfs of this stuff, and this is what I'm getting.

Okay. Now I don't know if you can see it, the numbers that are of significance here, in my mind anyway, is to see if someplace else has got some other parameters that compare, I'd be interested in knowing that. Boron, conductivity, and sodium absorption

rate, this is the mean flow of operation. Mean --- loosely the average flow. Boron about 1.2, conductivity somewhere between 1,100 and 1,200, and sodium absorption ratio, less than 8. The problem with compressor ... at Oregon State University, we thought that the sodium absorption ratio was okay. Eight and below is not bad. Conductivity was awfully high, he thought, but not that bad. He was a little concerned about Boron. Boron tends to be an accumulator in the soil, and over time will build up. It's hard to leach it out, so he had some concerns about that. Now this is the worst case. If that ... fall --- I want to show you at maximum flow, at Little Valley, if you could pick up some more pollution in the Malheur River, then the numbers could not ... and you can see instead of allowing seven for sodium absorption ratio, except in the low time of the year --- September, October, November, December. Most of the numbers are quite a bit lower than what they are in the laboratory. And Boron, it's somewhat lower too. I think the thing to take from this graph or this --- people with data, and the other people with data is the quality of the water in the Malheur River, unless there is a lot of pollution in the Malheur River, is going to be just a little bit better than what is coming out of Malheur Lake. The Malheur Lake is not all that bad right now. What we need to know is how is that going to vary over time. And we need to have a better idea of what is coming, what flow is going to be coming out of Harney Lake and into Malheur Lake, and what the effect of that's going to be. Sir?

BUCK TAYLOR: You're working on a 1,000 cfs outlet of Malheur Lake. If that was larger, would those numbers decrease?

DICK NICHOLS: If it was more it would be --- these numbers would go up. The water in Malheur Lake is worse than the water in Malheur River. Okay.

BUCK MILLER: The evaporation then wouldn't make it ... first on evaporation, so that if the water flows out, you would have less water to evaporate.

DICK NICHOLS: True. The water will stay better in Malheur Lake, if we drain some of it

down the Malheur River. Yeah, there is no question about that. Sir?

MAN: Do I understand correctly that these would be based on the outflow of Harney Lake and Malheur Lake going 100 cfs? ...

DICK NICHOLS: Right. A 100 cfs out of Harney Lake, mean flows in the Silvies and the Donner and Blitzen and net evaporation. So under these circumstances ---

MAN: That's not a worst case scenario is it?

DICK NICHOLS: Well, you know, absolutely, positively worse. It's so bad --- I mean it --- I don't think it is realistic, I really don't. But I think we'll probably look at it and see what it does. What we really need to do before we start saying too much about it is getting a good feel for what the relationship, hydrology between Harney Lake and Malheur Lake is. I hate to jump to too many conclusions about this. Anything else? Yeah.

MAN: Does this have any effect on these particles in the water?

DICK NICHOLS: What have any?

MAN: Does this ...

DICK NICHOLS: No. You mean there is going to be some treatment as it goes down the river, not with salts. If you had something more that would precipitate out, fall out, or whether there would be biological treatment or photosynthesis or something like that, you'd have it. But calcium, magnesium, sodium, that's about as basic as you can get unless you had something down there heating it, which there isn't. ... Yeah.

MAN: Do you have any data on the mid ...

DICK NICHOLS: You mean by pollution?

MAN: By ...

DICK NICHOLS. We have data on all the flows going on the main stem. And we have pretty good flow data below each of the reservoirs.

MAN: ...

DICK NICHOLS: No, we don't have ...

MAN: ... say Highway 20.

DICK NICHOLS: No. We sampled it where the middle fork goes in. Yeah.

VAN DECKER: I'd like to go back to the model the ... is working on.

DICK NICHOLS: ... Okay.

VAN DECKER: Right now we're watching all the ... and all the other data is all part of the mix going into this ... It doesn't really mean anything to this group of people. I think about it, who in the presentation of the comparisons of the, of the predictable water quality in the river, if this were to drain out, it's really the only thing that is of significance at this point. The amount of water going from Malheur Lake to Harney Lake is significant, because that's where most of Harney Lakes water comes from. Water coming out of Silver Creek is so insignificant, already established, but it means nothing, and I think the place for insignificant things is to put them in the background and come up with the significant things. Now what we need to know, since what we're getting to in those, in the long run what is going to happen downstream if this water is used for irrigation. And let's have a comparative analysis of what that water is expected to be, and compare it with Columbia River water, Colorado River water, or somewhere else ... This data must be comparable from G.S. ... and this would mean something to these people here. And I think it would take a very short time, and essentially, and it would probably solve the problem. ... analysis, all the rest of this thing really doesn't have a lot of relevance.

DICK NICHOLS: Well I don't know how you can go about predicting what the concentrations in Malheur Lake are going to be unless you put together some sort of model. Because the quality is going to change as you draw water out, and as you put water into it, and as the water evaporates.

VAN DECKER: Well that's where --- you're a professional though, you work with these

figures and then you come up and tell us this is what we expect it to do if it drops three feet, if it's going to be thus and so.

DICK NICHOLS: Okay.

VAN DECKER: Aside from that you don't ---

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