ORAL HISTORY INTERVIEWS

MAX E. VAN DEN BERG

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STATUS OF INTERVIEWS:
OPEN FOR RESEARCH

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Interviews Conducted, Edited, and Desktop Published by:
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Senior Historian
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Brief Chronology of Max E. Van Den Berg

October 18, 1936–Born in central South Dakota
Attended a one room, eight grade school
Attended St. Marks High School on highway 14 about seventy miles east of Pierre, South Dakota

1954–Worked for a small construction company in Miller, South Dakota, running earthmoving equipment to build stock dams and roads, drain wetlands, and level agricultural land for Bureau of Reclamation irrigation feasibility studies on the projected Oahe Project.

Winter 1957-1958–Worked in the Homestake Mine in Lead, South Dakota, during the winter off-season when you couldn't move dirt.

1959–Entered the U.S. Army and spent a year in Korea.

c. 1961–Entered the civil engineering program at South Dakota State University for two quarters.

C. 1962–returned to earth moving in Miller, South Dakota

c. 1963–Returned to college

Spring 1967–Graduated from South Dakota State University with his master's degree in civil engineering, having applied to the Bureau of Reclamation and the U.S. Army Corps of Engineers, and private construction companies because he wanted to work in water resources development

July 17, 1967–Started work for the Bureau of Reclamation in Boise, Idaho, doing design flood studies in the Planning Division.

January 1973–Moved out of planning hydrology into the River and Reservoir Operation Section

June 1976–Was acting chief of the River and Reservoir Operation Section when Teton Dam failed

Fall 1976/spring 1977–Moved to the regional Operation and Maintenance Group where he inspected facilities from the points of view of operation, maintenance, and an accelerated safety of dams program

1977–Went on the region's dive team.

1978–Chief of the Safety of Dams Branch

1985–Selected to be Project Superintendent for the Minidoka Project in Burley, Idaho.

1990–Became Regional Supervisor of Water, Power, and Lands in Boise.

1993–Became program manager with a staff of two or three

1994–Headed the resources ***and*** technical service functions wrapped into one office with 238 people .

STATEMENT OF DONATION OF ORAL HISTORY INTERVIEWS OF MAX VAN DEN BERG

1. In accordance with the provisions of Chapter 21 of Title 44, United States Code, and subject to the terms, conditions, and restrictions set forth in this instrument, I, Max Van Den Berg, (hereinafter referred to as "the Donor"), of Boise, Idaho, do hereby give, donate, and convey to the National Archives and Records Administration (hereinafter referred to as "the National Archives), acting for and on behalf of the United States of America, all of my rights and title to, and interest in the information and responses (hereinafter referred to as "the Donated Materials") provided during the interviews conducted on December 5 and December 7, 1994, on March 20, and July 25, 1995, at the Pacific Northwest Regional Office of the Bureau of Reclamation, and prepared for deposit with the National Archives and Records Administration in the following format: cassette tapes and transcripts. This donation includes, but is not limited to, all copyright interests I now possess in the Donated Materials.

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Date: 7-25-95 Signed: Max E. VanDen Berg
Max Van Den Berg

INTERVIEWER:_____
Brit Allan Storey

Having determined that the materials donated above by Max Van Den Berg are appropriate for preservation as evidence of the United States Government's organization, functions, policies, decisions, procedures, and transactions, and considering it to be in the public interest to accept these materials for deposit with the National Archives and Records Administration, I accept this gift on behalf of the United States of America, subject to the terms, conditions, and restrictions set forth in the above instrument.

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Archivist of the United States

Introduction

In 1988, Reclamation began to create a history program. While headquartered in Denver, the history program was developed as a bureau-wide program.

One component of Reclamation's history program is its oral history activity. The primary objectives of Reclamation's oral history activities are: preservation of historical data not normally available through Reclamation records (supplementing already available data on the whole range of Reclamation's history); making the preserved data available to researchers inside and outside Reclamation.

The senior historian of the Bureau of Reclamation developed and directs the oral history program. Questions, comments, and suggestions may be addressed to the senior historian.

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For additional information about Reclamation's history program see:
www.usbr.gov/history

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Oral History Interviews
Max E. Van Den Berg

Storey: This is Brit Allan Storey, Senior Historian of the Bureau of Reclamation, interviewing Max Van Den Berg of the Pacific Northwest Regional Office of the Bureau of Reclamation in Boise, Idaho, in the Boise office on December the 5th, 1994, at about eleven o'clock in the morning. This is tape one.

Mr. Van Den Berg, could you tell me where you were born and raised and educated and how you ended up at the Bureau of Reclamation, please, or associated with the Bureau of Reclamation?

Born and Raised in Central South Dakota

Van Den Berg: I was born and raised in central South Dakota, born and raised on a dry land combination grain farm/cattle ranch. I attended a typical rural one-room country school. I believe the most students we ***ever*** had in that school during the time I went there was like eight. They were in all eight grades.

From that one-room country school, I went to a very small high school. The most students we ever had in all four high school grades was forty-three. We didn't have enough pupils, or students, to field a football team, so we limited ourselves to basketball and those kinds of activities.

When I graduated from high school . . .

Storey: What high school?

Van Den Berg: This was St. Mark's High School, which is about seventy miles east of Pierre right on Highway 14. It doesn't exist anymore. It was closed in 1962 or '63 with one of these consolidation efforts where many of the small high schools were consolidated into the larger ones, and all those students now go to Miller, South Dakota, which is a little larger town right there close.

Soon after Graduating High School Went to Work as a Heavy Equipment Operator out of Miller, South Dakota, Moving Dirt and Generally Building Small Livestock Dams

But almost immediately after graduating from high school, I went to work for a dirt-moving contractor, Roger Heinz [phonetic] Construction out of Miller, South Dakota. At that time he had one machine. He had a large

caterpillar and a scraper, and he was in the business of moving dirt, and I run that machinery. For about the next five years, I built stock dams, small stock dams for livestock water out in that prairie country of Central South Dakota.

Storey: What would have been the dates?

Van Den Berg: 1954 to 1959. That was the first shot. During that same time not only did we build a lot of stock dams–now, these weren't big dams. These were three, four thousand cubic yards of dirt. The largest one I ever built was probably in the neighborhood of fifteen thousand cubic yards. The highest one was probably no more than thirty feet.

Sometimes we were asked to come and build dams out in a rancher's pasture with no designs, nobody staked it. He just hired us to come out there, and we essentially took a look at the site, and [you] kind of created the design in your mind and you started building, and you built a dam.

"It was interesting, particularly in an area where you didn't have much water, and we were creating not only stock water but these also turned out to be, in the end, wildlife habitat . . ."

". . . the Soil Conservation Service and the A-S-C-S . . . were providing subsidies to farmers to drain wetland so that they could farm through them. So . . . I was building dams and creating stock ponds . . . a subsidized program–we were also draining wetlands under another government-subsidized program. . . ."

It was interesting, particularly in an area where you didn't have much water, and we were creating not only stock water but these also turned out to be, in the end, wildlife habitat, as more and more of these small stock ponds were created, you had more ducks and wildlife, muskrat, mink, and those kinds of things develop out there in that dry range land country, at the same time working under another government program to drain wetlands. You probably shouldn't put this on tape, but the Soil Conservation Service and the A-S-C-S[1]

1. A note on editorial conventions. In the text of these interviews, information in parentheses, ( ), is actually on the tape. Information in brackets, [ ], has been added to the tape either by the editor to clarify meaning or at the request of the interviewee in order to correct, enlarge, or clarify the interview as it was originally spoken. Words have sometimes been struck out by editor or interviewee in order to clarify meaning or eliminate repetition. In the case of strikeouts, that material has been printed at 50% density to aid in reading the interviews but assuring that the struckout material is readable.

The transcriber and editor also have removed some extraneous words such as false starts and repetitions without indicating their removal. The meaning of the interview has not been changed by this editing.

(continued...)

office at that time, they were providing subsidies to farmers to drain wetland so that they could farm through them. So during this same five-year period when I was building dams and creating stock ponds and wetlands–and that was under a government program also, a subsidized program–we were also draining wetlands under another government-subsidized program.

". . . it's probably safe to say maybe I built somewhere around a hundred and fifty of these small stock dams. I guess I doubt that there's anyone that is in the Bureau of Reclamation that has built more dams from start to finish than I have . . ."

During that period of time, I've tried to estimate, in my own mind, a time or two how many of those stock dams that I actually built, essentially by myself, because we had one machine. I ran the machine, I did it all. There's probably a minimum of twenty a year, which would have been at least a hundred, and probably no more than about thirty and maybe thirty-five in some years, because, typically, I could build two a week, but you only had about seven months during the year when you could actually move dirt because of the frost. So it's probably safe to say maybe I built somewhere around a hundred and fifty of these small stock dams. I guess I doubt that there's anyone that is in the Bureau of Reclamation that has built more dams from start to finish than I have, and, you know, I don't want that to sound like it's a brag or a boast; it's just a fact.

Spent 1959-1961 in the Military, including Time in Korea

Well, at the end of those five years, I was invited by Uncle Sam to join the military, which I did. I spent a couple of years in the military, a year in Korea.

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1. (...continued)

While we attempt to conform to most standard academic rules of usage (see *The Chicago Manual of Style*), we do not conform to those standards for individual's titles which then would only be capitalized in the text when they are specifically used as a title connected to a name, e.g., "Secretary of the Interior Gale Norton" as opposed to "Gale Norton, the secretary of the interior;" or "Commissioner John Keys" as opposed to "the commissioner, who was John Keys at the time." The convention in the Federal government is to capitalize titles always. Likewise formal titles of acts and offices are capitalized but abbreviated usages are not, e.g., Division of Planning as opposed to "planning;" the Reclamation Projects Authorization and Adjustment Act of 1992, as opposed to "the 1992 act."

The convention with acronyms is that if they are pronounced as a word then they are treated as if they are a word. If they are spelled out by the speaker then they have a hyphen between each letter. An example is the Agency for International Development's acronym: said as a word, it appears as AID but spelled out it appears as A-I-D; another example is the acronym for State Historic Preservation Officer: SHPO when said as a word, but S-H-P-O when spelled out.

While in the Military Decided He Might Want to Go to College and Study Civil Engineering

It was during that time that I finally started thinking seriously about going to college.

". . . past experiences with the building of dams and building of drainage ditches to drain some of these sloughs and also the leveling of some irrigation land under a Bureau of Reclamation pilot program in central South Dakota kind of led me into the engineering field . . ."

My past experiences with the building of dams and building of drainage ditches to drain some of these sloughs and also the leveling of some irrigation land under a Bureau of Reclamation pilot program in central South Dakota kind of led me into the engineering field where I said–you know, I enjoyed doing that, I'd like to work on it from the other end, from the engineering standpoint.

Worked on Land Leveling for Testing the Feasibility of Irrigation on Plots on the Future Oahe Project

I probably should share with you at this time that during that same five-year period from '54 to '59, there were two or three years in there when we actually leveled some land for some pilot irrigation projects in what would have been the Oahe Project there in central South Dakota. It would have been north of the Huron Wolfie [phonetic] area in South Dakota.

". . . there was an area there that had some pretty decent groundwater supplies, and if the farmer would drill . . . irrigation production well, the Bureau of Reclamation would work with them to level the land and work on this pilot irrigation. . . ."

The Bureau of Reclamation at that time had an office in Huron, and they were doing all the planning studies for this supposedly upcoming Oahe Project, but they wanted to also ***test*** the ***feasibility*** of irrigation in that country, and there was an area there that had some pretty decent groundwater supplies, and if the farmer would drill a production well, irrigation production well, the Bureau of Reclamation would work with them to level the land and work on this pilot irrigation.

Worked with Ray Dekramer from Reclamation

That was where I had my first contact with the Bureau of Reclamation, out there ***leveling*** that land, working with Bureau engineers. A fellow by the name of Ray Dekramer, who was a design engineer, operation and maintenance type, out of that Huron office, who is now retired, he and I worked quite a lot together. I ran the machine, and he was the Bureau engineer, doing the design, and doing the quality control, and those sorts of things.

Dirt Moving Experience with Dams, Work with Reclamation, and an Older Brother Who Took Civil Engineering at South Dakota State University Led Him into the Civil Engineering Curriculum

I suppose over those two or three years, maybe, I leveled somewhere in the neighborhood of 160 acres for flood irrigation. You not only leveled the land, but you built the dikes for the ditches and all those sorts of things. So ***that experience*** with building of the dams, the digging of the drainage ditches, the leveling of the irrigation land, my association with the Bureau of Reclamation, pretty much led me to the civil engineering curriculum when I went to college, that along with the fact that my older brother had also gone through the Civil Engineering Department ***at*** South Dakota State University.

First Two Quarters in School Were Tough and Then He Laid out for a Period of Time

Anyway, when I got back from Korea, I immediately started college and went for a couple of quarters at that time. They didn't have semesters, but I went for a couple of quarters, and then for some personal reasons had to stay out for about a year, went back to moving dirt, moving snow. I'd been out of high school like seven years before I started college, and those first two quarters were ***really*** tough. I was doing good to maintain a C average.

". . . one winter, about a year later, when I was out bulldozing snow at midnight, when it was about fifteen degrees below zero, I thought, 'There's *got* to be a better way to make a living than this.' And so that's when I crawled off the cat and went back and finished college . . ."

So I had some questions of whether I was going to continue this or not, but one winter, about a year later, when I was out bulldozing snow at midnight, when it was about fifteen degrees below zero, I thought, "There's ***got*** to be a better way to make a living than this."

Spent an Additional Four Years at South Dakota State University Getting His

Bachelor's and Master's Degrees in Civil Engineering

And so that's when I crawled off the cat and went back and finished college that time, spent the next–well, it was about an additional four years getting both a bachelor's degree in civil engineering, and I continued right on there at South Dakota State and got a master's degree in civil engineering.

Wanted to Work for the Bureau of Reclamation or the U.`. Army Corps of Engineers Though He Did Apply to Various Companies Also

When I graduated, I wanted very badly to work with agencies in water resource development, dams, large dams, not these little dams, but large dams, so I put in my application for both the Bureau of Reclamation and the Corps of Engineers. I also had an opportunity to go to work for Peter Kiewit and Company and the L. Johnson Construction.

". . . I'd worked for the contractors enough that I did *not* want the lifestyle of running from one place to another, never having any place to really call your place of residence . . ."

Both were in the dam building business, and they were interested in my past of actually physically having been out there ***building*** these sorts of things on a smaller scale associated with the engineering degree, but I'd worked for the contractors enough that I did ***not*** want the lifestyle of running from one place to another, never having any place to really call your place of residence, because, you know, contractors, that's the way that job is. You finish one job and you go to another.

Started Work for Reclamation July 17, 1967, in Boise

So I elected, instead, when I was offered a job with the Bureau of Reclamation, to accept that. So I came right from college in South Dakota to Boise, Idaho, where I am today. That was July 17th of 1967.

"I had kind of geared myself *not* for the structural design of dams, but for the water resources end of it. So I was geared more toward hydrology and hydraulics. . . ."

My first job with the Bureau was a little bit different than I had anticipated. I had kind of geared myself ***not*** for the structural design of dams, but for the water resources end of it. So I was geared more toward hydrology

and hydraulics.

". . . I wound up in our Planning Division here in Boise essentially . . . cranking out design flood studies, which are used to size spillways when you build a dam. . . ."

In fact, my master's degree, my thesis, was done on a hydrology study, and so I wound up in our Planning Division here in Boise essentially doing design flood studies and cranking out design flood studies, which are used to size spillways when you build a dam.

"From 1967 until 1973 I worked in that planning group preparing design flood studies, forecasting runoff . . . The *only* inflow design flood that I prepared that the Bureau ever *used* to build *anything* with was the . . . design flood study for Teton Dam before it was built . . ."

Well, we had a lot of planning going on at that time. From 1967 until 1973 I worked in that planning group preparing design flood studies, forecasting runoff for the yearly operations, those sorts of things. The ***only*** inflow design flood that I prepared that the Bureau ever ***used*** to build ***anything*** with was the infamous Teton Dam. I did the design flood study for Teton Dam before it was built, and that flood study was what they used to size the spillway. Of course we all know the history of Teton and what had happened.

January 1973 Moved to River and Reservoir Operations

So anyway, in January 1973, I had an opportunity to move out of the planning hydrology function into the real live river and reservoir operations. I worked with a fellow by the name of Dick Lindgren [phonetic], who was the Regional River and Reservoir Operations Chief. There were two of us that essentially run that program. A couple of years later we got another hire, so there were three of us. Dick Lindgren retired in March of 1976.

"I was acting as the Chief of that River and Reservoir Operation Section in an acting capacity the day that Teton Dam failed . . ."

I was acting as the Chief of that River and Reservoir Operation Section in an acting capacity the day that Teton Dam failed, which is a real scary thing when you think about hydrology.

". . . I had been in contact with our Burley office because it was spring and we were doing flood control operations every day, Saturday and Sunday, and I'd been in contact with them on the phone. We had decided what our operations were going to be for that day and for the rest of the weekend. And at 8:30 that morning, there was no indication that there was anything wrong, or at least our office in Burley, Idaho, hadn't heard anything from the Teton construction office yet . . ."

It was kind of an unusual thing because–I don't know how much detail I want to go into here, but at 8:30 that morning, as the Regional River and Reservoir Operations Chief, I had been in contact with our Burley office because it was spring and we were doing flood control operations every day, Saturday and Sunday, and I'd been in contact with them on the phone. We had decided what our operations were going to be for that day and for the rest of the weekend. And at 8:30 that morning, there was no indication that there was anything wrong, or at least our office in Burley, Idaho, hadn't heard anything from the Teton construction office yet, that there was a problem.

". . . I got a call from . . . Leo Bush. He was over in Burley at that particular time and was in the River and Reservoir Operations Section for the project office telling me that Teton had failed. Of course, I wouldn't believe him because I'd talked to him at 8:30 that morning and there wasn't any indication that there was anything wrong . . ."

Well, I was outside–I live out in the country, and I was outside the rest of the morning doing something outside, and there was no one around, and I wasn't listening to the radio or the TV. I came in about 12:30, and the phone was ringing, and I got a call from this fellow, Mr. Leo Bush. He was over in Burley at that particular time and was in the River and Reservoir Operations Section for the project office telling me that Teton had failed. Of course, I wouldn't believe him because I'd talked to him at 8:30 that morning and there wasn't any indication that there was anything wrong, and certainly, after a few minutes, when Leo told me to turn the TV on or turn the radio on or something, then I started getting the flavor that, yeah, something has happened. Having done a lot of flood routings, you start calculating in your mind what kinds of things you might be looking at downstream.

"Channel capacity below Teton was about 4,000 to 4,500 [cfs] without doing serious flooding, and, of course, with a dam failure, you know *immediately* you're in serious trouble . . ."

Well, I ***knew*** from our discussion that morning that there was 251,000 acre feet of water in Teton Reservoir, and just a quick calculation told me that if that water all came out of that reservoir in a twenty-four-hour period, that we'd be looking at 125,000 cubic feet per second of flow. Channel capacity below Teton was about 4,000 to 4,500 without doing serious flooding, and, of course, with a dam failure, you know ***immediately*** you're in serious trouble, if you know anything about water flow at all.

But anyway, at a twenty-four-hour rate, it'd be 125,000 cubic feet per second. If you backed that up to twelve hours and say all that water comes out of there in twelve hours, that's 250,000 cubic feet per second, and if you say six hours, then it's 500,000 cubic feet per second. Well, that ***really*** starts getting your attention. Of course, Leo Bush had already told me that the public had been notified, that there were helicopters going up and down the river, that the evacuation was taking place.

So my job really was to get to the office, get into the Regional River Reservoir and Operations Control Center and start doing whatever we could to project ***when*** these flows would reach where and how broad of an area that they would cover when they got there. It's fair to say that we didn't have any experience in dealing with those kinds of flows.

That was probably about one o'clock by the time I got into the office. By two o'clock there were a number of individuals in the office, engineers, people working, public relations people. The Regional Director was out of town, but we had quad sheets laying all over the floor showing the river and the flood channels for that particular area and, you know, trying to make some guesses.

". . . I do recall that the news media really tried to create some stories that didn't exist, had people from all over the United States calling in . . . It was almost like they were making up stories sometimes, and you just have to tell them, '. . . There's no problem with it.' But you just continually were bombarded with these things. . . ."

I don't recall at this time how accurate we were, but I do recall that the news media really tried to create some stories that didn't exist, had people from all over the United States calling in, "Well, we understand that Anderson Ranch is going to fail, is failing too." It was almost like they were making up stories sometimes, and you just have to tell them, "No, Anderson Ranch is not even in the same area. It's safe. There's no problem with it." But you just continually

were bombarded with these things.

"I recall vividly a discussion with a reporter from New York . . .[who] kept trying to make a story that American Falls Reservoir, which is on the Snake . . . in the path of the Teton flood, was in trouble and that when the waters hit, American Falls was going to overtop and it was going to fail and then there would be a domino effect all the way downstream. . . . there were some safety problems with American Falls, and as a result . . . we had an empty spot in that reservoir of 500,000 acre feet that was twice as large as the capacity of Teton . . . we were going to *stop* the Teton flood at American Falls, that would be the end of it. . . ."

I recall vividly a discussion with a reporter from New York that I was on the phone with that kept trying to make a story that American Falls Reservoir, which is on the Snake, which is in the path of the Teton flood, was in trouble and that when the waters hit, American Falls was going to overtop and it was going to fail and then there would be a domino effect all the way downstream.

Well, at the time that Teton failed, there were some safety problems with American Falls, and as a result of that, we had a 500,000 acre foot restriction on American Falls. So we had an empty spot in that reservoir of 500,000 acre feet that was twice as large as the capacity of Teton, which was 250,000 acre feet, and it didn't seem to matter how you tried to explain it to this reporter that American Falls was not in jeopardy, that this water would come into American Falls in a large flow but not anything like a tidal wave like he was trying to create, that the dam would not over top, and that we weren't worried at all about American Falls and that the Teton flood was going to ***stop***, that we were going to ***stop*** the Teton flood at American Falls, that would be the end of it.

Well, he kept coming back to the point of the overtopping issue, that when that water hit that reservoir, American Falls was going to overtop. Finally, in an effort to try to get him to understand, I said to him, I said, "Well, now, just assume that you've got a two-gallon can in one hand that's totally empty and a one-gallon can in the other hand that's totally full and you pour that one-gallon can in that two-gallon can. Does it make any difference how fast you pour it in there as to whether or not that two-gallon can is going to run over?"

And he said, "No."

And I said, "Well, that's exactly the situation you've got with American

Falls. It doesn't make any difference how fast we put that Teton water in American Falls, it is ***not*** going to overfill and overtop the dam."

"Oh, now I understand it."

But it took a lot of explaining and bringing it right down to a very simple level before he could understand that that water was not going to overtop American Falls. That was just one of the interesting phone calls that we had to deal with from the public standpoint.

"It was a pretty black day, you know, for the Bureau of Reclamation. *If* there's a fortunate part about the failure of Teton, it's that it happened at 11:30 in the morning and not at 11:30 at night, as quick as it failed. . . . If that would have happened in the dead of the night, there would have been many, many times the lives lost that there were lost. . . ."

It was a pretty black day, you know, for the Bureau of Reclamation. ***If*** there's a fortunate part about the failure of Teton, it's that it happened at 11:30 in the morning and not at 11:30 at night, as quick as it failed. You start, I think, at 9:30, or something like that, in the morning with some pretty severe leakage, and by 11:30 it had a total blowout. If that would have happened in the dead of the night, there would have been many, many times the lives lost that there were lost. So in some ways, if there's anything fortunate about Teton at all, it's the fact that it did fail during the day and not during the night.

". . . I understand, from the reports that it was essentially a design failure, had nothing to do with the rate of fill . . ."

There was a ***lot*** of activity after Teton, I think, that probably a lot of people have shared with the historians on the conclusion, I understand, from the reports that it was essentially a design failure, had nothing to do with the rate of fill, although that was a problem. It was a problem from an operating standpoint in that the initial designs said we were supposed to control the rate of fill to one foot per day, and I, as the Acting Chief of the River Reservoir Operation Section, in cooperation with forecasting runoff, had to provide input to Denver on whether or not we could control that fill to one foot per day.

The Rate of Fill Could Not Be Controlled to Design Specifications Because the Outlet Works Were Not Completed from a Construction Point of View and Denver Instructed That the Auxiliary Outlet Works Be Run Wide Open and the Reservoir Be Allowed to Rise and Spill

We had a ***big*** water year that year. The runoff on the Teton Basin was forecast about 145 percent of normal, and we ***knew*** that without all of the outlet works ready and available to use, that we couldn't control the rate of fill. You see, at that particular time, the construction was not totally complete on the outlet works. There was still some finish work to do, some finishing of the inside of the tunnels with coal tar epoxy, those kinds of things. We did have an auxiliary outlet that was being run wide open.

I worked with Denver, a fellow by the name of Ed[win] Rossillon, every day on the operation of Teton, and as the spring and the runoff grew, we continued to tell Denver that with a 145 percent forecasted runoff and the unavailability of the main outlet works, that we couldn't control that rate of fill to the one foot per day. Well, Denver relaxed it to two feet per day, and later on, essentially, after they had been also provided with the input that, "Hey, we can't even control it to two feet per day with that auxiliary outlet," they essentially relaxed it totally and said, "Well, the way we want you to operate Teton is to run the auxiliary outlet works as hard as you can run them, and let the reservoir fill up and spill over the spillway." Well, as we all know, the reservoir never quite got to the crest of the spillway the day that it failed.

". . . these dams, when they're under construction, they were totally under. . . the control of Denver Office . . . When Denver gave me the directive as to the way they wanted the reservoir operated, run the . . . auxiliary outlet works as hard as we could, let the reservoir fill up and spill over the spillway, *not* ask for use of the main outlets . . . I said, 'If you want us to operate in that fashion, would you please write me a memorandum directing us to do so.' That memorandum was mailed out of Denver on June the 5th. The dam failed on June 6th . . ."

It probably doesn't mean a whole lot, but when Denver gave me the directive–see, these dams, when they're under construction, they were totally under–essentially under the control of Denver Office during that period of time. When Denver gave me the directive as to the way they wanted the reservoir operated, run the auxiliary spillway or the auxiliary outlet works as hard as we could, let the reservoir fill up and spill over the spillway, ***not*** ask for use of the main outlets because they weren't quite finished from a construction standpoint yet.

I asked Denver at that time, I said, "If you want us to operate in that fashion, would you please write me a memorandum directing us to do so." That memorandum was mailed out of Denver on June the 5th. The dam failed on

June 6th, if I remember the dates right.

". . . the conclusion was that the dam was going to fail when it got to a certain elevation anyway because of the way it was designed. The review panel said that the rate of fill had nothing to do with the failure. . . ."

Not that it made any difference, because the conclusion was that the dam was going to fail when it got to a certain elevation anyway because of the way it was designed. The review panel said that the rate of fill had nothing to do with the failure.

But that's just an interesting part of my background, as far as working for the Bureau, of that negotiation there with the people involved, of the operation of Teton just before it failed. And it's one of those experiences, I guess if it had to happen, maybe you're glad you were around to be part of it, but it's one of those things you wish you'd never have to deal with because they're tragic. You know, they destroy a lot of things, not just loss of lives, but also a lot history, a lot of family values, like family heirlooms and those kinds of things that just get washed down the river that are irreplaceable. I believe it is safe to say the Federal Government paid out something like $365 million in claims as a result of Teton.

Storey: What was the design failure, do you know?

Van Den Berg: It was the way that the embankment itself was designed. I don't profess to be an expert on this. We had some of the best experts in the world.

END SIDE 1, TAPE 1. DECEMBER 5, 1994.
BEGIN SIDE 2, TAPE 1. DECEMBER 5, 1994.

Storey: You were talking about the design problem that failed and the fact that it was an embankment problem, a design problem.

Van Den Berg: Yeah. As I understand it, in reviewing the report, the embankment was not designed satisfactory for that particular site. It didn't have the appropriate filter zones in the embankment. Now, filter zones essentially are zones of different gradation of materials, where you have one zone that more or less protects another zone. If you have very fine-grain material, you'll have a filter maybe on one side of it that will let the water go through, but it won't let the material go through.

The problem with Teton, that's when the water started going through it, it starting taking material with it, and there were none of these filter zones to stop that movement of the material. So once that starts, why, then it just eats them out and they go. It's my understanding that that's the conclusion that the review panel reached, that it was a design problem, that the structure was designed inadequately for that particular location.

There's probably a lot more a person could say about the Teton episode, but as far as my own experience, that's been one of the big experiences in working for the Bureau, is being so closely involved in and with Teton.

Moved into the Operation and Maintenance Group in the Region Doing O&M Inspections and Safety of Dam Inspections

Not too long after Teton failed, it was either that fall or the fall of '76 or spring of '77, I moved out of the River and Reservoir Operations Section and went into the Operation and ***Maintenance*** Group of the regional office, and ***there*** my responsibility was to inspect and evaluate these major structures, the dams and the reservoirs and some of the distribution systems from an operation and maintenance standpoint and also from a safety standpoint.

"The Bureau, even back in the sixties, had some sort of a safety-of-dams program, but it was geared pretty much to the adequacy of spillways to pass the large floods. . . ."

The Bureau, even back in the sixties, had some sort of a safety-of-dams program, but it was geared pretty much to the adequacy of spillways to pass the large floods.

Joined the Pacific Northwest Region's Dive Team

My tour of duty there was the operation and maintenance group, inspecting these dams, led to inspecting almost every dam in the Pacific Northwest Region at some time or another, and part of that, I eventually joined our underwater inspection team, became a certified scuba diver and actually went down with the other people to inspect the underwater facilities.

Here in this region, we have maintained for many, many years a group of divers, of scuba divers who are technically oriented, geologists, engineers, natural resource-type people, that can actually go down with underwater gear and inspect these facilities under the water. That's been a very cost-effective

program in that sometimes in a couple of days you can go out there and do some inspections that would take you many months and lots of dollars to get down there and see that in any other manner.

". . . with that inspection responsibility also came the accelerated safety-of-dams program, which started essentially in 1978 with the passage of a Federal Safety of Dams Act. . . .

But anyway, along with that inspection responsibility also came the accelerated safety-of-dams program, which started essentially in 1978 with the passage of a Federal Safety of Dams Act. I was assigned essentially the responsibility to follow up with all the safety issues. As that program continued to grow, the regional office made a decision that we needed a Safety of Dams Branch to deal ***just*** with that factor, and that was set up. I and a number of other people moved into that branch.

Selected to Be Manager of the Safety of Dams Branch

It was headed up by a fellow by the name of John Walker, who was there for about a year, then he retired, and upon his retirement, why then I was selected as the Manager for Safety of Dams Branch at that time, and essentially dealt with the safety-of-dams issues from a regional standpoint from 1978 or '79 until 1985.

Working on Rebuilding Jackson Lake Dam

During that period of time, I got involved in a lot of activities. Probably one of the major rehab jobs was the rebuilding of Jackson Lake Dam up at Jackson, Wyoming, inside of Grand Teton National Park. That was quite an effort in that here we had what was considered to be one of the more unsafe dams in the region, and probably in the Bureau, setting inside of a national park that's considered to be one of the real pristine areas in the West, right down at the base of the Grand Tetons.

"Of course, you had the traditional water users that wanted it rebuilt; you had the people who had the pure park concept that wanted us to take it totally out, just do away with it; and everything in between those two extreme views. . . ."

There was a lot of opposition to turning even a shovelful of dirt inside of Grand Teton National Park to make that dam safe, and we had a very intensive public involvement program, a lot of pros and cons. There were a lot of heated

meetings, heated discussions. We had people not only from the regional office but also from Denver making presentations to the publics as to why that dam had to be fixed. I don't know, I think at one time we counted it up and there were something like a total of eighty-some public meetings associated with the rebuilding of Jackson Lake Dam, and over a three-or a four-year period of public involvement, the public were really divided. Of course, you had the traditional water users that wanted it rebuilt; you had the people who had the pure park concept that wanted us to take it totally out, just do away with it; and everything in between those two extreme views.

"The National Safety of Dams Act that was passed in 1978 essentially said that the Federal Government would make these dams safe so that they would provide the services for which they were originally authorized. . . ."

The National Safety of Dams Act that was passed in 1978 essentially said that the Federal Government would make these dams safe so that they would provide the services for which they were originally authorized. That was kind of the bottom line of that whole thing. There were a lot of words, there were a lot of presentations, but probably the one that really got people together was made by an elderly lady in Jackson, Wyoming. I'm trying to recall her name now. It was Dr. Marta Murray [phonetic], I believe. She was quite elderly. She was like eighty years old, but she'd been a leader there in the valley for years and years and years, and it's safe to say that she was very concerned about the environment and the damage to the environment and those kinds of things. But after attending most of these meetings, this little lady stood up at one meeting, and she said, "You know, folks, we've got some of the best experts in the world telling us that this dam is unsafe." We had people like Larry von Thune out of Denver that was a participant in that, was very valuable. And she says, "They've got to know what they're talking about. Otherwise they wouldn't be in the business." And she says, "***I think*** we just should all get behind them and get this thing done. It has to be done. Let's do it." ***That*** three-or four-sentence statement by this Dr. Marta Murray probably had more to do with the cooperation, the future cooperation, received up there in that valley probably than anything else many of us had ever said.

So along with that, then, we got off the dime, and with that kind of support, Jackson was eventually rebuilt. Right now I don't even remember the date that it was completed and dedicated, but I think it was 1988, the completion and the dedication.

1985 Became Project Superintendent of the Minidoka Project at Burley, Idaho

As far as my involvement, in 1985 I left the Boise office here after being here in this region for seventeen and a half years or so when I was selected to be the Project Superintendent for the Minidoka Project out of Burley, Idaho, which is the project, or was the project, office that had jurisdiction over all of Eastern Idaho and Western Wyoming. Part of the responsibilities, of course, was the operation and maintenance of Jackson Lake Dam. So in the capacity of being Project Superintendent over at Burley, I had the opportunity then to continue to see the rebuild of Jackson from start to finish and essentially the completion and the dedication. It was nice that on dedication day it was full in the midst of a number of years of drought. 1986 or '87, we started having drought years. I guess it was 1987. Water shortages. But the day of dedication we'd had enough runoff that year to where it was full.

During that period, as Project Superintendent over at Minidoka, I got involved in a lot of activities over there. Like I say, it was drought years, low runoff, not enough water, trying to find water for lots of different uses, a lot more effort by some other interest groups, you know, to get some water for their purposes to create better particularly environmental conditions for industry and fisheries and wildlife, those kinds of things, and something that a lot of us worked pretty hard at.

Working to Save Trumpeter Swans below Island Park Reservoir

I got involved in one ***real*** effort to save about 500 trumpeter swans below Island Park Reservoir. I think that was in 1989, and it was a combination of extremely dry year and severe cold weather that essentially froze the river over. And trumpeter swans are aquatic feeders; they feed out of the water. They feed on the water weeds down in the water. In some ways it's kind of hard to supplement their diet, although a lot of that has happened. But during that period of time when we had these 500 swans that were essentially starving to death, I and some folks were up there one morning in 38-degree-***below***-zero weather, out there trying to save swans. We got the water users, the traditional water users, involved in it and made them aware of the problem. They stepped forward and donated, I think, somewhere around 20,000 acre feet of water to be released downstream to open up the river for those swans–that's probably the thing that kept a lot of them from dying.

I think of the estimate of 500 or so, there were still probably about 100 swans that actually died of starvation, some of them were undoubtedly just of old age, but an awful lot of starvation because of the cold weather, but it was cold. The weather people tell us that some of the weather we had there at that

time was like a 500-year event, the combination of 38 to 40 degree-below-zero weather with fairly good winds and an extremely dry fall and winter. The combination of that dryness and cold weather, they tell me, killed juniper trees that were 500 years old, and that's kind of the way the foresters and stuff say that that event was like a 500-year event when it come to severity, the combination of cold and drought. So that was another interesting part of the things we got involved in.

Storey: That was while you were Project ~~Manager~~ [Superintendent]?

Van Den Berg: That was when I was Project ~~Manager~~ [Superintendent] over at Burley. I think that was 1989 when that actually happened. I was Project ~~Manager~~ [Superintendent] from '85 to 1990.

Enhancement of Canada Goose Nesting below Palisades Dam and Reservoir Through Reservoir Operation

There were some neat things that happened. There's been a lot of enhancement, I think, from our operations for some of the other uses. Even back in the seventies, when I was in the River and Reservoir Operation Section, we went through a effort with the Idaho Fish and Game Department on what we called the Canadian goose nesting problem, working with the Fish and Game to try to find a way to protect some of the nests during a spring runoff. What I'm explaining here is what happens below a dam when you're storing water is that your river is small, isn't very high, your geese start to mate and nest in March, so they'll build their nests down close to the water, out on islands out in the middle of the water, and then later on in the spring, when we have to bring the water up either for flood control releases or for irrigation deliveries, which can happen in April or May, those nests were being flooded out and destroyed.

So we worked with the Fish and Game Department on what we called goose flush water. ***Now***, in 1994, we're talking about fish flush water, but in 1973, '74, '75, we were talking about goose flush water. The Fish and Game would monitor the geese, and when the geese would start to nest down low close to the water, we'd raise the water up for a few hours and push those geese back up the bank and make them nest higher. It was very successful. You did risk a lot of water, but at the same time you had some impact on forcing the geese to nest high. That way, later on in the spring, when we had to bring the water up for other reasons, why, they weren't washed out and the success rate was much higher. In fact, the goose population is doing extremely well over there now. That's just another example of one of those efforts to meet some of

these other needs.

Storey: This is where?

Van Den Berg: Below Palisades in Eastern Idaho, below Palisades Dam and Reservoir. Palisades sits right on the Idaho-Wyoming border.

". . . you have five or six major dams and reservoirs on that project above Milner Dam, and you have to operate in such a manner that you try to satisfy not only all of the needs of the traditional water users, but all the needs of the other interests . . ."

That whole operation of the water on the Minidoka Project is quite a balancing act, because if you start from Jackson, Wyoming, essentially you go downstream clear to Milner Dam, which is in south central Idaho, the Minidoka Project is about a 1.2 million-acre Federally developed irrigation project. Now, granted, 900-and-some thousand acres of that is supplemental water, but there's 300-and-some thousand acres that are full service. In other words, they get ***all*** of their water from the Federal storage reservoirs. But you have five or six major dams and reservoirs on that project above Milner Dam, and you have to operate in such a manner that you try to satisfy not only all of the needs of the traditional water users, but all the needs of the other interests, and in later years with all the recreation, you have like a $30 million floating industry down through the Jackson Hole area on the Snake River, the rubber rafting type thing. You have a large fly fishing industry.

Trying to Deliver Water and Benefit Other Downstream Users

So every year you're working with those other interests also to see if there isn't some way that you could move that water downstream in such a manner that it's more beneficial for their interest, but also get it downstream to the water users that own the water at times when they need to use it. It gets to be quite a balancing act, because, quite frankly, what is good for the rafters, the floaters, floating industry, is not necessarily good for the fly fishermen. So we try to balance the needs between all of those different interests.

Storey: What kind of problems do you have balancing needs like that?

Van Den Berg: Well, like I say, people don't always see eye to eye. Even sometimes when you think about the other interest groups, we talk about the traditional water users as being irrigators, that's what most of these projects were built for, but then you

have the other interest groups, the fishermen, the fly fishermen, the floating industry, people concerned about water quality, just people concerned about the scenic view of the river and drawn-down reservoirs. Everybody has their own interest.

Some of the problems–we've had lawsuits filed against the Bureau of Reclamation for the operation of the rivers and reservoirs, and we've had to go to court and defend those operations in court. To date, we've been successful, ***mostly***, I think, because we can essentially show that without a controlled operation, even though it may not be the most desirable thing, it's still better than what sometimes would be provided by Mother Nature. Mother Nature has a tendency to run all the water off in the spring, and then by midsummer, a lot of the streams are dry or very, very, very low.

Blue Ribbon Trout Fisheries below Reclamation Dams

So I see a lot of enhancement that has taken place because of the federally built projects. Now everybody doesn't agree with that. But yet when we talk about fisheries, if you read *Field and Stream*, you read about the blue ribbon trout fishery below Jackson Lake Dam in Wyoming, below Palisades, below Island Park, below Flaming Gorge on [a tributary of] the Colorado, and some of that, I think, is attributed to the more constant flows that provide some decent water flows throughout the summer months.

When we were challenged in court on the operation of Palisades Dam and Reservoir in Eastern Idaho by Trout Unlimited, one of the things that we were able to show without a doubt, that if the Bureau of Reclamation had operated the way that Trout Unlimited wanted us to operate for the previous year, in the previous year, the year before this lawsuit was filed, the river would have gone dry that next year because we would have released so much water that we wouldn't have had any to essentially run downstream and the river would have gone dry in, if I remember correctly, in August, and we'd have had about a thirty- or forty-mile stretch of the Snake River, from essentially Heise [phonetic], Idaho, downstream to where the north fork of the Snake River feeds in that would have essentially been dry.

Now, granted, there's some water in that river, but it's all taken up by natural flow rights or diverted to satisfy natural flow rights, but I think the courts could see very readily that even though we may not have been doing what some folks wanted us to do the year before, that the operation that we ran and that we proposed actually made water available at ***all*** times instead of more

one year and not any the next. So I think the court was able to see that very quickly, and ruled in our favor that our operation was the way it should be, the way it was intended by the state water rights, Congress, and that we had gone a long ways to preserving a flow that was adequate for the fish.

Storey: How do these folks express their concerns to Reclamation?

Van Den Berg: We have public meetings. Many times it's just they send you a letter. They'll drop in. They most certainly always come to the public meetings. I've experienced many times when we're like, say, presenting the summer's operation for a stretch of the river and someone in the crowd would say, "Well, have you thought about this? And could you do this? This would help satisfy some of these other needs," and we've found times when we've been able to look at something even in a public meeting like that and say, "Yeah, you know, that's a pretty good idea, and that's something we can do. We'll do it."

Storey: Do you have any specific examples?

Van Den Berg: Over in Jackson I recall a time or two where we were having our annual spring meeting on the operation in Jackson, Wyoming, and the floating industry and the fly fishing industry both there with some different needs presenting some scenarios, "Well, maybe if you guys thought about doing this, it would work a little better for both of us," and we've been able to change those, make some changes on the operation right there in the meeting and say, "Okay that's what we'll do." Those are the types that I'm most familiar with.

It's an interesting thing. You work an ***awful lot*** with the public, and now we also now have the endangered salmon that we're dealing with, trying to find and buy water. There are other people much more knowledgeable than I am about that that if you haven't already interviewed them, you probably will be. So I'll probably not talk much about the salmon.

Storey: Was that going on when you were managing the Minidoka Project?

"The salmon issue really didn't raise its head probably until about 1990, about the time I came back to Boise. . . ."

Van Den Berg: No. No. The salmon issue really didn't raise its head probably until about 1990, about the time I came back to Boise. In 1990 was when the salmon issue really started to get hot. We were seeing a little bit of it before then, but as far as effort to purchase water on the Bureau's part or purchase space, I guess I'd

have to say it was just more or less in its infancy at that particular time.

The Minidoka Project was one of those that I felt early on had all the ingredients of an exceptional project because it had so much variance, all the way from the high mountains, the Tetons in the Jackson Hole area, clear down to the sagebrush-covered plains in Southern Idaho, about a 300-mile stretch of the river there. It had all kinds of different wildlife and environmental interests.

Reclamation Involvement in Development and Maintenance of the Tex Creek Wildlife Management Area

We've had some real success stories with wildlife development. Tex Creek Wildlife Management Area east of Idaho Falls, that was built as mitigation for both Teton and Ririe. Ririe Dam was a dam that was built by the Corps of Engineers and eventually transferred over to the Bureau of Reclamation for operation maintenance. When those dams were built, they destroyed some winter habitat area for mule deer and for elk and for moose, and to mitigate those losses, the Federal Government bought up some winter range for elk and other species, bought some ranches from some private ownership there in Eastern Idaho. Those lands, along with some lands that the state . . .

END SIDE 2, TAPE 1. DECEMBER 5, 1994.
BEGIN SIDE 1, TAPE 2. DECEMBER 5, 1994.

Storey: This is tape two of an interview by Brit Storey with Max Van Den Berg on December the 5th, 1994.

We were talking about the purchase of compensatory lands for Ririe Reservoir, was it?

Van Den Berg: Yeah, for Ririe and Teton both. Ririe is just east of Idaho Falls, Idaho. These lands were purchased.

Storey: From ranchers?

Van Den Berg: From private ranchers. And then there was also some state lands involved; some Bureau of Land Management, which were Federal lands, involved; some Forest Service lands involved; and the Tex Creek Wildlife Management Area that we're ***still*** involved with, because we contribute quite a bit to the operation and maintenance from a cost standpoint.

Storey: What creek?

Van Den Berg: Tex Creek. They call it Tex Creek.

Storey: T-E-X?

Van Den Berg: T-E-X. Tex Creek Wildlife Management Area is a real success story. The state of Idaho, Idaho Fish and Game Department, manages it. We furnish some of the funds, as does BLM.

If I remember correctly, when those lands were first started, when they first started to develop those lands for wildlife habitat, there were about 200 head of elk that wintered in that area, and now that number is somewhere between 2,500 and 3,000. Fields are actually planted for grazing by the elk. They plant crops. You plant winter wheat. You plant alfalfa. The state actually puts up some alfalfa to be fed on years when the snow gets too heavy. And they don't feed unless they absolutely have to. But they've reintroduced the sharptail grouse in that area. You can go over there in the wintertime and you can see deer and golden eagles and elk and moose and sharptail grouse and coyotes. It's just a really fascinating area. It's probably one of the better mitigation success stories that I've been aware of, at least, in the Bureau.

Storey: So Reclamation purchased the land and then turned it over to the state for management?

Van Den Berg: Part of it. Part of it, yeah. They didn't purchase it all. I think Reclamation purchased 8- or 9,000 acres, and then the Corps of Engineers also had purchased some land for Ririe. The total land base now of Tex Creek Wildlife Management Area is like 27-, 28,000 acres. So it's a big area. There are some videotapes and some special films that have been put together on Tex Creek that would certainly worth anybody taking a shot at to look at. They're extremely interesting.

Storey: Well, I hate to say it, but we've reached the end of our time for today.

Van Den Berg: Maybe I've run out of things to talk about. I don't know. I just kind of rambled on.

Storey: You haven't. I'd like to ask you if it's all right for researchers both inside and outside Reclamation to use both these tapes and the resulting transcripts for research purposes.

Van Den Berg: If there's any way they can use them, it's fine with me.

Storey: That's a yes, I take it.

Van Den Berg: That's a yes. That's a yes.

Storey: Okay. Thank you.

END SIDE 1, TAPE 2. DECEMBER 5, 1994.
BEGIN SIDE 1, TAPE 1. DECEMBER 7, 1994.

Storey: This is Brit Allan Storey, Senior Historian of the Bureau of Reclamation, interviewing Max Van Den Berg in the Pacific Northwest Regional Offices, in Boise, Idaho, on December the 7th, 1994, at about two o'clock in the afternoon. This is tape one.

During our last interview, Mr. Van Den Berg, we were talking about your time as Project ~~Manager~~ [Superintendent] at the Minidoka Project.

Van Den Berg: That's right.

Storey: I was wondering, for instance, how many water user groups were represented on the project, and what kinds of issues came up with them.

The Project Superintendent Worked with 130 to 150 Traditional Water User Groups on the Minidoka Project

Van Den Berg: Oh, boy. A hundred and thirty to a hundred and fifty different water user entities involved in the Minidoka Project. Now, that's just the traditional irrigators, different irrigation districts, different canal companies. You know, at the same time you also dealt with state people, EPA [Environmental Protection Agency] people.

". . . starting in 1987 . . . We had to deal with water shortages, water rationing, water accounting. We went through some real efforts to better account for the water and the water use in that whole upper Snake area . . ."

But if we talk about the traditional water users, during that period of time, the things that came up, first of all, was a real need to deal with some of the first real water shortages in that area for many, many years, starting in 1987, the beginning of what we have called seven out of the last eight years have been

drought years. We had to deal with water shortages, water rationing, water accounting. We went through some real efforts to better account for the water and the water use in that whole upper Snake area, which is essentially the Minidoka Project.

We worked with the state through the District 0-1 watermaster's's office in Idaho Falls. We did some things to help people understand how the water rights system works. I think we were rather creative in at least one effort where we created what we called our bean-bag water rights presentation, which was essentially a display of the seven dams and reservoirs in that area, particularly the reservoirs, and then using a presentation method, using colored beans, we were able then to ***visually*** present to people, to groups of water users, to the public, exactly how the water rights in a very complicated system like that work. It was the first time we'd done anything like that, and it was received extremely well. In fact, I understand that about every two years, people over there are asking for a review of that so that they do understand the water rights better, you know.

". . . during times of shortages, I think it's even more important that we . . . work hard to make certain that the people, whoever they are, get the water that they're entitled to. Maybe they don't get all the water they want, but they get all the water that they're *entitled* to . . ."

But ***that*** detailed monitoring went along with the drought period, and during times of shortages, I think it's even more important that we, as a government agency, work hard to make certain that the people, whoever they are, get the water that they're entitled to. Maybe they don't get all the water they want, but they get all the water that they're ***entitled*** to and in accordance with the water rights and also in accordance with the congressional authorizations.

Trout Unlimited Lawsuit

We had other issues. I spoke about some of them the other day, the swan issue, the Trout Unlimited lawsuit against us. The Trout Unlimited lawsuit was an extremely big issue. The water users spent probably well over $100,000 of their money in legal fees to help we, the Federal Government, defend the water rights that we have a responsibility to defend. When I say a responsibility, most of our contracts that we hold with the water users, such as the space-holder contracts, there's a clause in most of those that essentially says that the Bureau of Reclamation will defend the water rights against any other

uses, defend those water rights, because we hold those water rights in trust for the people and that we will defend them according to state law. But even though that contract, or those contracts, spelled out that we had a responsibility to do that, the water users stepped forward and put forth a tremendous effort to help defend those water rights, and we were successful.

I think I mentioned that in our last meeting, we won the first go 'round. Trout Unlimited appealed it to the Ninth Circuit Court, and we won that go 'round also, that what we were doing over there was appropriate in accordance with state water law and it was appropriate in accordance with the congressional authorizations of the project.

Storey: What was Trout Unlimited suing us about?

Van Den Berg: Well, they were suing us about the operation, not that they were actually trying to take any of the water, but they were suing us essentially to force us to do an Environmental Impact Statement before we changed the operation. Their claim was that we were changing the operation to go outside the boundaries of what was allowed, essentially Palisades Dam and Reservoir there in Eastern Idaho on the Idaho-Wyoming border. We, because of water conditions, had decided that we had to cut the releases from Palisades from about 1,200 cubic feet per second, and these are fall and wintertime flows, down to 750 cubic feet per second to store water in the reservoir but also to prevent us from wasting water past American Falls, which is the next reservoir downstream, wasting water past American Falls that actually someone was entitled to.

Now, that's hard for a lot of people to understand, but the minute that you run water out of the system and you aren't able to capture that water back or an equal amount, and you don't fill the reservoir space and somebody goes short because of it, then you have wasted or released a personal property right that you had no right to release. So it's an extreme balancing act. You have to be extremely careful that you're not running so much water downstream that you actually lose something that someone is entitled to, and that's what they were–Trout Unlimited was suing us to force us to do the EIS before we could lower the releases out of Palisades Dam and Reservoir. We were able to successfully defend that.

Storey: And did the case go beyond the appeals court?

Van Den Berg: Just to Ninth Circuit Court, yes. See, it was held in Federal court in Pocatello, Idaho, and then the next appeal was the Ninth Circuit Court, which I think is in

San Francisco, and we were successful also at the Ninth Circuit Court of Appeals, and that was it.

Storey: And then it didn't go beyond that?

Van Den Berg: It didn't go beyond that.

Storey: When you were here in the Boise office, you were Acting Head of the section that controlled the flow of the river.

Van Den Berg: Yeah, the River and Reservoir Operation Section.

Storey: How did that relate to you at the Minidoka Project? Who was actually saying what was going to be released when, and how did you split up the responsibility? What kind of interaction is there?

How River and Reservoir Operations Functioned When He Was Minidoka Project Superintendent

Van Den Berg: Okay. By the time I got down to the Minidoka Project in 1985, there had been some changes as far as responsibilities from River and Reservoir Operation. More of the ultimate responsibility had been passed on to the project, passed from the regional office to the project. So, by and large, the way it ***really*** worked was that the regional office here, the regional River and Reservoir Operations Section would do the forecasting, the formal forecasting of river runoff. They would do a lot of the analysis of the runoff and the projections, and they pretty much then worked in an advisory capacity to the project office.

So at the Minidoka Project, what we were receiving from Boise was expert advice on how to operate the river and what kinds of releases needed–or should be made from their viewpoint. Most of the time, we were in pretty close agreement in what needed to be done on the river, because the people that have worked in that business for a long time, they know the characteristics of those basins. They know how they run off. Each one of them has their own distinct personality when it comes to runoffs. Those are things you have to learn. So that relationship was really one of an advisory group, and then the project office, like at Minidoka, has to take that information and essentially do what they think is best with it.

In my opinion, if a project office got to the point where they were operating in such a manner that they were either endangering the safety of those

facilities or endangering the property and life along the streams downstream, maybe, from the standpoint of not doing a correct flood control operation or jeopardizing the water supply for the water users, any of those three issues or so, if the regional office ***really*** felt that the project office was jeopardizing some of these issues, they would still have the authority to say, "Folks, this is the way you're going to do it." Fortunately, that hasn't had to happen too often.

Storey: What are the factors that played into your decision at the project about how to manage the operation of the rivers and reservoirs?

Factors That Influence River and Reservoir Operations

Van Den Berg: Oh, there were a lot of them. First of all, the water rights themselves, the basic water right, the water supply. The first thing you have to look at and foremost is what was the project built for? What is the real original baseline purpose of that particular project? What did Congress authorize it for? So the first thing you've got to do is you've got to look at that and say, "Okay, that's a congressionally authorized responsibility that we have to meet."

Then you start looking at other things. If irrigation is the first priority, that's the thing you have to look at. If flood control is a second priority, you do that in concert with storing water for irrigation, because when you're storing water you're reducing floods is what you're doing. Power production, fish and wildlife, recreation, you have to crank ***all*** of those things in, and some of them are higher priority than others. There's certain times of the year when flood control will have a higher priority than irrigation. There's other times when irrigation will have a higher priority than flood control because of the timing of the year. Power production is usually secondary to irrigation, and you gain your power production from the release of irrigation water. That's not always true because we have some projects that essentially are built for power: the Grand Coulee Project. It's built for irrigation, too, but it's also built for power.

There are just many, many factors, but you try to meet the basic purposes, the authorized purposes, and then anything you can do to enhance some of these other public interests, you try to accomplish that at the same time. You work with local and public officials, you know, whether it's fish and wildlife issues, recreation. We have places over there–well, right at Burley, where every year they have one nation's bigger speedboat regatta races right on the river, right there beside Burley, Idaho, and there are years when you may do things operationally to facilitate the occurrence of that big boat race there in the first or latter part of June. So you just crank all that stuff in.

Storey: How do you crank it in? Do you have a computer program?

Van Den Berg: We have computer programs, and computer programs are wonderful when you're trying to create scenarios. What happens if we do this? What happens if we do that? But probably the greatest decision-making factor we have are still people that have the personalized experience of what needs to be done where at what time. Computers are just tools, and it's the long, long experience of people like Earl Corless, who has been there as one of the chief river and reservoir operators on that project for a number of years, that knows those basins intimately. You know, they can fly over that watershed at certain times of the year, look where the snow line is, and make some pretty good estimates of how much water's going to come off of that drainage basin and where you have to have space in the reservoirs and where you don't, and how many days of warm weather you're going to have before you see a real rise in the river flow. There's just an awful lot of personal experience that goes into those decision-making processes. But your computer is a very useful tool, and a lot of the information that goes into the computer, outside of the hard data itself, when you start asking yourself "what if's" comes from the personal experience of these people like Earl Corless that have seen some of these things happen in the past and says, "Well, let's see what will happen if we do this. Let's see what will happen if we do that."

We can pick and choose hard data that goes into the computer, in the computer program, into the modeling system. We can take exceptionally large snow packs maybe from one year, take an exceptional hot spell from another year, take the occurrence of an exceptionally large rainstorm happening right during the height of the snow melt period from another year, and you can pile all those things up on each other and see what kind of a critical situation you might be in if that happens.

Operating the System During Runoff

It's an interesting challenge. It's one of the real active, really action-packed jobs for three-, four months out of the year that you'll get into where you live with it day and night. You live with it Saturdays and Sundays. When the river is running, you have to take care of it. Saturdays and Sundays don't mean much.

Storey: The water's still coming.

Van Den Berg: The water's still coming, and you've got to be prepared for it. You either have

your decisions made on Friday, and if it's at the right time of year, you can go home and relax on the weekend, but if the river's running hard at you, you'll make a decision on Friday but you'll be back there looking at it Saturday morning and Saturday night and Sunday morning and Sunday night. We have people that are there most of the time during those high of runoff periods.

Storey: What kind of a staff does it take for the Minidoka Project to do this?

Van Den Berg: Well, if we're talking just about the River and Reservoir Operations part, there's really only about four or five people that work in the project office on those kind of issues. Now, granted, they get some advisory support out of the regional office from a staff of four or five people, but that regional office also is providing advice and service to a lot of other project offices, or several other ones. If you really had to hone it down, I suppose you'd have to say, well, three or four people pretty much full-time for four or five months in the winter and spring, starting in about March and ending in about July.

Storey: And how much of your time as Project ~~Manager~~ [Superintendent] would be devoted to this issue?

Van Den Berg: Oh, on a normal year, maybe 5 percent of the time. The staff briefs you on what's going on. You deal with the public as the Project ~~Manager~~ [Superintendent]. Five to ten percent on any–well, let me clarify that. Five to ten percent maybe for four or five months, but then if you take years like 1986, which was the second largest runoff year record on the upper Snake, you spend a lot more of your time then dealing with it, particularly dealing with it from a public standpoint, and the reason I say that is that when you get an exceptionally big water year like that, one that comes right after a normal water year when you have a lot of good carryover in the reservoirs, as early as the first of March or maybe sometimes as early as the first of February, you start seeing already that you're going to have a big, big runoff year, and so maybe in March you start running some pretty big water.

Storey: To make space in the reservoirs.

Van Den Berg: To make space in the reservoirs to catch the spring runoff and to prevent flooding further on. Sometimes you've got to run enough water that you actually start flooding people. I mean you're flooding the fringes, the low-lying farmlands right along the river channel, some of the pasture land, lawns and stuff of some of the homes that are built right alongside of the river. They're built in the flood plain, and in 1986, we were running big enough water just for

flood control that we were putting water on lawns in and through the cities of Hayburn and Burley, Idaho, and it didn't go over very well, but the only thing you could do, and the people would complain, is you'd just have to explain to them that it's either this much now or a whole bunch later.

Storey: Even more later.

Van Den Berg: Or a lot more later, and we know that you don't like to have this up on your lawn, but there really is no choice. So you could spend a lot of hours in a day just dealing with the public on those kinds of issues.

Storey: One of the issues that's been increasingly prominent in recent years is Indian water rights. Were there any Indian water rights involved with the Minidoka Project office?

Indian Water Issues

Van Den Berg: Oh, yeah. We have the Shoshone-Bannock reservation there at Pocatello, Idaho, that have water rights, reserved water rights.

"We actually have an irrigation project on the [Shoshone-Bannock Tribes Fort Hall] reservation that was *built* as an Indian irrigation project . . ."

We actually have an irrigation project on the [Shoshone-Bannock Tribes Fort Hall] reservation that was ***built*** as an Indian irrigation project, and while I was Project Superintendent over there, why, the Shoshone-Bannocks, as the tribes are called there, were going through the court settlement of what was their original treaty water rights according to the treaty. Well, those things have to go through a process of evaluation almost like an adjudication, and even though I wasn't involved much in the detail, you know from a manager's standpoint that that settlement of that Indian water right issue could take away from the water rights for the project, because the water rights issues are basically according to the date of the treaty, which, if I remember correctly, was like 1867 was the date of the treaty that created the reservation there, and essentially said that, "You shall have whatever water you need to do whatever things you need to do for your livelihood from this day forward."

And, of course, there were a lot of years when people and states and our government didn't pay a lot of attention to that and built projects, used those water rights, and our Native Americans stepped forward one day and said, "Wait a minute, folks. You're taking something that belongs to us by treaty,

and we want our day in court, and we want our fair share of the water." So the Sho-Ban claim for their treaty rights went through the process, and they were awarded, it seems to me, like four or five hundred thousand acre feet of natural flow rights out of the Snake River that preceded any other rights.

Storey: Natural flow rights. What does that mean?

Natural Flow Water Rights

Van Den Berg: Well, that means that it's not water that's been stored in the reservoir. It's water from the natural flow of the stream. If you just assume that there are no reservoirs or dams on the river at all and this water is flowing past naturally, then they're entitled to a chunk of that natural water that's flowing by their property. And so when we talk about natural flow rights, it's different from storage rights, because the storage is essentially a man-made water supply, storing water during times of plenty to be used during times of shortages.

Storey: So they couldn't, for instance, call on Reclamation to deliver water?

". . . in this settlement, these were additional rights that they were entitled to above and beyond the waters available for the government-built irrigation project . . ."

Van Den Berg: Not for anything except the Indian irrigation project that was built as part of the project. There was already some storage water identified for that Indian irrigation project, which was just a small part of the reservation, understand, and there was also some groundwater pumping for that particular Indian irrigation project. So in some aspects, yes, they could call and had a right to call on some of the storage water because it was set aside for that Indian irrigation project, but in this settlement, these were additional rights that they were entitled to above and beyond the waters available for the government-built irrigation project and could be used on other lands or for other purposes, which also includes things like hunting and fishing and subsistence.

Storey: How did you become involved, even if only peripherally?

Van Den Berg: Well, just being Project Superintendent, you try to stay abreast of all the things that are going on. I would attend meetings dealing with the claim, you know, with the water rights claim. Our legal folks and our water rights people essentially handled most of it.

END SIDE 1, TAPE 1. DECEMBER 7, 1994.
BEGIN SIDE 2, TAPE 1. DECEMBER 7, 1994.

Storey: You were saying that basically you were involved because you needed to know what was going on, and the attorneys and the water rights people were the ones who were really involved in the lawsuits.

Van Den Berg: That's right. You know, we have our water rights people who were working on this. We had the attorneys, our U.S. Attorneys from the Solicitor's Office, and then also the irrigators also had lawyers representing them that were involved in this also, because the claim had some negative effects on the traditional water supplies, but it was a settlement that really needed to be made in order to get a full picture of the demands on the water rights on the Snake River.

Storey: And the water rights people would have been regional people?

Van Den Berg: Yeah.

Storey: Here in the regional office?

Van Den Berg: Here in the regional office.

Storey: Who was representing whom?

Van Den Berg: In the capacity that our regional office people operate, because we have a responsibility both to the traditional water users and to the Native Americans, we felt somewhat that our water rights people were representing both of those interests at the same time and that our part was not the controversial part, but essentially to work at it to create what seemed to be a fair settlement for both parties and a rights settlement for both parties.

Storey: And then the irrigator's attorneys would be working . . .

Van Den Berg: They worked for the irrigators. Their job, as much as anything, I think, was probably to try to make sure that the amount of water granted to the Native Americans ***fit*** with what they were actually able to use that water for ***on*** that particular reservation. There are a number of acres of land there that are still undeveloped, that could be irrigated. We call that PIA land, Potentially Irrigable Acres. There's water that could be used for manufacturing if they so desired; just for in-stream flow purposes, to create good resident fisheries.

I think it's safe to say that the traditional water user communities, the irrigators, wanted to make sure that the data that the court was being asked to make decisions on was accurate and true data. If you talk about potentially irrigated land, the first claim that came in on numbers of acres, I don't know the exact number, but I know that it was much, much higher than what was originally settled on as true potentially irrigable acres. So it got to be kind of a negotiated settlement. Well, it was a negotiated settlement in lots of ways.

Storey: Who was the solicitor representing, or the U.S. Attorney, I believe you said?

Van Den Berg: Yeah. The situation, as I remember it, was that they probably foremost represented the interests of the Native Americans on that claim because they were looking at it from the 1867 treaty right, who really had the first claim to that water.

Storey: Did I hear you say that this was a lawsuit or that this was a water rights adjudication?

Van Den Berg: I don't think I want to use the term "lawsuit." It was a claim, and it turned out to be a negotiated claim. As I remember back, the U.S. Attorney's Office pretty much represented the Native American interests, and the Solicitor's Office represented our, the Bureau of Reclamation's, interest, both from our responsibility to the water users and our trust responsibilities to the Indians. That's kind of the way I recall it.

Storey: Who were they representing this before or in front of?

Van Den Berg: My recollection is it never went to court; it wound up as a negotiated settlement. So it was a group of representatives that essentially sat down and hammered out this agreement.

Storey: Stimulated by a situation which ***could*** have gone to court?

Van Den Berg: Oh, very definitely. Very definitely it could have gone to court.

Storey: So did the Indians also have attorneys involved?

Van Den Berg: Oh, yes.

Storey: What about the state water board, for instance?

Van Den Berg: They were involved.

Storey: It's complicated, isn't it?

Van Den Berg: It's extremely complicated.

Storey: Who would be sitting down at the table working out the negotiations?

Van Den Berg: Oh, you'd have people–the lawyers for the tribes, the U.S. Attorneys, the Solicitors. Our water rights people would do would be furnishing data, but essentially it was the attorneys that sat down and hammered these things out.

Storey: And, I presume, the state attorney?

Van Den Berg: Yeah. There were attorneys there from the Attorney General's Office.

Storey: So were these things that you attended for informational purposes meetings of these groups as they negotiated, or how did that work?

Van Den Berg: Well, I didn't go to every session by any means. Most of the time, I went to them as an observer to try to understand what was going on and get a flavor of the processes.

Storey: You mentioned that because of the drought, you needed to have better control and keep better track of what was going on. Can you give me some more details about what was going on and how it changed?

Van Den Berg: Well, I've got to go back a lot of years.

Storey: That's fine.

1977 Was the Shortest Runoff Year on Record

Van Den Berg: For my involvement when I was still part of the River and Reservoir Operations Section, working in that capacity. In 1977 we had one of the most severe–well, the shortest water year of record in this part of the country. Fortunately it was just a one-year drought in between a couple of good years, but it was an ***extremely*** short year, like I say, the shortest ~~on record,~~ runoff year on record, and at ***that*** particular time, in 1977, recognition came to the forefront ***real quick*** that we needed to get a lot better handle on the water management on a lot of these projects and river basins. So there were some things started at that time.

As far as a little better accounting system, the state, in cooperation with the water users, the District 0-1 watermaster's's office at Idaho Falls worked pretty hard that year to put together an accounting program, accounting procedures, to better handle all of the water rights, and that worked fairly well as long as we had normal or pretty decent water years.

". . . '86 was an extremely big year; '87 was the next real serious water-short year–we started seeing once again that even though we had come a long ways with our water accounting, that we still really weren't doing it good enough. So the Bureau of Reclamation worked hand in hand with the watermaster's's office . . ."

When 1987 came along–and '86 was an extremely big year; '87 was the next real serious water-short year–we started seeing once again that even though we had come a long ways with our water accounting, that we still really weren't doing it good enough. So the Bureau of Reclamation worked hand in hand with the watermaster's's office on identifying this water, what water belonged to who, an ***extremely*** complicated computer accounting program.

Some Complexities Regarding Natural Flow and Storage Water

You get this whole intermingle of natural flow rights and ***storage*** water rights, all happening at the same time. If you have a few hot days during the snow melt season and the natural flow comes up quite a bit, there may be enough there to satisfy all of the rights on the river and so you don't have to use any storage water. Then when the flow tapers off, all of a sudden there's not enough natural flow rights to satisfy everybody, so you start supplementing that with storage rights. So you can have an irrigation district be on natural flow right one day, be using some storage water the next two or three days. Maybe for some reason you get some rain or you get some hotter days and more snow melt and the river comes up again, and so they go off storage, they're totally satisfied by natural flow rights.

"You're dealing with . . . 130 to 150 different water user entities, trying to identify when these districts were taking storage water, when they weren't taking storage water, how much natural flow right they were taking, and it's just of such magnitude that we had to create some sort of an accounting system to take care of it. . . ."

You're dealing with, like I say, 130 to 150 different water user entities, trying to identify when these districts were taking storage water, when they weren't

taking storage water, how much natural flow right they were taking, and it's just of such magnitude that we had to create some sort of an accounting system to take care of it.

Well, in the end, after people worked on it for a long time and did a lot of massaging of this accounting system, I feel fairly comfortable that we have essentially got a brand on just about every acre foot of water over there, and we can send that acre foot of water down to the right person. You know, we're dealing with several million acre feet of water, and that's not to say that we don't lose a few hundred acre feet here or a few hundred acre feet there, and we have some pretty good records to show it, that by just this accounting system alone, that we were able to conserve or document from 150,000 to 200,000 acre feet of water that was being conserved and retained in rightful ownership.

There was some storage water that was being used by people who were not entitled to it, and I think through this whole accounting system we have almost eliminated that. There's still some of it goes on, but we've come a long, long ways toward helping the state stop the inappropriate use of water.

Storey: Where was this accounting system maintained?

Van Den Berg: In Idaho Falls, in the state watermaster's's office.

Storey: In the state watermaster's Office?

Van Den Berg: Right.

Storey: And that's the watermaster's you've been talking about?

Van Den Berg: That's correct.

Storey: It's not a project watermaster?

Van Den Berg: No.

Storey: Is it on a computer?

Van Den Berg: Yes, absolutely.

Storey: Is it a P-C or a mainframe?

Van Den Berg: At that time it was a mainframe. They may have progressed to a personal computer now where they can run these things off of a personal computer because of the increased capacity, but in '85, '86, '87, it was a mainframe-type setup.

Storey: And this was something Reclamation had access to?

Van Den Berg: We had access to it, yeah.

Storey: As well as the watermaster's.

Van Den Berg: Right.

Storey: Who entered the data?

Van Den Berg: Both the watermaster–mostly the watermaster, but sometimes also we had to massage the data. We checked some of the data. See, our responsibility for the storage water was a little bit different than the watermaster's. The watermaster's responsibility was to tell us how much water was going into the storage rights that we hold for the people, but it was our responsibility, then, to take that water and determine who got what in that particular reservoir, and it wasn't all share and share alike. Some of the reservoirs up there have different blocks of space with different priority dates that makes it extremely complicated. There's blocks of space that predate other blocks of space by one day, and so in that type of a scenario, the junior block of space doesn't get any water until the senior block of space is full, is filled.

Storey: This is actually a level in the reservoir?

Van Den Berg: Actually a level in the reservoir, yeah.

Storey: So when you get to X number of feet, everybody who occupies a block of space in the water below that level gets water that year. Am I thinking correctly?

Van Den Berg: In some cases, that's correct. Not in every case, but in some cases that's correct.

Storey: Where did the data come from that went into the accounting system?

Van Den Berg: It comes from the state, from the watermaster's office.

Storey: Where did they collect it? How did they get it?

Gathering the Data for Management of Water Distribution

Van Den Berg: They collect it from stream flow, from diversion records, from storage records.

The Hydromet System

Probably one of the greatest tools we've got is the Hydromet System. The Hydromet System is a remote, data, collection system that operates via satellite. Many of the stations are automated to the point where we can sit most anywhere in the Pacific Northwest Region and access stream flow data at almost any point. We can sit here in this office on the computer and call up and see what the flow is at a point on the Snake River above Jackson, Wyoming, or in Central Idaho, or up in Washington. So a lot of this data comes in from automated data-collection stations, weather stations, stream flow stations, via satellite, and it's not only just stream flow. It's snow pack. We have snow pack stations up in the mountains that actually measure the water content, the depth of the snow, water content, wind, solar radiation, evap and transpiration, and a lot of those different kinds of parameters.

Storey: When you say, "We have this," who do you mean?

Van Den Berg: Bureau of Reclamation.

Storey: We maintain these stations?

Van Den Berg: Yeah, we maintain these stations.

Storey: These are the sort of little houses–they look like culverts to me on end, that have the little solar panels on top?

Van Den Berg: That's right. That little solar panel is what keeps the battery charged that will send the message, that's also an antenna, will send the message to the satellite.

Storey: And then who receives the data?

Van Den Berg: And it can be received right here in this office. If you'll notice, out to the east end of the building, there's a great big satellite dish sitting out there. That's our collection dish for the Hydromet station. Now, in the state of Idaho, they can collect it, the Corps of Engineers can get data off of there. Hydromet, as we

talk about it, even though the Bureau of Reclamation has done an awful lot of the work, has involved some other agencies–the Corps of Engineers, the Soil Conservation Service. But the stations that ***we*** have installed on the water systems that we operate and maintain have almost all been installed either by the Bureau or in cooperation like with the Soil Conservation Service.

Storey: Were they installed when you went to the Minidoka Project in '85?

Van Den Berg: Oh, yes.

Storey: I notice you said, "on the ones we created." Does that mean we also have these stations on the canals?

Van Den Berg: Yeah. There are some of these stations on the canals.

Storey: You mentioned a moment ago diversion records, and I'm interested in how we collect the diversion data.

Van Den Berg: There's two ways. We've got places where the diversion records are collected via Hydromet stations, but there's also a hard record that's also collected right there in that gatehouse, a typical stream-gauging station that puts that data on hard copy, on a roll of tape. Quite often, the Geological Survey or the state help maintain these stations. That's the more sophisticated way to get the data, but because you can't have one of these expensive stations on every little diversion that takes place, the watermaster's office also goes out and physically measures an ***awful lot*** of diversions, either on a daily, biweekly, or a weekly basis depending upon the type of a diversion it is.

There are some diversions that when they turn them on in the spring, they essentially run almost constant all summer long. So the state can go out there and they can measure that diversion maybe once a week or twice a week. You have other diversions, because of the way the water is used, maybe they have to measure twice a week or maybe they have to measure it ***daily*** because it fluctuates. You know, the demand is greater, they take more water out of the river. The demand goes down, they shut the gate down. So you've got those two different methods.

There's one other method that goes along with that, and that is on pumping plants or groundwater pumping. We don't get involved in groundwater pumping too many places. There is one district where we have an awful lot of groundwater pumping, but the state watermaster has come up with

a method to essentially measure, convert kilowatt hours of power used to quantity of water diverted for a pump, for a certain pump. You have to calibrate it. So the state then can go out and periodically read the power meter and convert that power usage to a quantity of water that was diverted. That's another method that they use for data collection.

Storey: Sounds exceptionally complicated to me. If we have 110 major water . . .

Van Den Berg: A hundred and thirty to a hundred fifty.

Storey: –user groups, each one of them has multiple water users within it, I presume.

Van Den Berg: Oh, absolutely. Absolutely.

Storey: And can we tell who got what when?

Van Den Berg: In some cases yes and some cases no. There are canal companies and there are irrigation districts that measure their water deliveries to every user. Every user. And so in that particular case, yes, you can tell who got what water and when did they get it. Unfortunately, there are other districts or canal companies that ***only*** measure the major diversions. They know the total volume of water that they divert and probably the total volume of the water that's used, but they don't know exactly . . .

Storey: Where it was delivered?

". . . in 1994 we shouldn't have any place where their water measurement isn't pretty much up to snuff, and that's not the case. We've got places where water measurement is not what it should be. . . ."

Van Den Berg: Well, they know where it was delivered, but they don't know how much was delivered to each spot. It's not a good situation in 1994, you know. There are some beliefs, mine included, that in 1994 we shouldn't have any place where their water measurement isn't pretty much up to snuff, and that's not the case. We've got places where water measurement is not what it should be.

Storey: Let's see if I'm understanding this correctly. We probably can tell how much water was delivered to every major irrigation organization, irrigation, whatever we want to call it.

Van Den Berg: That we're associated with, yes.

Storey: That we're associated with.

Van Den Berg: Yes.

Storey: In some instances we'll be able to tell ***within*** that unit where water was delivered, and in other instances we won't.

Van Den Berg: That's right.

Storey: But we'll have a pretty fair idea of the total amount of water delivered to ***our*** water users.

Van Den Berg: Yeah.

Storey: At their headworks or whatever.

Van Den Berg: Yeah.

Storey: Do any of the irrigation–what do you call them?

Van Den Berg: Irrigation districts.

Storey: The districts–share the same main canal, for instance?

Van Den Berg: Darn few. There's a place or two in the region where I know they do.

Storey: But not on the Minidoka Project?

Van Den Berg: Right now, I can only think of one on the Minidoka Project where two different irrigation districts share a section of the main canal.

Storey: The reason I ask the question is because I'm wondering if they have conflicts over that use and how Reclamation becomes involved in it–or if at all.

Van Den Berg: Where that canal was built by Reclamation, we definitely have involvement in it if there are conflicts, and usually it's spelled out in the contracts how those two entities will deal with that combined section of the canal where they both will use that portion. There are other places where we serve a supplemental water supply to what was an existing irrigation district or canal company.

Storey: Before we came in with our project?

Van Den Berg: Before we came in with our project, and I could show you several places where there are two, sometimes three, main canals running right side by side going down through the valley at least for a ways together, that the people are just not willing to share the same canal. That's why there are three canals there. They could very easily be combined into one canal if you could get past that perception that when the water gets down there, you might not be getting everything that's entitled to you, the other guy might be getting a larger share than you get. But there's quite a few canals that run right side by side.

Storey: Did you ever get into a situation where there were water disputes that involved us?

Van Den Berg: Oh, yeah.

Storey: "I'm not getting enough," "He's getting too much," "They're getting too much," whatever?

". . . I've had people come in the office just madder than whatever because they're not getting all the water they're entitled to . . . Most of the time, the disgruntled people have been actually receiving more water . . . than what they were entitled to, and when the managers or the ditchriders start tightening up on the system and delivering *exactly* what they're entitled to, then these people think they're being shorted because they're not getting as much as they used to. . . ."

Van Den Berg: Oh, yeah. As Project Superintendent, I've had people come in the office just madder than whatever because they're not getting all the water they're entitled to, they don't think they are, and most of the time because we, the Bureau of Reclamation, have transferred that operation and maintenance responsibility back to an irrigation district. You can listen to them, but in the end you pretty well tell them, "You've got to go back and work with your irrigation district."

Most of the time, the disgruntled people have been actually receiving more water delivered to them than what they were entitled to, and when the managers or the ditchriders start tightening up on the system and delivering ***exactly*** what they're entitled to, then these people think they're being shorted because they're not getting as much as they used to.

". . . sometimes you really have to go to some extremes to prove to them that they're getting all that they're entitled to, and sometimes you never get there, it doesn't really make any difference *what* you do, you'll never be able to convince the person that they're getting as much water as they're entitled to. . . ."

And sometimes you really have to go to some extremes to prove to them that they're getting all that they're entitled to, and sometimes you never get there, it doesn't really make any difference ***what*** you do, you'll never be able to convince the person that they're getting as much water as they're entitled to.

Storey: Did that happen when you were Project Superintendent?

Van Den Berg: Oh, yes.

Storey: So the irrigation districts were tightening up on their deliveries?

Storey: Oh, absolutely, starting in 1987, when we got into those drought years.

END SIDE 2, TAPE 1. DECEMBER 7, 1994
BEGIN SIDE 1, TAPE 2. DECEMBER 7, 1994

Storey: This is tape two of an interview by Brit Storey with Max Van Den Berg on December the 7th, 1994.

When the tape ran out, we were just beginning to discuss the irrigation districts' tightening down on water deliveries because of the drought of 1987 and beyond.

"We've been blessed with a number of good water years, and it's just a lot easier to operate with a little extra water than it is a little shortage. 1987 was the first year of the drought. . . ."

Van Den Berg: We've been blessed with a number of good water years, and it's just a lot easier to operate with a little extra water than it is a little shortage. 1987 was the first year of the drought. People managed a little better. By 1988, it was really getting their attention, and they ***really*** start managing the water. In fact, there were some irrigation districts that were totally out of water by the first week in July, but some of the irrigation districts and canal companies put their users on rationing, reduced allotments, as we call it, delivered to them very precisely what they were entitled to, and it caused some conflict for a while because everybody, or at least some people, felt like they were being shorted, they weren't getting what they were entitled to or what they wanted.

"One of the common sayings by managers was, 'Well, you may not be getting what you want, but you're getting all that you're entitled to,' and quite often that

didn't set too well, but by 1989, when we were in the third year of the drought, people were really reconciled to the fact that we were dealing with a lot shorter water supply, and it was just amazing . . . how far they could actually stretch those water supplies . . ."

One of the common sayings by managers was, "Well, you may not be getting what you want, but you're getting all that you're entitled to," and quite often that didn't set too well, but by 1989, when we were in the third year of the drought, people were really reconciled to the fact that we were dealing with a lot shorter water supply, and it was just amazing what they could actually do and how far they could actually stretch those water supplies when they had to do it. Now, granted, on other years, when the water supply was good and they used more water to irrigate with, that water goes somewhere. The plant just doesn't use it, because the plant only uses about the same amount of water on any given year.

So what happened to the rest of the water? Let's just say that on a good water year they were putting four acre feet per acre and on a bad water year they were putting on two and a half acre foot per acre and essentially raising the same kind of crop. What happens to that extra water? Well, one of two things: it either runs off and returns to the river, or it deep percolates and goes into the groundwater.

The Snake River Aquifer, Thousand Springs, and Trout Farms

Over on the Minidoka Project, particularly over on the north side, we have what we call the Snake River Aquifer, and this is the aquifer that feeds the Thousand Springs area in the Bliss and Hagerman area of the Snake River, the area that now has the largest concentration of trout farmers of anywhere in the United States and probably anywhere in the world, and those trout forms are there because of Thousand Springs. This water comes out of the bluffs of the Snake River at an ideal 56 or 58 degrees, crystal clear, perfect in quality, and it comes out of the Snake River Aquifer.

". . . the Thousand Springs almost doubled in flow *after* farmers started irrigating on the north side of the Snake River . . ."

Well, there's a point that needs to be made in that the Thousand Springs almost doubled in flow ***after*** farmers started irrigating on the north side of the Snake River, and the reason for that was because of this deep percolation of the irrigation water. When this irrigation water was flood irrigated or spread out

over all these acres and acres of land, it deep percolated down into that basalt foundation. It built up the groundwater table, and with the build-up of that groundwater table, then your flow of Thousand Springs increased and it almost doubled in size from the days when the covered wagons first came through this area. Now we're seeing a reversal of that, and it's because of the efficiencies that the farmers have implemented in irrigation.

Early on, when everybody flood irrigated, it probably took at least four acre foot per acre, and in some cases seven or eight, and I know of areas because of how rocky and gravelly it is, they might pour as much as fifteen acre foot per acre on it just to keep enough water there to grow a crop that maybe only consumptively used two and a half acre foot per acre, and all that excess water went down into the groundwater.

Well, now farmers are converting to sprinkler irrigation. They're not putting on four acre foot per acre anymore. They're putting on essentially what the crop needs, and there's very little waste in a lot of areas. At the same time, there's a lot more groundwater pumping out of that Snake River Aquifer, and so the combination of more groundwater pumping to grow a crop, better efficiency with less waste, less deep percolation, we're now seeing the Snake River Aquifer reduce and the flow of the Thousand Springs actually starting to subside.

I don't think it will ever happen, but if you took conservation on the irrigated farm ground to the maximum, you might see the Thousand Springs go back to the flows that existed when the covered wagons came through here in the 1850s and 1860s, which might not be good for a lot of people, particularly for all the trout farmers.

How Water Is Allocated among Individual Farmers

Storey: You mentioned something a moment ago that seemed to indicate to me that each irrigation district would determine what the allotments of its members was going to be.

Van Den Berg: That's true.

Storey: So one district, for instance, might say, "This year we're giving you 50 percent," and another one might say, "We're giving you everything we've got because we think it's going to snow this winter."

Van Den Berg: That's true.

Storey: Is that true?

Van Den Berg: That's true.

Storey: So Reclamation did not have to become involved in whether Farmer X got 25 percent, 30 percent, 50 or 100 percent of his allotment. That was the irrigation district that was responsible for that.

Van Den Berg: That's correct.

Storey: And so they're constantly, I suppose, juggling things, "Well, maybe we ought to save part of our allotment so that next year we ***know*** we have our X percentage in case it is isn't a good winter." That's interesting.

". . . it doesn't make any sense to save water to the point where you damage an existing crop that has all the investment in it, all the work in it. You might as well use that water and grow an excellent crop this year and take the gamble on the next year. . . ."

Van Den Berg: If you can save part of that allotment and still complete a crop for the existing year, it doesn't make any sense to save water to the point where you damage an existing crop that has all the investment in it, all the work in it. You might as well use that water and grow an excellent crop this year and take the gamble on the next year. Don't damage the crop you have in the ground if you can help it.

During the Drought in 1977 Reclamation Actually Ordered Reduction of Deliveries on Some Canal Systems

Now, there have been times–now, I wasn't involved in this, but in 1977, the Bureau of Reclamation actually ordered the reduction of deliveries on main canal systems and two irrigation districts early in the growing season because some districts just would not believe that they were going to run out of water if they continued to use water at the rate they were using it, and that was a time when the Bureau of Reclamation stepped in and essentially ordered the reduction of deliveries. So that has happened.

Storey: Did that happen while you were Superintendent of Minidoka?

Van Den Berg: No. I think the reason it ***didn't*** happen was because most of those managers

had been through 1977.

Storey: They knew what was coming.

Van Den Berg: And they knew what was coming, and they were much more conscious of their water use and much more cooperative. You know, we made recommendations. We would say, "This is how much water you've got. How are you going to use it?" It's interesting.

"You've got managers out there that they can tell you on any day how much water they've used, how much they've got left, and how they're going to use it. You've got managers out there, if you went up to them and asked them how much water they'd used, 'I don't know.'"

You've got managers out there that they can tell you on any day how much water they've used, how much they've got left, and how they're going to use it. You've got managers out there, if you went up to them and asked them how much water they'd used, "I don't know."

"How much water have you got left for the rest of the season?"

"I don't know."

But we have some responsibilities also to let some of those districts know how they're using their water and at what rate and provide them some guidance. Most of them are pretty good.

Storey: One of the things I was interested in finding out when I came to Reclamation is that we have "water losses," so called.

Van Den Berg: Oh, yes.

Storey: Seepage, evapotranspiration, and so on, and evaporation. How do those water losses play into water rights and deliveries and that kind of thing, or do they?

Water Losses and Their Relationship to Water Rights

Van Den Berg: Oh, yeah. They play into the deliveries a whole bunch. I guess you'd say they do play into the water rights also, because if you have a canal system that leaks a lot of water, and we have some of those, where these canals run off across these fractured basalt areas, they can lose a lot of water. That creates some of

the recharge to the Snake River Aquifer, particularly over in that area.

". . . the water right has to be sufficient so that when they divert X amount of water, transport it down through this long leaky canal, that out the end of that comes enough water to irrigate the lands that are to be irrigated. And so your water right has to be bigger because of the losses. . . ."

So the water right has to be sufficient so that when they divert X amount of water, transport it down through this long leaky canal, that out the end of that comes enough water to irrigate the lands that are to be irrigated. And so your water right has to be bigger because of the losses. Your canal has to be bigger at the upper end to carry that extra water. We have places where you can have 25-, 30 percent loss in a canal system.

Storey: So let's see if I'm hearing this correctly. The amount delivered at the headworks of the canal company is the entitlement for the entire canal or for the irrigation company?

Van Den Berg: In most cases, yes.

Storey: For the irrigation district. But they never expect to deliver all of that water.

Van Den Berg: Oh, no. No.

Storey: Because they have losses, and the water flows through the canal, and it gets X number of miles down here, and here's Farmer Y's turnout, and at the turnout, though, he has an anticipated yield.

Van Den Berg: Yes.

Storey: He expects, "I'm going to get X number of acre feet through my turnout."

Van Den Berg: Yep.

Storey: So it's built into the way the water rights are set up for the particular canal.

Phantom Pumps and Various Ways They Are Dealt with

Van Den Berg: Yeah. And you have evaporation, too. I don't know whether I should put this on tape or not, but then also you have the phantom pumps.

Storey: What's that?

Van Den Berg: That's the pump that comes out of the shed when the sun goes down and goes back in the shed before the sun comes up. You know, you really kind of hate to put something like that in the record, but it's a fact of irrigated agriculture. Unfortunately, we have folks out there that will steal water, and we refer to them as the phantom pumps. They have big pumps nowadays that you can mount on the back end of a tractor. You can run out there after dark and stick that thing down in the canal and pump water all night and go out there before daylight and jump on it and drive it back in the shed and who knows.

Storey: Well, it would seem like a pump's rather noisy.

Van Den Berg: Well, they are.

Storey: But it's out in the middle of nowhere, too.

Van Den Berg: A lot of times they're out in the middle of nowhere. I don't think there's much of that happens anymore, but I think back probably before 1977, there was a lot of that going on. I know that during the drought of '77 on the Minidoka Project, the watermaster and the then-Project Superintendent, who was a fellow by the name of Carlos Randolph and a group of people, they floated the river and did a survey looking for illegal pumps.

Storey: Did they find any?

Van Den Berg: They found several hundred.

Storey: What did they do about it?

Van Den Berg: The watermaster had them removed. Some of them were small, you know. Some of them were pumps that were maybe only irrigating a couple acres of lawn and pasture alongside the river, but irregardless, it was an illegal water-taking. And some of them were big, and it was the state's responsibility to deal with that.

Storey: It sounds like they were fairly permanent installations.

Van Den Berg: A lot of them were. Yeah, a lot of them were.

Storey: What about the phantom pumps, though?

Van Den Berg: Well, the phantom pumps you never see.

Storey: They just don't find them?

Van Den Berg: They just don't find them.

Storey: So the state watermaster is the one who's responsible, and how do you tell them, "Go tear it out," and they tear it out, you go and look and it's not there, and then you come back in a year and it's there?

Van Den Berg: Well, people have been fined, you know. Stealing water is an offense. I know of an instance or two where the watermaster has hired a contractor with a bulldozer to essentially come out and close diversions.

There's a story that might be interesting for people that I've only heard myself, but down in Southeastern Idaho, down in the Bear Lake country, in the forties and fifties there was a watermaster down there that carried blasting powder or dynamite with him, and whenever he found an illegal pump or an illegal diversion, he just got his blasting powder out. They said he had one of the best run districts because he had very few people who wanted to lose a pump, because he'd just blow them up, but that was years ago, back in the forties and fifties.

Keith Higginson, who was at one time Commissioner of Reclamation and who is now the Head of the Idaho Department of Water Resources, personally told me that story of this watermaster down there. So I think it comes from a good source.

Storey: Were you at the Minidoka Project when they were redesigning the Minidoka powerplant?

The New Minidoka Powerplant

Van Den Berg: Yes, I was.

Storey: Tell me about how you were involved in that, where it came from, what the need was, what your involvement was.

Van Den Berg: Over a lot of years there'd been some plans to replace or rebuild the Minidoka Powerplant, and we thought for a long time that that was going to fly. As a result, sometimes we didn't do the needed maintenance on the existing units

because we didn't want to spend a lot of money fixing, rebuilding something that we were probably going to replace.

In 1985, when I went to Burley, Unit Number 6 at Minidoka Powerplant had gone down because of some problem with the impeller, and the estimates and cost to fix that particular unit was higher than what we could get out of it. So essentially we shut Unit 6 down and said, "From this day forward we're not going to run Unit Number 6."

At that particular time, we didn't think there was a strong possibility that we were going to get to do much with Minidoka Powerplant at all, but through some things that happened and some decisions that were made on rebuilding this thing with O&M-type money, operation and maintenance-type money, a decision was reached that we just couldn't continue to try to keep that old powerplant running. That powerplant was built in 1908. It was, I believe, the first powerplant that was built to provide electricity for lifting irrigation water, so it has some historical significance. In fact, it's on the National Register of Historic Places. But anyway, we got pretty much the go-ahead then to either rebuild the plant or do something to modernize it, but at the same time retaining its historical significance.

Through the design process, the conceptual design process, it became readily noticeable that rebuilding the existing plant right where it was was probably not acceptable. There were some safety issues concerned, the concern of trying to maintain the historical significance of that building and that plant, and through that whole effort and particularly through the efforts of some of the staff there, Al Inman [phonetic], who is there yet as the Head of the Electrical Operation Maintenance Division, was very instrumental in that. As Project Superintendent, I recreated the Electrical Division down there and hired this Al Inman in from Shasta Dam in California to essentially take over the responsibilities of dealing with rebuilding Minidoka Powerplant, uprating Palisades. There were just so many activities going on from an electrical standpoint, that we felt like we needed a real expert to deal with those kinds of things. Al came with good credentials, and he's proven that those credentials are warranted. He's done an outstanding job over there, but he was pretty instrumental in guiding this thing through the design, not doing the design, but the planning, the planning parts of it. Our people here in the regional office that did an awful lot from the funding standpoint and the support to go along with that, but as I said earlier, it became readily available we weren't going to do much at the old plant.

So in the end, the final design was to build a new powerplant out away from this one. It would be a two-unit plant. It's under construction right now. Penstocks are essentially in place. It'll probably be operational about 1997, but that new plant will be built. The old plant, the five original units will be moth-balled. Units 6 and 7 will be uprated and rebuilt. So in the end, we will essentially have four operating units there that will generate just a little bit more power than what we generated there before, but the old original five that were built [in the original] ~~when~~ Minidoka Powerplant will be there and will be used as a museum, which is good.

My involvement was essentially, from the Project ~~Manager~~ [Superintendent] standpoint, hiring somebody that was knowledgeable enough to take hold of a program like that and make it work, and that was Al Inman, and just more or less telling the guys, "Hey, let's see if we can get this done." And we went for it, and got the cooperation, and did it.

But I want to clarify that the thoughts of rebuilding Minidoka Powerplant had been there a ***long*** time. They were just this up and down. "Yeah, we can do it." "No, we can't do it." "We probably won't ever get it done," and then all of a sudden everything started coming together.

Storey: After the failure of Unit 6?

Van Den Berg: After the failure of 6, yeah, but I don't know that that failure of Unit 6 had a whole lot to do with the final decision to go ahead and spend the money either to totally rebuild the plant or to build a new plant. I think there was a need there. Some of us at least had the philosophy that, hey, our biggest responsibility is to take care of the facilities that we already have in place before we go out and spend a bunch of money building new ones.

". . . I still think that's kind of the best philosophy, to take care of what you have before you spend your money on buying new stuff. . . ."

Everybody doesn't agree to that, but I still think that's kind of the best philosophy, to take care of what you have before you spend your money on buying new stuff.

Storey: Do you happen to recall when the decision was made to proceed?

Van Den Berg: No, I don't. I don't.

Storey: I'm just wondering about the time frame. I'm presuming that the Minidoka Powerplant would be described in the Reclamation scheme of things as either a small or a moderate size plant.

Van Den Berg: Oh, small. Small. You know, you talk about a 20 megawatt plant, you know, in comparison to Grand Coulee that has 700 megawatt generators. I mean, there's just no comparison. It's small.

Storey: And it took maybe ten-, twelve years to move through the alternatives stage, the design stage, the construction stage to completion?

Van Den Berg: Yeah, by the time we think about nothing happening in '85 except some thinking, and it's probably going to be completed in '97 or '98.

Storey: I believe I'm thinking correctly that you told me the other day when you went to the Minidoka Project that Reclamation was O&Ming the project, is that right?

Minidoka O&M by the Irrigation Districts

Van Den Berg: That's correct, yeah.

Storey: But during your tenure, you transferred O&M to at least some of the irrigation districts. Could I get you to talk about that transfer process, or am I thinking wrong?

Van Den Berg: No, I think you're thinking wrong. That happened, but it did not happen during my tenure there.

Storey: Happened afterwards?

Van Den Berg: No, it happened before. (Storey: Oh, okay.) The way most of the Bureau of Reclamation projects that were actually ***built*** by Reclamation, the way they've operated is that Reclamation built the project; Reclamation ***operated*** the project until they got all the bugs and stuff out of it, until it was working the way Reclamation felt it should work; and then it was transferred to the irrigation district for operation and maintenance.

". . . Reclamation has . . . continued to do the operation and maintenance on all of the major structures, such as the dams. . . ."

Now, Reclamation has maintained or has continued to do the operation and

maintenance on all of the major structures, such as the dams. We do the operation and maintenance on the dams.

Storey: That's fairly typical, I think.

Van Den Berg: But the distribution systems, the big canals, the headworks, all those kinds of things, ***that*** has been transferred to the irrigation districts. I've been ***involved*** in some of those transfers, but not on the Minidoka.

Storey: Would that have been before you were at Minidoka?

". . . I think the last official transfer of an irrigation district to the water users was A and B Irrigation District in about 1964 . . ."

Van Den Berg: Oh, yes. I think the last official transfer of an irrigation district to the water users was A and B Irrigation District in about 1964, somewhere in that era.

Storey: Let's go back to the beginning of the last interview and work through some of these other issues then.

Van Den Berg: All right.

Storey: Can you think of anything else about Minidoka that you think would be interesting, that you ought to tell me?

Replacing Radial Gates in the Spillway at Minidoka Dam with Gates from Teton Dam

Van Den Berg: I think there's one thing that I forgot the other day, and that is that this also happened at Minidoka Dam in that the ***old*** spillway that was built in Minidoka Dam back in the early 1900s, it was three, four radial gates, built out of wood, was in really bad, bad need of repair. During my tenure there, we did some things, decided that we had to get that spillway rebuilt, and in the end, what we did was we salvaged spillways and bridges. Where the spillway is at Minidoka Dam, you have to go across the channel to get out there to it.

"We moved a bridge from below Jackson Lake down in Wyoming that was used for the Jackson Lake construction, we brought that down to Minidoka Dam and put it in permanently. . . ."

We moved a bridge from below Jackson Lake down in Wyoming that was used

for the Jackson Lake construction, we brought that down to Minidoka Dam and put it in permanently.

END SIDE 1, TAPE 2. DECEMBER 7, 1994.
BEGIN SIDE 2, TAPE 2. DECEMBER 7, 1994.

Storey: So you had salvaged this bridge from just below Jackson Lake and brought it down.

Van Den Berg: Right. We had salvaged the bridge. We brought it down, put it in permanent so that we'll always have a way to get across that south channel at Minidoka Dam with heavy equipment.

Storey: And get to the spillway.

Van Den Berg: And get to the spillway. Okay, that was the first step. Then the second step, we salvaged the radial gates out of Teton Dam. They were just setting there, hadn't ever had any water against them, hadn't ever done a thing since the day Teton failed. And so we took those gates out and brought them down to Minidoka and floated a contract then to have those gates put into the Minidoka Dam, and it was a contract. It was a pretty big effort. It was a 2 or 3 million-dollar job even yet, but yet we felt like it saved a lot of money to use those gates from Teton and the bridge from Jackson. Always looking for a way to save a dollar and do a good job if you can.

Storey: Was Jackson Lake part of the Minidoka Project?

Van Den Berg: Yes, Jackson Lake is part of the project.

Storey: ***And*** Teton?

Van Den Berg: And Teton, yes.

Storey: So they were under your authority, as it were?

Van Den Berg: That's correct.

Storey: I believe it was you who the other day mentioned that the irrigators who were going to benefit from Teton still wanted Teton.

Irrigators Who Stood to Benefit from Teton Dam, Even after the Failure, Wanted a New Dam Built

Van Den Berg: Oh, yeah. They still did.

Storey: Did they raise a fuss about you taking away their spillway gates?

Van Den Berg: No, not too much in that they never paid for any of it. They weren't making any payments on it. It was still government equipment. So it wasn't a big issue.

Storey: My understanding is these things are sort of fairly specialized and custom built.

Van Den Berg: In most cases, that's correct.

Storey: Did it just happen that these gates worked at Minidoka, or did you have to do major alterations? How did that work?

". . . it just so happened that the configuration of these Teton gates was such that they worked very nicely at Minidoka. . . ."

Van Den Berg: No. Actually, radial gates, because of their very nature, can do a lot of things in different places. They raise up and down. You either build them high and narrow or wide and shallow or whatever. But it just so happened that the configuration of these Teton gates was such that they worked very nicely at Minidoka. They were about the right height. They were wide enough to release more water than what we were releasing before. And the design was all done. We didn't have to spend any money on design because we could just go right back to the design manual for the Teton and build a concrete structure there at Minidoka to fit those gates in, because we already did it before. So we saved a lot in design cost. We saved a lot in the fabrication of the gates. We had our own people take the gates out of Teton and move them down to Minidoka, which, I believe, saved many thousands of dollars. So there was just a lot of pluses to doing that. The fact that the radial gates were like they were–if they'd have been 50-foot-tall radial gates, yeah, then it wouldn't have made sense to do it, but they were close enough to being the right size, the right height, that it worked very well.

Storey: And somebody made the connection that you had a need here and gates up there.

". . . we had a regular program of searching for surplus equipment when we had a need . . . There's a lot of government surplus equipment out there if people are willing to look at it and try to find it. You don't have to go out and buy it brand new. . . ."

Van Den Berg: Yep. We did quite a bit of that. I suppose maybe a little bit of it is my Scotch nature, but we had a regular program of searching for surplus equipment when we had a need, and we picked up like a two-yard front-end articulating loader from the Air Force at Colorado Springs, Colorado, at a cost of transportation, which wound up costing us $1,600 to move that good piece of machinery from Colorado Springs to Idaho. If we had gone out on the open market for bid and bought a piece of equipment like that, it would probably have cost us 75 to $100,000, and we were able to pick it up surplus, and it cost us 1,600 bucks to get it to Idaho, and it did everything we needed it to do.

We also picked up things like some semi tractor trailers over here at Mountain Home, Idaho, to do a job we needed. There's a lot of government surplus equipment out there if people are willing to look at it and try to find it. You don't have to go out and buy it brand new.

Storey: How many people were on the staff of the Minidoka Project?

Staffing on the Minidoka Project in the Late 1980s

Van Den Berg: About sixty-five.

Storey: And how many of them are actually in Burley?

Van Den Berg: About twenty-two, twenty-three.

Storey: Where would the others be?

Van Den Berg: Well, you had people out at Minidoka Dam. You know, we had fifteen or twenty there, and we had somewhere, fifteen or twenty up at Palisades, and then you had one at Jackson, a couple at Ririe, one at American Falls, and it varied from winter to summer. In the wintertime we were probably down into that sixty-five range. In the summertime we put on extra help to care for the campgrounds and additional maintenance, some temporary summer help. So we might have got up into the seventies during the summer months.

Storey: Was recreation a major issue for any?

Recreation Issues on the Minidoka Project

Van Den Berg: Recreation was a pretty big issue, yeah. We had several recreational areas.

Storey: That we administered?

Van Den Berg: That we administered, yeah.

Storey: Which ones would those be?

Walcott Park at Minidoka Dam

Van Den Berg: Well, over in that country, you got the one right there at Minidoka Dam, is Lake Walcott, Walcott Park,[2] and that has gone through a whole big rebuild here in the last few years, something that got started when I was project superintendent down there, recognized need, worked with some people here from the regional office, and got good support all the way through the organization that that was something that needed to be done, and ***tremendous*** financial support from the local community. The little town of Rupert, Idaho, there came forth with from 650 to $750,000 of either money or in-kind services as a cost-sharing effort to help with the rebuilding of that park. That was one of the big things that happened, that got started when I was there. It's essentially finished now. I've had the good fortune of being able to go back there and speak both at the dedication of the building of it and the dedication when it was completed, you know, the opening dedication and the completion. That's rather nice.

Storey: This was the rebuild of the dam or the recreation . . .

Van Den Berg: Of the recreational area of park, of the park.

Storey: I think I reviewed that as a case when I was in the Advisory Council [on Historic Preservation].

Van Den Berg: Yeah. And then, recreation is big up around some of the other reservoirs. Palisades, the Forest Service handles all recreation there except for just below the dam where we have some small recreational areas that we handle. Up at Jackson, the National Park Service handles it all because Jackson Lake Dam is inside a national park. Island Park, the Forest Service handles it there because

2. Named after Charles Doolittle Walcott, the first Director of the U.S. Reclamation Service from 1902 to 1907. The U.S. Reclamation was the predecessor bureau from which the Secretary of the Interior created Reclamation in 1923.

it's totally surrounded by Forest Service lands. Ririe, which is the Corps of Engineers-built dam that was transferred to us for operation and maintenance, East Idaho Falls, we operate and maintain those recreational areas. In discussions with the project since I've left, we have some efforts going on there now to try to work a cooperative deal with the county or the state, that maybe they would be willing to step forward and operate and maintain those recreational areas over there, because it's a high-use area. It's eight miles from Idaho Falls, and it gets a tremendous, tremendous amount of recreational use. Those are essentially the two major recreational areas that we actually operate and maintain, the one at Lake Walcott and then the one at Ririe.

Storey: We have a lot of visitation?

Van Den Berg: You have a ***lot*** of visitation, a lot of visitation.

Storey: Do you remember any numbers?

Van Den Berg: I know that at Lake Walcott on weekends like Fourth of July, you can expect two or three thousand people in that park. And with this rebuild of the park and expansion of it with overnight camping areas, daytime camping areas, a better boat ramp, I expect the use will really grow.

Storey: As I recall, that was a CCC-constructed area originally and we rebuilt it.

Van Den Berg: Yep. It was.

Storey: One of the things that you often run into in situations like this is the need for law enforcement, and, of course, right now Reclamation is looking toward obtaining law enforcement authority.

Van Den Berg: Yeah.

Storey: As Project Supervisor, were you ever in a situation where you really felt you needed law enforcement authority, and how did you handle that?

Law Enforcement Issues

"Yeah, we needed it. I'm not so sure we wanted it. I personally felt . . . I'd just as soon have other people be responsible for that. . . ."

Van Den Berg: Yeah, we needed it. I'm not so sure we wanted it. I personally felt sometimes that I'd just as soon have other people be responsible for that. Up at Ririe Dam, we had some incidents there where the fishermen and the boaters, the water skiers and stuff, were getting into some battles. The boaters weren't always respectful of the fishermen. The fishermen weren't always respectful of the boaters. There was actually a time or two when they had to call the county sheriff out of Idaho Falls to go out there and keep law and order.

". . . at Ririe . . . we had a . . . contract, with the Sheriff's Department out of Idaho Falls to essentially police the Ririe area, and they checked the campgrounds, make periodic passes through the area . . ."

What we actually did at Ririe is, on a contract basis, we had a deal, a contract, with the Sheriff's Department out of Idaho Falls to essentially police the Ririe area, and they checked the campgrounds, make periodic passes through the area, and just essentially made their presence known that they were there. It still didn't stop some of the things that happened.

We had some severe vandalism. We had a couple of young fellows one time elect to try to shoot to death one of our rest rooms up there, something like 167 bullet holes in it. Unfortunate for them, they left some identifying information around that the authorities were able to take some of the cartridges in one of the boxes, because of the number on the box, manufacturing number on the box, and were able to trace it back to the ***store***, and that was at a time when you had to sign for ammunition when you bought it. So they were able to trace that back and find the two people who did it. The penalty imposed on those two people by the judge was restitution for the cost, which was about $9,000 worth of damage. One young fellow, I understood, has kept his nose clean, has made his full restitution and is doing well, and the other one is in prison in Wyoming.

But, yeah, when you talk about law enforcement, there's places where you need it. You wonder sometimes whether you want your own people to have that enforcement authority. We have had cases out at Walcott Park where parties and stuff have got out of hand. For a number of years up until recently with the new park, overnight camping and stuff was not allowed. The park was to be empty at ten o'clock at night and the gates closed, and sometimes it was pretty hard to encourage the people to leave.

Storey: What about concessions or what the Park Service would call "in-holdings?" Did we have any of that on the Minidoka Project, maybe cabins on the lake?

Van Den Berg: Oh, yeah, but most of that was–had some stuff up around Jackson, concessions. There are some in-holdings there that the Park Service had to deal with. We didn't have to deal with it. The Park Service had to deal with it.

Storey: So it wasn't a particular problem for you?

Van Den Berg: No. We didn't have the problem over on the Minidoka like they have–we have some other places where we've got some problems. Owyhee Reservoir over here. Somebody may talk to you about that.

Storey: Let me just ask you a couple of questions. I don't think you told me that date when you were born.

Born October 18, 1936

Van Den Berg: 1936. October 18, 1936.

Storey: Well, I would like to keep going because I have a bunch of other questions, but our time is up again. I'd like to ask you whether or not it's all right for the tapes and the transcripts resulting from the tapes to be used for research by people inside and outside of Reclamation.

Van Den Berg: Yes, it is. Yes, it is.

Storey: Thank you. Appreciate it.

Van Den Berg: All right.

END SIDE 2, TAPE 2. DECEMBER 7, 1994.
BEGIN SIDE 1, TAPE 1. MARCH 20, 1995.

Storey: This is Brit Allan Storey, Senior Historian of the Bureau of Reclamation, interviewing Max Van Den Berg, an employee of the Bureau of Reclamation, in the Pacific Northwest Regional Offices of the Bureau of Reclamation in Boise, Idaho, on March the 20th, 1995, at about nine o'clock in the morning. This is tape one.

Mr. Van Den Berg, last time when we were talking, you mentioned the Hunt Internment Camp for the Japanese Relocation Program during World War II on the Minidoka Project. Could you tell me some more about that?

Hunt Internment Camp on the Minidoka Project During World War II

Van Den Berg: Well, that particular camp, of course, was established during World War II essentially for the relocation of some of our Japanese-American citizens inland off the coast. The lands that that camp was built on were Federal lands, part of the Minidoka Project. ***My involvement*** came about as the Project Superintendent on the Minidoka Project when the Japanese-American League approached the Bureau of Reclamation about putting together some sort of a memorial out there at that particular site, which, you know, was a very good idea, I think. After looking at it a little bit, you realize that it ***is*** one of the real important parts of our history, but looking at it today, maybe also has a little bit of–has some real negativism to it when you think about, you know, how we treated some of our own citizens at that particular time.

And so we worked hand in hand, people from the Minidoka Project Office, people from the regional office here, we worked hand in hand with the Japanese-American League, and over a period of two or three years put together some plans to put up a permanent memorial there at that particular site, and along with that, then, there was a dedication ceremony. By the time the dedication ceremony took place, I was back in Boise working over here again as the Regional Supervisor of Water, Power, and Lands, but went back over and was there on the day of the dedication service.

If I recall correctly, at one time there was something like 10,000 citizens in that particular camp. There are still places in the canal systems where these citizens built drop structures of hand-placed rock mortared together that were standing up better than some of the concrete structures that we built. There are still shrubs, some existing shrubs there that were planted.

Storey: This is at the internment camp?

Van Den Berg: At the camp. There's still some old rock structures there that were part of the foundations in the guard camps and those kinds of things that either haven't been removed or have just weathered away. The wood parts are gone, but the rock structures and the rock columns are there. It must have been quite an experience, not a positive experience, for those particular citizens when you think of the desolation of that country as compared to the coast, and being hauled out there on a train sometimes in the middle of the summer in 100 degree heat with dust so thick you couldn't hardly breath or in the middle of the wintertime, when it was cold and rainy and snowy and blizzardy. It must have been a pretty shocking experience for those people.

Storey: Were there any tensions in putting together the memorial? (Van Den Berg: Were there what?) Any tensions between the groups?

Van Den Berg: No, none whatsoever. I didn't experience any of that. All the people that participated–you know, really, there just weren't any indications of any animosities or hard feelings that that had happened. It was a thing of the times.

Storey: Who all came to the dedication ceremony, do you remember?

Van Den Berg: Oh, there were numbers of people who had been in that camp. Of course, most of those that were there that came to the memorial service were youngsters in the camp, teenagers, young people in their twenties and thirties that, you know, were still alive today, and they talked quite a bit. I talked with, oh, I don't know, with several individuals who had been there and gone to school, and gone to grade school and those kinds of things and listened, you know, to some of the stories, talking about where the guard camps were, the water tower, the flagpole.

The Minidoka Project Office down there has a ***number*** of pictures of that camp when it was in full bloom. One of the local newspapers that was running at that time evidently had taken a lot of pictures, a lot of aerial pictures, and written quite a bit about the camp, and when that newspaper closed down, went out of business, they brought those pictures over and gave them to the Bureau of Reclamation there in Burley, and I believe that those pictures and stuff are all there in the vault where we keep all that sort of stuff even today.

Storey: So the internees at the Hunt Camp were working on the Minidoka Project, is that right?

Van Den Berg: Well, they worked on ***that*** part of it. See, part of that whole program was, you know, they would, the actually plant gardens and raise a lot of their own food, and in doing that y built some irrigation ditches, did some things there on some of the canals to get water out onto the lands there that were part of that Hunt site, and they didn't work all over the Minidoka Project, you know, helping develop irrigation, but they did a lot of things right there in their area to put water on some of those lands so that they could grow their vegetables and their crops.

POW Camps in the Area

One of the interesting things I've recalled is that in that same vicinity,

not too far away, over in the Heyburn/Paul areas, there were two other P-O-W camps, and I believe one camp was German and one camp was Italian soldiers that P-O-Ws that had been brought over here.

Because of the Labor Shortage During World War II, Farmers Were Allowed to Hire Japanese and Italian Prisoners of War and Japanese Internees to Work Their Farms

Because of the shortage of manpower in the area as a result of the war, the local farmers were allowed to ***hire*** both the P-O-Ws and the Japanese citizens out of the internment camp to come out and work on their farms. Our government, in their infinite wisdom, even allowed us to pay the enemy P-O-Ws, the Germans and the Italians, ***more*** per hour than we were allowed to pay our Japanese-American citizens.

Storey: That's interesting.

Van Den Berg: I've heard that. I think there's a fellow in Burley that can verify that from the history records. It seems appalling to me, but I understand that was the case.

But the local farmers did hire a lot of the people to come out and work in their fields during beet harvest and potato harvest, and it wasn't just our Japanese citizens but also the German P-O-Ws and the Italians.

Storey: Hmm. That's interesting. Let's go back and talk about South Dakota State University.

Van Den Berg: Okay.

Storey: Why had you decided to–was it engineering that you studied or was it water resources?

Van Den Berg: It was engineering.

Storey: Why had you decided to study engineering?

Why He Chose to Study Engineering

Van Den Berg: Well, there were a couple of reasons. First of all, I'd been out working for a number of years for a construction company building dams, small dams, with a Caterpillar and a large scraper, and also built some roads, did some land

leveling ***for*** irrigation during that period of time, and found a ***real interest*** in dams, the building of dams, water resource development, irrigation development. That coupled with the fact that my older brother was also an engineer, had graduated from South Dakota State University. I think the combination of those two things was why I decided to go into engineering–civil engineering. And, of course, in civil engineering there are many, many options you can study in different directions from structural engineering to water resources, to sanitary engineering, water systems, water quality, all of those kinds of things.

". . . I honed in on the hydrology and the hydraulics and the water resource part of it. . . ."

But I honed in on the hydrology and the hydraulics and the water resource part of it.

"I also had a real strong interest in veterinary science . . ."

I also had a real strong interest in veterinary science, have wondered yet to this day whether or not part of my decision to go into engineering instead of veterinary science was I could get done in four or five years in engineering. It was going to take me seven years or so in veterinary science, and I, being an older student, I was in a hurry to get done and get out and start doing something. But I think it was the right decision for me, really.

The engineering, the water resources, the working with the irrigators, the water resource, the recreational-type things, it's been a ***really*** interesting profession.

Storey: Let's back up just a bit. I'm not sure that you actually told me when you were born.

Van Den Berg: October 18th, 1936.

Storey: Tell me about what land leveling was like. This would have been the early sixties, right?

Land Leveling with Late 1950s Technology

Van Den Berg: Even before that. The first land leveling that I did was in 1955.

Storey: Tell me what hand leveling was like back in those days.

"Back in those days, you had to have what we call a 'dirt eye.' Today, with the current technology, all you have to do is know how to run the machine, and they use what they call laser leveling today. So if you can drive the machine back and forth across the field, the laser adjusts the machine up and down to cut the humps off where necessary and deposit dirt where necessary. . . ."

Van Den Berg: It was a lot different than it is today. Back in those days, you had to have what we call a "dirt eye." Today, with the current technology, all you have to do is know how to run the machine, and they use what they call laser leveling today. So if you can drive the machine back and forth across the field, the laser adjusts the machine up and down to cut the humps off where necessary and deposit dirt where necessary. But back in those days, to do land leveling–and it's a misnomer in a way, because what you're actually doing is building a slope on the land so that the water will run across it.

". . . we were actually building a slope on the land so that the water would run from one end of the field to the other . . ."

They do have what they call field-level irrigation, which in that particular case you do level it exactly level, and you dump water in from all sides until you get two or three inches of water on the whole field then you shut it off and it soaks in. But what we were doing, we were actually building a slope on the land so that the water would run from one end of the field to the other, and you'd take a field and you'd grid it in hundred-foot grids, stake it so you'd have a stake every hundred foot lengthwise, crosswise, and you'd survey it, and then you would ***design*** the field in such a way, and you'd have to determine at each one of those stakes, "What do we have to do here to build that slope? Do we have to cut some off this hump? If so, how much? And how much do we deposit down in this low spot?" So that when you were finally done, you had a field that essentially sloped from one end to the other, and when you'd put water in a furrow, then it would run down that furrow to the bottom end of the field and irrigate the field, and you had to do this within an accuracy of a half a tenth, which is about a half inch.

"If the field was real flat to start with, you really had your work cut out for you, because on a field that's very flat where you have just a very minimum slope, the least little bit of error, why, you can have your water running off across the field in a different direction, and you don't want that to happen. On a steeper field, you can get by with a lot greater variance . . ."

If the field was real flat to start with, you really had your work cut out for you, because on a field that's very flat where you have just a very minimum slope, the least little bit of error, why, you can have your water running off across the field in a different direction, and you don't want that to happen. On a steeper field, you can get by with a lot greater variance, because, you know, from one end to the other, water has a tendency to run downhill. It'll stay in the furrow like that.

When I spoke earlier about having a dirt eye, everybody that you put on a machine back in those days could not do what they call finish work with a scraper or with a patrol.

Storey: A patrol?

Van Den Berg: A grader. And so you had to have a certain–I don't know whether you'd call it natural ability or what, but you had to have that dirt eye to be able to tell that, hey, you've got your cut about right, you've got your fill about right, because with a field that's staked at just hundred-foot intervals, there can be a lot of variance in between those hundred-foot stakes, and you have to be able to see where that break is. And evidently, I was able to do that. I not only leveled a lot of irrigation land, but also became the finish scraper operator on some pretty big road jobs after that, and in order to do that, you've got to be able to see the dirt, as they call it, see where things change. Some of these fields were big. Probably the biggest one was, oh, eighty acres.

Storey: How long would it take you to do a job like this? Was it expensive for the farmer?

". . . with a big Caterpillar or big scraper, a hired operator, we were working for twelve dollars an hour, machine *and* operator. . . . it seemed like an awful lot back in the fifties. . . ."

Van Den Berg: Yeah, it was expensive. In those days it seemed to be expensive, very minimal by today's standards. When we were doing that land leveling back there, believe it or not, with a big Caterpillar or big scraper, a hired operator, we were working for twelve dollars an hour, machine ***and*** operator. So if you run a ten-hour day, you're talking about $120 a day. That doesn't seem like much money by today's standard, but it seemed like an awful lot back in the fifties.

". . . if we were doing that in 1995, you're probably talking anywhere from sixty,

seventy, up to a hundred dollars an hour for that same type of machine and operator. . . ."

In comparison, if we were doing that in 1995, you're probably talking anywhere from sixty, seventy, up to a hundred dollars an hour for that same type of machine and operator. So there's been some changes. And the ***cost***, really, would depend on how much dirt you had to move. If you had a field where it just needed some minor touch up here or there to make the water run, it could take just a couple or three days to clean a field up and make it irrigate. On the other side of that coin, you can spend a week or two pretty easily on a forty-acre field. It wouldn't be uncommon to move forty thousand cubic yards of dirt on a forty-acre field, and that takes a while. You can more or less figure if you don't have to move the dirt very far, with the type of machine I was operating back in those days, you could probably move 1,000 yards a day. So if you had 40,000 yards of dirt, you might be working there for forty days in order to get that done.

On the other side of that coin, I've gone into fields where you could do a whole forty acres maybe in two or three days and move no more than three or four thousand yards of dirt to make that field irrigate because it had a pretty natural layout for irrigation, it just needed to have a little bit of dressing to make it work.

Storey: This was in Central South Dakota?

Van Den Berg: This was in Central South Dakota.

Storey: Was this using Reclamation water, do you know?

Some of the Land Leveling Was for Bureau of Reclamation Pilot Programs on the Oahe Project

Van Den Berg: The water wasn't Reclamation, but the projects, these small individual farm projects, were being built under Reclamation ***guidance*** as pilot programs to see how irrigation would work in that country for the authorized Oahe Project that was part of the Pick-Sloan Program.[3] I don't recall whether or not the Bureau of Reclamation furnished any moneys to help pay for the leveling, the physical leveling itself, but ***I do know*** that the Bureau of Reclamation did all the design, the layout, and quality control.

3. Pick-Sloan Missouri Basin Program authorized by the Congress in 1944.

Worked with Reclamation's Ray Dekramer out of Huron, South Dakota

I, working for the contractor, worked a lot with Bureau of Reclamation people, or maybe I should say a Bureau of Reclamation person in particular, a fellow by the name of Ray Dekramer, who was working out of the Huron, South Dakota, office at that time for the Bureau of Reclamation, and they did the design. This Ray Dekramer came out there and more or less did the construction administration and the quality control. When we thought we had the field done, then we would tell Mr. Dekramer that we felt like we were done, and he would come out, set up a level, a surveying instrument we call a level, and we would run a check then on the field to see whether it met all the criteria that they were asking for. If it did, we were done, and if they found some spots where it wasn't quite right, why, we would fix those, and then we were done. Whether or not the Bureau furnished any money to the farmers to actually help pay for our part of it, I don't know, but they did do the design.

Storey: What about crops? What kind of crops would justify this kind of what in that day was considered an expensive procedure?

Van Den Berg: Well, back at that particular time, ***most*** of those lands that I leveled, for the first two or three years, they raised corn. There's two reasons for that. One is that corn was a pretty good cash crop or feed crop. Most people in that area raised a number of cattle, and the farmers would raise corn on those lands, normally ensilage corn, and it would ensure them a feed supply in an area that was subject to drought where sometimes you just didn't raise any crops at all. In fact, in 1956 only the irrigated ground in that part of the country grew anything. Almost everything else dried out. The drought was so severe at that particular time, we just didn't grow any crops. The people there had something to learn. They didn't know irrigation. They didn't know how to take care of their land with that high production, and they found out that after two or three years that they had to start putting a lot of commercial fertilizer on that land in order to get any productivity out of it, to be able to sustain productivity. Up until that time, you didn't see hardly any fertilization.

But predominantly it was corn, and then they would rotate with small grains, maybe feed barley or something, and go back to corn, but mostly they raised crops that were tied to livestock production, to be used to feed livestock, to fatten livestock. I don't recall anybody in that particular area going into growing potatoes or anything like that.

Storey: Do you remember the equipment that you were using, the brands and the

models and all that kind of stuff?

Van Den Berg: Yeah, absolutely.

Storey: And how does it compare to today's equipment?

Van Den Berg: Ancient.

Storey: First of all, tell me what the equipment was.

Equipment He Used When Moving Dirt

Van Den Berg: A lot of difference. The one machine that I run for five and a half years was a 1947 D-7 Caterpillar crawler tractor. Behind that, we pulled a fourteen-yard LeTourneau L-P–that's the model number–L-P scraper. This was a cable-operated rig. The Caterpillar had a winch on the back, and so you actually had two parts to that winch. One part would actually wind up the cable to raise and lower the bit, the cutting bit on the scraper, and the other side was for running the in gates and the lift that would eventually push the dirt then out of the scraper as you laid it out on the ground or placed it in the borrow area. Those machines at that time, that D-7 Caterpillar weighed about 20,000 pounds, seemed big, but it wasn't too long until Caterpillar started coming out what we call the D-9 Cat, which probably weighed in the neighborhood of fifty or sixty thousand pounds and had a lot, lot more horsepower. But there were some real changes, starting in the mid-1950s on, in the dirt-moving industry. These rubber-tired scrapers, in 1960, I began operating a twin-engine Euclid scraper that was also a fourteen-yard scraper. It had an engine in the front, engine in the back. You run both of them from up front on the driver's seat. You could move–oh, on a good day in comparison, you could move four or five times as much dirt in a day with that twin-engine Euclid fourteen-yard scraper as you could move with a Caterpillar and fourteen-yard scraper. It was just so much faster. It was rubber-tired. It was self-propelled. It would go like hell, and you could move a lot of dirt in her.

Now, by today's standard, that fourteen-yard scraper in 1960 is small. We have scrapers now that run into the fifty, sixty, eighty yards, but they're used in volume production, where you really move a lot of dirt. Horsepower is tremendous, big V-8, V-12 diesel engines, sometimes two engines. I have seen machines that have actually had three engines and two scrapers all in one machine that one person would operate. I never did run one of those, but I've watched people operate it. There have been big, big changes in the machinery

from there in the fifties to what we're doing today.

Storey: And laser leveling, is it as easy as it sounds?

Van Den Berg: Yeah. I suppose it's because, you know, some of us old hands that used to do it the hard way with the dirt eye, we almost look at it as it's not as challenging because all you have to do with laser leveling is learn how to operate the machine and run the machine up and down the field and across the field, and it'll do all the brain work. You just have to drive it.

Storey: So do they have to do grids and things now the way you used to?

Van Den Berg: Well, they don't. It's different. They have to do surveying. They have to survey the field at least with some sort of a grid system to get an idea of how the land lays in the first place, to do the design. They still have to do some design work, in laser leveling, and once they do that design work and reach a decision that, okay, from one end of the field to the other we can have a certain amount of drop, or from one side of the field to the other you can have a certain amount of side fall, as we call it in the dirt-moving industry, why, then the operator can go out there, and he can set up his laser system, which is a sensor-type deal that shoots a laser beam across the field at the prescribed elevation or at a prescribed slope, and then as you run that machine across that field, it'll sense where that laser beam is, and it'll keep the blade or the bit on that scraper in such a position that it'll . . .

Storey: It'll give you that slope?

Van Den Berg: It'll give you that slope. Maybe I'm jealous, but I think it's probably a lot easier today than it was then, and in a lot of ways doesn't take as much ability to do a really good job of leveling as what you had to do when you had to be able to see the dirt, as we called it.

Storey: Tell me about constructing stock tanks in those days.

Building Stock Tanks

Van Den Berg: Well, South Dakota, particularly, was a dry state. A lot of our water came in the way of snow, and it would run off in the spring. You'd have intermittent dry ravines. They'd run a little bit of water in the spring, and by the first of June or so, they would be dry.

"There were . . . exceptionally good grazing lands, but there was no water supply. And you had two choices, to try to build some sort of a stock pond or to drill a well. . . ."

There were acres and acres of lands back there that were exceptionally good grazing lands, but there was no water supply. And you had two choices, to try to build some sort of a stock pond or to drill a well. Drilling wells in that country was kind of a crap shoot, even when you had some people who could witch water, a no-fail system. Sometimes they were unsuccessful.

". . . Federal Government got into a program of helping farmers and ranchers build these stock dams under a subsidy-type program . . ."

The Federal Government got into a program of helping farmers and ranchers build these stock dams under a subsidy-type program, and so the way this worked is that the farmer/rancher would apply through the . . .

END SIDE 1, TAPE 1. MARCH 20, 1995.
BEGIN SIDE 2, TAPE 1. MARCH 20, 1995.

Storey: You were saying that the Federal Government had gotten into a subsidy program for building stock ponds in this arid area.

Federal Government Vetting of Sites and Design of Stock Ponds

Storey: Yeah. The Federal Government, through the A-S-C-S office, that's the Agricultural Stabilization and Conservation Service, and then the S-C-S, the Soil Conservation Service, had programs there to assist people in building these stock ponds, and so they would apply, and the technicians or engineers would come out from those agencies and look over the land that this individual had and pick a spot to build a structure. Now, they were doing some subsurface sampling, "they" being the S-C-S office, before they would approve these structures, because sometimes there could be some kind of a gravel vein or something underneath right where you were going to build this thing and they wouldn't hold water. So they'd have to do some sampling and make sure that the site was just right, and after that was done, why, then they would design an earthfill structure in that location, set out some stakes, and then we would move in there with a machine–maybe I should say "I," because I was the only operator for the five and a half years we were doing that stuff–move in there with a machine and build a structure.

"On those small ponds, you still paid attention to design and how you constructed them. . . ."

On those small ponds, you still paid attention to design and how you constructed them. You had to cut what we call a key trench even in those small dams, just like we build in these big humongous structures that the Bureau of Reclamation has built over the years, and you dig this key trench until you get down to suitable material and make sure that all the organic material is moved off of that key trench and that you've got a good spot to start your fill, and then you go out into the reservoir area and clean off some area. When I say clean off, take off the organic material, the sod, and try to find some good clay. Usually in South Dakota we could find some pretty decent clay, and you'd start building your dam with that clay material in that key trench. Now, the goal was to maintain a zone right straight up from the bottom of that key trench of clean clay-type material that was impervious, that the water wouldn't run through. On the upstream and downstream side of that zone, we could put the other material, we could put the sod or the organic material–it always went on the downstream side. The cleaner material or the better material went on the upstream side, but it was ***real important*** to maintain quality of material in that key trench, in that zone that went from the bottom of the key trench clear to the crest of the structure.

"When we were . . . done . . . the Soil Conservation Service . . . would even core or drill a hole down through the center of that dam with a small auger to indeed check to see whether or not you had maintained continuous clay-type material . . ."

When we were ultimately done with the job and asked the Soil Conservation Service to come out and check it, once in a while they would even core or drill a hole down through the center of that dam with a small auger to indeed check to see whether or not you had maintained continuous clay-type material all the way through that zone. We call that "zone one" material, is what we call it. It's actually the zone that keeps the water from running through the embankment. And these embankments sometimes were anywhere from eight to ten feet high at a minimum. Probably the tallest one I ever built was thirty-five feet, anywhere from two to three thousand cubic yards to as much as ten thousand cubic yards.

Storey: How long would it take you to build your typical one, your eight- or ten-foot-high one?

". . . if I had two or three of them in the general vicinity, a lot of times I could build three a week, but roughly speaking, you could more or less figure on about a thousand yards a day. . . ."

Van Den Berg: Oh, probably about two to three days. I would actually, maybe, build two of these a week. If they weren't very far apart, if I had two or three of them in the general vicinity, a lot of times I could build three a week, but roughly speaking, you could more or less figure on about a thousand yards a day. So if you had two thousand yards of fill, you'd expect to build that in two days and then go onto the next spot.

Storey: How many hours a day?

"The fellow that I worked for . . . wanted a sixty-seven-and-a-half-hour work week. You got off an hour early on Saturday, but I could have all the hours over that that I wanted. . . . as long as the work was there, but the minimum was sixty-seven and a half hours. . . ."

Van Den Berg: Twelve hours, minimum. The fellow that I worked for, which was Roger Heinz Construction out of Miller, South Dakota, he wanted a sixty-seven-and-a-half-hour work week. You got off an hour early on Saturday, but I could have all the hours over that that I wanted. If I wanted to work eighty or ninety hours, I could do that, as long as the work was there, but the minimum was sixty-seven and a half hours. He wasn't real fixed about when you got there in the morning. If you got there at seven o'clock in the morning, you worked until seven o'clock at night. If you got there at six, you worked until six, a twelve-hour day on site, a half hour for lunch, and you worked the rest of the time.

Storey: Was that typical of the farming area?

"The philosophy, you know, back there is that you make hay when the sun shines, because in the wintertime back in that country, you couldn't move dirt, so you tried to get as much as you could done during the summer months . . ."

Van Den Berg: Oh, yes. Yeah. That was not unusual. The philosophy, you know, back there is that you make hay when the sun shines, because in the wintertime back in that country, you couldn't move dirt, so you tried to get as much as you could done during the summer months when you could actually be out there moving dirt. As long as the work was there, you were–probably the most hours I ever worked in a week was ninety-five hours.

Storey: And then during the winter you were unemployed, basically?

". . . some winters we were employed all winter long rebuilding machinery, getting ready for the next year. . . ."

Van Den Berg: Sometimes, not always. There was a winter or two where we spent almost all winter rebuilding the machinery, overhauling the engines, rebuilding the tracks. This contractor also had a couple of drag lines. They almost always worked in other areas. In fact, they worked on the Garrison Project up in North Dakota quite a bit, helping build some of those canals up there, but some winters we were employed all winter long rebuilding machinery, getting ready for the next year.

". . . one winter . . . I went and became a gold miner in Homestake Gold Mine at Lead, South Dakota, through the winter months. Didn't like that too well. . . . I was working 4,350 feet *down* under the surface. . . . I was . . . a contractor's helper. . . . You got paid so much an hour to move ore cars, to shovel rock onto the railroad tracks. . . . The rock where I worked was 108 degrees natural temperature . . ."

There was one winter where I went and became a gold miner in Homestake Gold Mine at Lead, South Dakota, through the winter months. Didn't like that too well. As quick as the spring broke and we could move dirt, I went back to moving dirt again.

Storey: How long were you at Homestake?

Van Den Berg: About five months, I think.

Storey: You were working the deep mine?

Van Den Berg: Yeah. I was working 4,350 feet ***down*** under the surface.

Storey: Tell me about that a little bit, if you would.

Van Den Berg: Well, when I went to work there–well, all the time I worked there, I was what was considered a contractor's helper. We had deep mining crews that were usually made up of four people, and there'd be four of what they called contract miners and then a helper. When I first went to work there–well, ***all the time*** I was there, I was a helper to a contract crew, and the reason they use the term "contract" is that these people, these contract crews, worked on a basic hourly

wage but also, then, they got paid according to production. So the more that they could produce, the bigger check they took home. The contractor's helper wasn't part of that. You got paid so much an hour to move ore cars, to shovel rock onto the railroad tracks.

It was an interesting experience. You'd get in a cage with a number of other people and you'd drop three, four, five thousand feet down a hole in the ground, and it's dark, and you wear the typical miner's hat with a lantern on top. It runs off a battery pack that you carry on your belt. Hot. The rock where I worked was 108 degrees natural temperature, so they blew a lot of fresh air down in the mine to cool things off. The deeper you go, the hotter it gets. I was down to 1,500 [??] once. That was deep enough for me.

But it was a good experience. The pay was good. The working conditions were constant. They never changed. You know, it could be twenty below zero topside and you'd go down in the mine, the temperature would be the same. It could be a hundred degrees topside, and you'd go down in the mine, the temperatures were the same. It never changed from winter to summer. It was pretty constant down there.

Storey: Do you remember what they paid?

Van Den Berg: I think, as a contractor's helper at that time, I was making something like $2.87 an hour.

Storey: And that was considered good pay?

Van Den Berg: That was considered pretty good pay in 1958.

Storey: And it was '58, then?

Van Den Berg: I think, yeah. It was the winter of '57 and '58, is when it was.

Storey: One other thing you mentioned that you did while you were operating heavy equipment was draining wetlands. Could you tell me about that process?

Draining Wetlands in South Dakota

Van Den Berg: Oh, yeah. That's an interesting conflict in some ways.

"This was another one of these subsidy programs through A-S-C-S and the Soil

Conservation Service . . ."

This was another one of these subsidy programs through A-S-C-S and the Soil Conservation Service where a farmer could apply for assistance to help drain wetlands. Quite often there were wet areas in agricultural fields that didn't hold water through the season. They were just wet enough during the spring, at least some springs, to make it impossible to farm them or hard to farm, and so you would go out and you would build drainage ditches to drain the water out of these low areas.

Drained Both Intermittent and Permanent Wetlands

I will refer to those as intermittent wetlands because they were wet early in the spring, but by late May or early June they were almost always dry. So they were essentially non-productive-type lands. So by draining those low spots, they could become productive, at least from an agricultural standpoint.

There were some other wetlands that we drained that were not intermittent. They were wetlands that had water in them all year long, and you would also drain some of these because the farmer/rancher wanted to either farm it agriculturally or wanted to turn it into good grassland to graze cattle, and so we drained some wetlands that were real true wetlands, that had water in them almost all year long.

It sounds strange today, because now we're in a situation in this country where we're either trying to ***stop*** the reduction of wetlands or even build wetlands. The Bureau of Reclamation today, we're supporting the rebuilding of wetlands. I think about that quite a bit, because now we're spending money to reestablish some of the things that we destroyed forty years ago. I know places back there in South Dakota where it would be easy to reestablish 160 acres of wetland with no more than probably ten to fifteen yards of dirt. You could do it with a dump truck. Sometimes these drainage ditches, you had to dig a drainage ditch for a long, long ways to drain a lowland or to drain a slough. It would only take about one dump load of dirt to stop that water from running down that canal. It would be easy to reestablish some of those wetlands. I don't know whether they're doing it or not, but I think about that quite a bit when we're out here spending money to recreate wetlands here, that there are opportunities out there where it could be done pretty easily.

Storey: Yeah. How were these designed?

Van Den Berg: The designs on those were simply a leveling procedure. The S-C-S would come out and survey the–***usually*** it was the natural runoff channel, because almost all of these sloughs or low places had someplace around that if they got so full, there was a spot where the water would run out, the high water would run out, and that was usually pretty obvious. So you'd survey this and figure out how much you had to cut out of that natural channel to make that slough drain totally, and the way you did that is you'd go out to the low point of the slough, the deepest part of the slough, and most of the time these were only–well, in the intermittent ones, you know, maybe they only held six inches of water in the spring. The real wetlands, they may have a couple of feet of water in them that lasted all summer. But you'd go out to the deepest part of the slough and start at that particular point, start with a canal bottom or a drainage ditch bottom that was about four inches deeper than the low spot in the slough, and then you would dig that out to a spot outside of that area that was lower than the slough. So essentially what you had was just a drainage ditch with a bottom that was twelve feet wide–that's not right–ten feet wide, and that sloped a tenth for every hundred feet, and what that means is for every hundred feet of distance, you'd drop the elevation by a tenth.

Storey: Of a foot or . . .?

Van Den Berg: Tenth of a foot, yeah. And so when you got done, why, the water would run out of that slough very nicely, and you'd have a dry piece of ground that you could farm or graze or do whatever you wanted.

Storey: Do you have any recollection of the ***size*** of the intermittent wetlands on average?

Van Den Berg: On the average, oh, they varied all over the place, from probably two or three acres for some of the smaller ones up to ten to fifteen acres, twenty acres, for some of the larger ones. That's for the intermittent.

Some of the real wetlands, there was one there that was about 160 acres.

Storey: But on average, what was the other end of the range? Let me put it that way.

Van Den Berg: Oh, I'd say if you had to average all of them, you're probably talking five to ten acres.

Storey: Not very big areas.

Van Den Berg: No, not big areas, but particularly in the farm fields, in the fields that they were actually trying to farm agriculturally and these intermittent wetlands, my personal opinion on those is that they didn't really do anything any good. They didn't provide anything for some of our wildlife, particularly like our ducks and stuff, because by the time the ducklings and stuff are ready to hatch, they were dry, there was no water there, and it may be miles, maybe a long ways from water. So in some ways, intermittent wetlands were leading like maybe a mother duck or something to hatch out a brood someplace where they were bound to fail, where if the wetland wasn't there, then they would go to where there was permanent water and do that. So in my opinion, it didn't provide lots for wildlife and those kinds of things, and it made it damned miserable for the farmer to farm some of those lands because they were just wet enough to get him stuck, either that or he had to make short fields. He couldn't go through them. He'd have to turn around and just make a lot of short runs and a lot of turnaround time. So there were a lot of benefits in some cases to doing it.

But the real wetlands, I think that was a bad decision to drain those at that time. But they were government-subsidized.

Storey: Yeah. Were there any other activities that you can think of that you were engaged in when you were operating equipment?

Other Kinds of Things He Did with the Earth Moving Equipment

Van Den Berg: Oh, yeah. Bulldozing snow. Some winters, when we had a lot of snow, blizzards in South Dakota, we'd spend a lot of time out bulldozing snow, opening roads, clearing out feedlots and stuff so that people could feed their cattle. Sometimes that's the only way you could do it. You just had to get somebody out there with some big machinery to move that snow in order for people to feed their livestock. Did a lot of that.

Even worked as a car crusher for a time or two. One of the local junkyards would hire us to come out and smash old car bodies, and so you'd go out there with this Caterpillar, run up on top of these car bodies and smash them down flat so they wouldn't take up so much room, and then he could stack them on a truck and haul them off somewhere. I don't know where they went, but we actually smashed some cars down for him a couple of springs.

We did some work in what was referred to at that time as the dump yards for the local communities, which now are referred to as sanitary landfills. A lot of these small communities would just have an area, forty or eighty acres,

where they'd dump all their junk during the year, and in the spring, we would go out there with a Caterpillar and a dozer and push all this stuff up in kind of a rick, as we called it, at one end of the field, or in some cases, if they asked us to, we would dig a big trench with the bulldozer and bury it. We did quite a bit of that every spring.

Storey: Whole variety of things, then.

Van Den Berg: A lot of stuff.

Storey: When you came to Reclamation, if I can read my notes at three months' remove, you started working on the design flood study?

Doing Design Flood Studies at Reclamation

Van Den Berg: Yeah. (Storey: For . . .?) Well, there were a number of reasons for doing those types of studies. You could almost call it a safety-of-dams program at that time that was evaluating the capability of the spillways on a lot of the existing dams, evaluating their capability to pass the design floods, and that was some of the work, and then there was also the job of doing design flood studies for sizing new construction, the spillways on new construction.

One I remember very well, and I probably mentioned that earlier, is I did the design flood study for Teton, and that information was then taken down to Denver and used to size the spillway for the Teton Dam, which, as we all know, ultimately failed.

". . . two purposes for that type of work. One, for new construction, for the sizing of spillways for new construction, and the *other* for checking the adequacy of the spillway for some of the construction that took place years and years ago. . . ."

There was two purposes for that type of work. One, for new construction, for the sizing of spillways for new construction, and the ***other*** for checking the adequacy of the spillway for some of the construction that took place years and years ago.

Based on Hydrology Records since Early Dam Construction, Several Spillways Have Been Enlarged

Many of these structures were built in the early 1900s, 1902 on up to 1930s and '40s. They used the data that was available at that particular time to size

spillways, but we have seen enough flood events in recent years, ***big*** flood events, to make us take a new look at some of the criteria that was used on those old studies and that old construction. As a result of that, there have been several spillways that have been enlarged because current criteria would tell us that that existing spillway is not big enough to take care of the maximum probable flood that might occur at that location.

Storey: What do we normally design for nowadays?

Issues That Are Considered in Sizing Spillways

Van Den Berg: Nowadays we normally design for the probable maximum flood ***if*** it's what we call a high-hazard structure, and that means that there's a large population downstream from that structure. So you don't want to take ***any*** chances of having an inadequate situation where too small a spillway could cause a dam to fail and have a catastrophic failure in the area downstream. There ***are*** places where we will accept designs for floods of lesser magnitude than the probable maximum, maybe even as low as one-half the probable maximum flood ***if*** it's what we consider a low-hazard structure or if it's in an extremely remote area where there may be plenty of time for the flood to attenuate, as we call it, to smooth out and not be so big when it got downstream. Because enlarging spillways or building the large, large spillways to take care of the maximum probable flood can be ***extremely*** expensive, so you want to make sure that what you're dealing with warrants the expenditure.

Some of the natural floods that have occurred recently that have really made us take another look are the Rapid City, South Dakota, flood that happened in 1972, the Colorado-Big Thompson flood that I believe occurred in 1976. Those were both floods of magnitude that we didn't think probably could happen up until the time they happened. So then you back up and you start taking a look at your data again and saying, "Hey, if it can happen there, can it happen here?"

Storey: Yeah, why can't it happen here?

Van Den Berg: Yeah. Mother Nature can throw some pretty big stuff at you that you're just maybe not prepared to handle. Over here in central Oregon, which is considered to be a drought or an arid area, there was a flood over there on Willow Creek that the Geological Survey estimated the runoff from a twelve square mile area–it was a flash flood type of thing–that the peak runoff from that twelve square miles was like 57,000 cubic feet per second. Now, we don't

expect ***that*** kind of a flood off of the Boise system, which is over ~~12,000~~ [1,200] square miles. So when you see those small events like that that can happen and cause such tremendous floods on a very small area, it has to make you reevaluate a little bit where you're at with some of this other data, but you've got to recognize, percentage-wise, you can get a lot bigger flood off a small area than maybe you can off of a large area, because normally that concentration of storm isn't going to happen over a big, big, big watershed like the Boise watershed. It may happen over a ***piece*** of it, a small part of it, but it's not very likely that it'll happen over all ~~12,000 square miles. I should correct that. It's not 12,000 square miles. It's~~ 1,200 square miles.

Storey: But that's still a very large area.

Van Den Berg: Yeah.

Storey: Where is the art and where is the science in design flood studies?

Van Den Berg: Probably the simplest way that I can answer that is that the science is in the existing data of events that have already happened, and you can take that data and run the data through what we call a frequency analysis to produce what we call a frequency curve that could then project out that if you have a certain magnitude of a flood in a hundred years and that could project out to the possibility of having some larger flood in a thousand years or ten thousand years or way out there in never, never land. To me, that's the science. You take the data you have, you evaluate it, and you say, okay, if this event has already happened and it fits on this frequency curve, and it's within, let's say, a hundred-year period, then if you go out to a five-hundred-year period or thousand-year period, you could expect that over that time frame. You could have a flood somewhat larger than what you've already seen.

The art of doing a design flood study is being familiar enough, I think, with the characteristics of a watershed to understand how they're going to react when you dump water on that whole watershed or how they're going to react if you have a storm that comes in at the bottom of the watershed and moves to the top, or if you have a storm that comes in at the top of the watershed and moves to the bottom. It makes quite a difference in the type of ***flood*** you have, and that's where the art comes in, I think, of making some decisions on what you come out with with design flood studies.

And you can add another element. If a storm comes ***across*** the watershed instead of up it or down it, these are all the things that can affect how

runoff occurs. But that's what I see the art of understanding or having a feeling for a particular watershed and how it's going to react under certain conditions.

Storey: I think a little while ago you used the phrase "maximum probable flood."

Maximum Probable Flood

Van Den Berg: Maximum probable flood.

Storey: Is that, by definition, a thousand years?

Van Den Berg: No. No.

Storey: Or is there a definition of what that is?

Van Den Berg: There isn't a definition as I understand it from a frequency standpoint. Now, I've been out of design flood hydrology and into management for a lot of years, but I don't believe that we put a frequency on a maximum probable flood. It's the never-never-type flood.

What that really tells you is that if you have all of these hydraulic–or not hydraulic, but hydrology-type conditions occur at the right time, or you probably would say the wrong time, then they all stack up on top of each other and you can get this type of a flood that is really, really, really big–the Rapid City, South Dakota, flood. That took very specialized hydrologic conditions for that type of a flood to occur. It isn't anything that's going to happen very often, but there were certain things that just stacked up on top of each other and just built, and when it turned loose, it turned loose some awful big water. Same thing happened with Colorado-Big Thompson.

Storey: Where in the art . . .

END SIDE 2, TAPE 1. MARCH 20, 1995.
BEGIN SIDE 1, TAPE 2. MARCH 20, 1995.

Storey: This is tape two of an interview by Brit Storey with Max Van Den Berg on March the 20th, 1995.

Where in the art and the science of design flood study are the most interesting, or maybe I should say the most heated, discussions taking place? Where do they take place? Where are the areas of agreement and disagreement,

maybe is another way of putting the question.

Van Den Berg: I don't think I can answer that today. I've been out of that detail-type work for so long . . .

Storey: Where were they when you were in it?

Van Den Berg: Well, back at that particular time, probably the most discussion took place as to whether or not you could reasonably expect all of these conditions to pile up on each other. Now, when I talk about conditions, let's talk just a little bit about a typical what we call rain on snow on frozen ground type of event. And there are some watersheds that are subject to that. You may have a fall with pretty good moisture, the ground is wet, you get some extremely cold weather, the ground freezes. It's like concrete. So you have a watershed that's essentially all frozen, and we had an event like this in the Pacific Northwest in 1964 that was a ***broad*** event, that was a classic example of this type of a flood, but the ground is frozen and then you get snowfall, and the snow pack is like a big reservoir. Snow is water. And you get the snowfall. It builds up on the watershed, stacks on the watershed, and then somewhere along, the weather warms up, it starts to rain, you have a Chinook wind, the snow pack does what we call–it starts to ripen. It's holding this rain and in itself it's melting, and it becomes like a snow cone, a slushee.

At some point in time, the water starts running out of the bottom of that snow pack, and this is where the snow pack becomes about 40 to 45 percent water. Now, a typical new snow, light snow, is only about 10 percent water, but as this snow pack melts and it's raining on this snow pack, and this snow pack is consolidating, becoming more and more like water all the time, at about 45 percent, the water starts running out the bottom of that. And if you continue to have the rain and the water, your snow pack collapses and this water all comes at you at once off this frozen ground, which is like concrete, and you get one hell of a flood.

"December 22nd, 23rd, 24th, 1964, . . . It snowed for a couple-, three-, four-, five days. The weather turned warm. It started raining. Chinook winds, and the snow pack collapsed. The maximum runoff of record on the Boise River occurred December 23rd, 1964, and was measured, what we call unregulated-type flow, of 44,000 cubic feet per second. . . ."

December 22nd, 23rd, 24th, 1964, that's exactly what happened. The ground was frozen. It snowed for a couple-, three-, four-, five days. The

weather turned warm. It started raining. Chinook winds, and the snow pack collapsed. The maximum runoff of record on the Boise River occurred December 23rd, 1964, and was measured, what we call unregulated-type flow, of 44,000 cubic feet per second. Now, fortunately we had dams on the river that were partially empty so only a 110 second feet went through Boise, but without the dams there, 44,000 cubic feet per second would have gone through Boise. We had dams at that time that failed up in Montana.[4] There were just big floods all over the Pacific Northwest at that time, but a classic case of that type of a flood.

But that was the type of thing that was argued a lot. Can these things pile up on you and happen all at the same time? Well, prior to 1964, to that particular flood, people said most likely not. After that flood, people started saying, "You're damned right it can happen because it's already happened." And since we've already seen one of those, what makes us think it can't be bigger?

". . . I've been in Boise, Idaho, since 1967, and . . . During that particular time . . . we've seen the lowest year of record, 1977. We've seen the largest volumes of record, 1971, the second largest of record, 1986. We've seen the two driest years of record that are side by side, '87 and '88 . . . the only thing that tells me as a hydrologist is that we can have extremes on both ends of that. We can have droughts that are worse than 1977, and we can have flows that are much bigger than 1971 or 1986. . . ."

Now, I've been in Boise, Idaho, since 1967, and I've worked in water resources and hydrology and associated-type activities. During that particular time, which is about twenty-eight years–and I'm talking about ***volume***; I'm not

4. No Reclamation dam failed as a result of this event. Mr. Van Den Berg must be referring to dams owned by other entities. However, Gibson Dam on the Sun River Project did overtop during a high flow event in June of 1964. A Reclamation report says:

> "The maximum historical water surface, elevation 4,732.23, occurred on June 8, 1964. A record inflow of 60,000 cubic feet per second (cfs) caused Gibson Dam to overtop where water flowed over the parapet wall for 20 hours without seriously damaging the dam. After this event, modification work was done to provide additional protection to the dam and foundation for safe overtopping of greater than 100-year frequency flood flows.
>
> "Gibson Dam's spillway, located through the left abutment, is a drop-type structure controlled by six 34-foot-wide by 12-foot-high radial gates. The radial gates were installed in 1938 to provide 15,000 acre-feet of storage. The spillway crest is at elevation 4,712.0, with top of the spillway radial gates at elevation 4,724.0. The spillway provides a discharge of 30,000 cfs at reservoir elevation 4,724, top of active conservation, and 50,000 cfs at reservoir elevation 4,729.0, top of the parapet. The discharge enters a 29.5-foot-diameter vertical shaft and turns into a horizontal tunnel before discharging into the river below."

Source: Accessed on August 6, 2012, at about 10:30 A.M.
http://www.usbr.gov/pmts/sediment/projects/ReservoirSurveys/Reports/Gibson%20Reservoir%201996%20Sedimentation%20Survey.pdf

talking about peak–but if we talk about volume runoff on a system, we've seen the lowest year of record, 1977. We've seen the largest volumes of record, 1971, the second largest of record, 1986. We've seen the two driest years of record that are side by side, '87 and '88, and I've experienced that in twenty-eight years. Now, the only thing that tells me as a hydrologist is that we can have extremes on both ends of that. We can have droughts that are worse than 1977, and we can have flows that are much bigger than 1971 or 1986.

This last drought that started in 1987, up until now we've had about one good year during that period of time, and this year looks halfway favorable. Only thing that tells me is it may not be over.

So it's an interesting science and study when you really work with it.

Storey: And perhaps if we had a thousand years of history, it wouldn't be so surprising to us.

Using Tree Rings to Look at Precipitation Patterns

Van Den Berg: It wouldn't be, but in some ways we have a thousand years of history. There is a study, the thing was put out by some folks that worked for the Forest Service or some forestry-type research people, the study of tree rings. The study of tree rings is a very good indicator of what type of years you had, whether they were dry years, wet years, those kinds of things, and I believe, if I recall right, that study goes back to like 1276 A.D. or something, a lot of years ago. Because they have trees that are that old, and they can cut them and they analyze them. And during that period of time there's been at least one thirty-eight-year drought, drought period. There's been several fifteen- to twenty-year drought periods. There's been a lot of tens and quite a number of fives. So there are ways you can look at these long, broad records and say, "Hey, if it's happened before, why can't it happen again?" If there'd been a thirty-eight-year drought, essentially, in the Pacific Northwest, what makes us think it can't happen again?

Storey: That's right. On the other hand, dendrochronology, or tree ring study, is not going to show you these unusual catastrophic events so much.

Van Den Berg: No. No. They're not. They can show you an unusually wet year because of your growth width, unusually dry years, trends, but they may not show you the catastrophic events, because quite often the catastrophic events take place in a relatively small area and they happen quick.

Storey: Very quickly.

Van Den Berg: You could have a tremendous, tremendous flood off a drainage basin in the fall or winter, one of these rain-on-snow-type floods on frozen ground, and have a regular drought year the following summer, and so you wouldn't see any of that.

Storey: Yeah. Well now, is design flood study a sort of a prelude to moving into river and reservoir operations?

Van Den Berg: Yeah, it is.

Storey: Is it a ***necessary*** prelude?

Van Den Berg: Well, it's more a prelude to construction, you know, to building of a structure, but if you're going to be in river reservoir operations, you've got to have an idea of what those type of floods are, what conditions it takes to create them, what you might do quickly if you see one of these things building up on your watershed. Most of our standard operating procedures for our reservoirs have a section in that document that addresses the design flood, and it spells out in that document what the conditions are, what the design flood would be, how much water would have to be released downstream on what type of intervals, maybe building up the flows in order to keep the reservoirs from overtopping, just a lot of information in there that can be very helpful to anybody that's operating a reservoir when you have a big flood come in. So it is, it's a prelude to operation. You need to have that. You need to know the characteristics of that watershed in order to operate correctly.

Storey: Now you moved, as I recall, from design flood study into river and reservoir operations here in the regional office.

Van Den Berg: That's correct.

Storey: Is it a regional office responsibility? Let me rephrase that. At that ***time***, was it a regional office responsibility to operate the entire region?

Van Den Berg: At that time it was a regional office responsibility to do all the forecasting and to assist the project offices in making the right decisions on operating the dams and reservoirs. The gentleman that I worked for for a number of years, a fellow by the name of Dick Lindgren [phonetic], was considered to be one of the most knowledgeable folks about all these watersheds in this region. He and I, we had

a lot of discussions. I think he was the coach, and, of course, I was the student, and bringing me up to speed, but we talked quite often about what would happen if a project office didn't take the right action. Dick's philosophy, and I still think it would be true today, if we seen somebody operating that was going to jeopardize the structure, then we would pull rank from a regional office standpoint, a Regional Director standpoint, and take over the operation of that structure.

Storey: I would think that there's something sort of inherently schizophrenic about operating in Reclamation, because, on the one hand, you're trying to store water for uses, whatever they be, municipal, industrial, irrigators. On the other hand, you're trying to protect [against] catastrophic flood situations. Is that true, or am I just building problems out of thin air?

Balancing All the Issues That Affect Reservoir and River Operations

Van Den Berg: I wouldn't categorize it as schizophrenia, because we have and have had very good data to work from. But it is, it's a balancing act, because you have to do all of these things, or you want to do all of these things, to provide the services for which those structures were built and at the same time not create any undue hazards. So if you think about a reservoir as just an empty can and a watershed as a water supply, then you have to look at that reservoir and the watershed all the time during the runoff season to get a good picture of what you need to do operationally. You want to provide any kind of flood control that you can to the downstream areas. That's a benefit. To do that, you have to have some empty space in that reservoir to capture that water when it comes downstream, and you want to do that in concert with the need to fill that reservoir so you have an irrigation supply ready to go April 15th, May 15th, depending on where you're at. Some of our reservoirs are in the high country, maybe we don't fill them until July, when the snow pack is about done.

But it is a real balancing act. It's nothing to fear. It's nothing to panic about. You look at the conditions on your watershed. If you don't have much snow up on the watershed, why then maybe you're storing as much water as you can store in the reservoirs because you aren't going to need it for flood control, particularly true on a watershed where all the data tells us that the floods that come off of that are snow-melt-type floods. So you can forecast those. If they're snow-melt-type floods and you don't have snow on the basin, you're most likely not going to get much of a flood. So you can operate accordingly. You can go ahead and store whatever water's coming off and fill it up now. The other side of that coin, if you have a tremendously big snow

pack and you're forecasting X amount of runoff, you may want to have those reservoirs almost empty when that big snow melt flood comes so that you can then store that flood, reduce the flooding that would have occurred downstream, and at the end of it, have the reservoirs full and ready to provide all the irrigation, power, recreation, fish and wildlife enhancement and those kinds of things that you can do, a real balancing act.

Now, on other watersheds that are subject–where the floods come from maybe rain floods, you can't forecast those a month in advance or two weeks in advance, maybe at best a day in advance, if there's a big storm coming in from the coast or something. Most of those type of reservoirs, we have what we call ***exclusive*** flood control space. In exclusive flood control space, you ***never*** put water in it unless you're absolutely forced to put water in it to protect the area downstream. It's there for flood control, period. Case in point, Ririe Dam over in Eastern Idaho has 10,000 acre feet of exclusive flood control space. We'll never put water in that space unless we're forced to do it by a big flood, and then we'd do it to protect the area downstream.

Storey: But aren't there always situations where there are miscalculations?

Van Den Berg: There could be.

Storey: Do you ever remember any?

In the fall and winter of 1972-1973 "Mother Nature just outfoxed us . . ." on the Yakima Project

Van Den Berg: Yeah. We had a situation–I wouldn't want to call it a miscalculation. Mother Nature just outfoxed us on that one, but on the Yakima Project in 1973, we had one of these late fall November-type rain-on-snow, frozen-ground-type floods, and it stored a lot of water in the reservoirs so that the reservoirs had more water in them than what we were comfortable with at that time of the year because, you know, we still knew that we could get some more floods and that sort of thing. So we dumped–for flood control, we released a hundred thousand acre feet of water. This would have been in the fall of 1972, like November '72. After we had that storm, after we dumped that water, the spring of '73 was a very dry spring. We never filled that space. I mean, we lacked filling the system by at least a hundred thousand or more. If we had not released that hundred thousand we'd have probably been just about right, but that's one of those things where your best judgment told us we needed more space for flood control. By early December we didn't have it, we released some water, and

Mother Nature turned around on us, and we had an extremely dry spring, and we really never got that water back. No one was really damaged by it. We still had an adequate water supply, but it's one of those that you remember where you got fooled.

On the other side of that coin, you know, you can take a system like–we'll talk about the Boise system here. We have three dams on it. The snow melt flood is running at you in the spring. You're filling the space. The snow melt flood is over, you think. The flood is going down, and so you're bringing the reservoir up. You're kind of trying to balance and top the reservoirs off, and then all of a sudden you get a hell of a rain, and you've got the reservoirs full. You've still got some snow melt coming at you, you've got a big rain that kicks in a pretty good flood, and you've got to release more water than you would like to release.

So far, we haven't had situations where we created a lot of damage, but we've had some situations where we flooded some lands, some farm fields, fields that were planted. This was like late May, early June, fields that were planted down along the Boise River, because you got hit by that big rain flood right at the ***end*** of when you were topping those reservoirs off–so it can happen to you.

Storey: One of the things I would sort of suspect occurs is that you anticipate more water, you release water, and then it doesn't appear. Does this cause tensions with the irrigators?

Van Den Berg: Oh, absolutely.

Storey: What kind of ***form*** does that tension take?

Van Den Berg: Well, I don't know the best way to describe it really, except that they let you know right away that they think you goofed up. Most contracts that we have with the irrigation districts have some clauses in there that stipulate that if water is released for flood control and you don't get that water back, that you can't be held liable for damages of an inadequate water supply. So there is some protection there.

Varied Public Opinions about How Reclamation Should Operate

I guess I'd have to say that the form it normally takes is that the water users, the irrigators, being in the business they're in, would like us to operate

more conservatively on the side of filling the space. The folks that like to build their houses in the flood plain right next to the river, where, quite frankly, in my opinion, we should not have houses, like us to be much more conservative on the other side, conservative for flood control. And then you have the other interests of the fish and wildlife interests, environmental interests, power generation, all of those things, fishing interests. They all are putting pressure on to do things ***their*** way, and we try to balance as best we can all those needs, recognizing that many of these projects were authorized ***by*** Congress to provide certain services.

How the Project Authorization Can Affect a Project

We have projects that were built strictly for irrigation. Any flood control, recreation, fish and wildlife enhancement, that's all incidental to the purpose of the project, but the basic authorization was irrigation. Now, we have other projects where they're authorized not only for irrigation but for power generation, for recreation, for fish and wildlife enhancement, M&I water, so you have more flexibility on a structure that's multipurpose, particularly when it was authorized for flood control.

"We have structures that we operate *informally* for flood control. . . ."

We have structures that we operate ***informally*** for flood control. If you had to look at everything legally, I would guess that, from a legal standpoint, somebody could say, or a court could say, there's no legal reason to have to provide flood control from that structure because it was built totally for irrigation, but in today's time you would still operate it for flood control, knowing that if you've got a big water supply out there on the basin, you'd be foolish to sit there with the reservoir full and then create a flood downstream. You know, you draw the reservoir down, make some space available, knock the top off of that big flood when it comes in, and have a full reservoir at the end, and hopefully everybody's happy.

Storey: Who's responsible for knowing how much water is up there stored in the snow pack and so on?

Van Den Berg: We are.

Storey: So we send people up to do measurements and so on?

Reclamation's Participation in Gathering Hydrologic Data and the Hydromet

Van Den Berg: Well, we send some people up to do some checking once in a while. In the ***old*** days, we sent people up. I can remember when I first was in the River and Reservoir Operations in 1973 and '74 and '75, where we had to send people on snowshoes and cross-country skis one place. Up in the Bob Marshall Wilderness above Hungry Horse in Montana was a twenty-mile one-way trip on cross country skis to go in and take data, because that had been classified as a wilderness area and we couldn't set a helicopter down on a snow pack by that measuring station. It was illegal. So we sent people in there on cross-country skis to take data.

Now we have what we call a Hydromet System, which is an automated data-collection system, and we can monitor the hydrologic conditions up on those watersheds on a daily, hourly–we can get about as much data off of those as we want any time we want it, and so the only thing we send people out for any more is to fix equipment, to calibrate equipment, to make sure it's measuring what it says it's a measuring, and those kinds of things.

Storey: But it is us. It isn't U-S-G-S or S-C-S or anything?

Van Den Berg: No. Well, SCS does a lot of measuring of snow packs, of the snow depth. We do a lot of stuff in cooperation with the Soil Conservation Service, but we install a lot of our own stations. The Soil Conservation Service makes forecasts. We make forecasts. They make their forecasts strictly from a water-supply standpoint. We make our forecasts from water supply, flood control, power generation. I don't want to sound like I'm–I'm not throwing stones at the Soil Conservation Service, because their needs and responsibilities are different, but ours we have to operate by. It makes a difference whether you actually have to operate a structure by the forecasts you're operating by or whether you're making a forecast just to tell the publics how much water there is there.

Storey: If you go back to those days when you were in Operations, did we have any techniques to try to deal with water users so that–let's see, how should I put this?–basically to sort of blunt any concerns they were have about the way we were managing the reservoir and river systems?

Van Den Berg: No, I don't think so. Back in those years, no.

Storey: What about now? So that, you know, when they found out we released a

hundred thousand acre feet for flood control purposes, it didn't come as a big surprise to them, that kind of thing?

Van Den Berg: I think the communication now is a lot better than it used to be. We had good communications then, but I think it's better now. We're getting information out there to those people almost daily. Some of the irrigation districts, we've even helped them hook up to the computer system so that they can sit there in their office and look at what the conditions are on the watershed and what's happening and those kinds of things.

Storey: So it's done that way?

Van Den Berg: Yeah.

Storey: But we never, for instance, try to involve them in River and Reservoir Operations decisions or anything?

Van Den Berg: Not in the ultimate decisions. We advise, we tell them, we listen, but when it comes down to a lot of times when somebody has to make a call.

Storey: What about in a situation like Owyhee, where it's being ***run*** by the water users rather than us? How does that work between Operations and them?

Reservoir and River Operations When a Water District Is Running a Feature or Project

Van Den Berg: We will do the forecasting, and we'll furnish that information. Well, actually, we furnish it to the area office now, and then from the area office, that information goes out to the irrigation district, and they'll talk with the Manager, and if there's a situation up on the watershed, they talk with the Manager about what he's going to do and when he's going to release water, how much he's going to release. They're pretty responsive to that. You know, they have a heavy degree of responsibility in operating those reservoirs also. There's been a couple of times over the last number of years where, like Owyhee, where they maybe didn't pay quite enough attention to what was happening up on the watershed and had to release some bigger flows downstream than what they would have had to release had they done something a little earlier, and they caused some damage, and they were sued, and they had to pay some money. So they're pretty responsive to that. They don't want to take any undue chances either.

Storey: And was that true back when you were in River Operations also?

Van Den Berg: Yeah.

Storey: Okay. Well, I'd like to continue because this has been very interesting, but I know that . . .

Van Den Berg: If you've got a few more questions, I can go another ten minutes maybe.

Storey: Okay.

Van Den Berg: If you've got some other questions, Brit.

Storey: Well, tell me about–let's see, how should I put this?–a situation where River and Reservoir Operations were delicate, let's say, where you had sort of an ***impending*** emergency or a crisis or something like that. How did the office operate? What I'm interested in is how the office functioned on a day-to-day basis and how it reacted when something unusual was going on, what kind of hours were kept, all those kinds of things.

Van Den Berg: Oh, that sort of stuff.

END SIDE 1, TAPE 2. MARCH 20, 1995.
BEGIN SIDE 2, TAPE 2. MARCH 20, 1995.

Storey: You had just mentioned that last time we talked a lot about Teton. We didn't need to cover that again.

Operations During Runoff and Big Water Events

Van Den Berg: Yeah. I don't think so. Once that happened, of course, the coverage was continuous, but even now, when we have a situation–the last big flood event that I was involved in, that was in 1986 when I was the Project Superintendent over at Minidoka, and essentially you watch those things continuously, continuously. I don't mean hour for hour, but you look at all your data in the morning, you look at all your data in the evening before you go home. If you've got any changes to make operationally, we have people on call twenty-four hours a day. During the flood season, we have people on duty on Saturdays and Sundays, at least a couple-, three hours a day, to look at the data, to see what's happening, to make adjustments. We've run water ***hard***, I mean released big channel-full flood flows for as much as sixty, seventy, eighty days

on some of those springs when we have had really, really, really big water, and during that period of time you're dealing with that every day, at least twice a day, in the morning and in the evening, and if need be, if the situation gets critical enough, you'll have people on duty even during the night to watch stuff.

Storey: Well, you know, the way you're talking, it's almost as if we have a room somewhere where we can go in and we can see what's going on. Do we?

Van Den Berg: Oh, yeah. We can do that. Like down at Burley, we have our Water Operations people down there, that they have all their computers, their electronics, where we can monitor that data all the time. We don't have a picture on the wall or anything that shows what this is doing or that's doing. We're not as sophisticated as some places like B-P-A or the Corps of Engineers, but we have the data there. It's available.

Storey: How is it available?

Van Den Berg: It's available in a printout form on your personal computer. You can set at your personal computer, and you can call for a reading of some station up there in the mountains, a reservoir level, a discharge level, a stream measurement, just about whatever you want to call for, and, of course, these things are all grouped for drainage basins, so you can call for the data on a drainage basin, and it'll show up there on your screen. We can make hydrographs current, as they occur, hydrographs on the screen coming from the data that we have to see what's happening as the flood grows and releases increase and those kinds of things. So I think we're very capable and have the tools necessary to set there and really visualize what's going on up on that watershed.

Storey: Now, right now we're talking about ***now***?

Van Den Berg: Yeah.

Storey: What about back when you first came to River and Reservoir Operations in the late sixties, wasn't it?

Van Den Berg: Yeah.

Storey: What was it like getting data then?

Obtaining Hydrologic Data When He First Came to Reclamation in the 1960s

Van Den Berg: Telephone and teletype, and you got data up in the mountains from snow packs once a month, or, as the year wore on, when you started getting down toward the end of your snow season, twice a month, they'd take mid-month measurements. Soil Conservation Service and some of our staff would go out and physically measure those sites twice a month. So you were kind of–in between those measurements you were asking yourself some questions, what's really going on, particularly if you had some big storms. If you didn't have any storms between measurements, you knew there wasn't anything going on, but if you had some storms come through, you wanted to know what happened, but you normally had to wait until either the mid-month measurement or the end-of-the-month measurement, and then, you know, you would get some of this data by teletype from other agencies, the Corps of Engineers, the Soil Conservation Service. You'd pick up the telephone. You'd call people who physically go out and do the measurements.

During 1973, the first four hours of every day was spent almost continually on the telephone gathering data.

Storey: So that was the way, if you had a crisis, you kept track of it, was telephone and teletype?

Van Den Berg: Yeah.

Storey: So we would have people sitting somewhere sending us information. Okay. Do you remember any of those particular events that happened back then that you and–was it only you and Mr. Lindgren?

Putting Together the Hydromet System

Van Den Berg: At one time. When I first went to work in River and Reservoir Operations, it was just I and Dick Lindgren. We were just starting work on the Hydromet System, this automated collection system which is put together by a number of different agencies, the Corps of Engineers, the Bureau of Reclamation, Soil Conservation Service, B-P-A, U-S-G-S, the National Weather Service, River and Reservoir Operations Center, all collaborated together on putting in this Hydromet System.

As the work in that continued to grow, we then hired a third person into that unit so it was a unit of three, and I, myself, was what we called the Hydromet Coordinator, kind of as a collateral-type duty for about a year or so, until such a time when it got big enough to the point where we felt like we

needed to put somebody ***full-time*** on it, and then we hired a person. He's still our Hydromet Coordinator today, Dan Lute [phonetic] who has essentially been with this thing. He wasn't in on the early ***planning*** stages of it, but when we actually started building it, he's been there with it. He's considered the ultimate Bureau guru on Hydromet-type machinery and facilities and that sort of thing ~~in the Bureau~~. He's been asked to go to foreign countries and share his knowledge–Denver, all over. So it grew from two people to three people to four people.

Storey: Do you remember any particular event that occurred while you were there?

Van Den Berg: No, not during that particular time. I think the biggest thing that happened during that period, I mentioned me releasing a hundred thousand up on Yakima, then it dried up and we never got it back. We had a couple of big floods here on the Boise, one of them where we had the reservoir full and we got a rain flood right at the end of that particular period that made us push water pretty hard downstream and flooded some low-lying agricultural lands and those kinds of things that riled the public pretty good.

". . . you know . . . anybody that gets wet doesn't like it, but anytime you reduce a . . . natural flood, you reduce that substantially from what *would* have occurred without the dam there . . . a lot of people don't understand . . . if we hadn't been there storing some of that flood and knocking the peak off . . . they would have gotten flooded a lot worse. . . ."

But, you know, flood control, anybody that gets wet doesn't like it, but anytime you reduce a flood, a natural flood, you reduce that substantially from what ***would*** have occurred without the dam there, you've provided some sort of a benefit. What a lot of people don't understand is that, hey, if we hadn't been there storing some of that flood and knocking the peak off of some of that flood, they would have gotten flooded a lot worse. You know, they're not happy to have gotten flooded, but they could have gotten flooded a lot worse, just naturally, if we hadn't been there.

Storey: Well, once again, I think my ***extra*** ten minutes is up. I'd like to ask you if it's all right to use the tapes and transcripts from this interview for research purposes.

Van Den Berg: Sure. I have no problem with that.

Storey: Thank you.

END SIDE 2, TAPE 2. MARCH 20, 1995.
BEGIN SIDE 1, TAPE 1. JULY 25, 1995.

Storey: This is Brit Allan Storey, Senior Historian of the Bureau of Reclamation, interviewing Max Van Den Berg in the Pacific Northwest Regional Office of the Bureau of Reclamation in Boise, Idaho, on July the 25th, 1995, at about nine o'clock in the morning. This is tape one.

I was wondering, Max, if you could characterize through your career the relations the various offices you've been in had with the Denver office and the Commissioner's Office in Washington.

Working with the Denver and Washington Offices of Reclamation

Van Den Berg: Of course, there's been a number of them over the past thirty years. With the Washington office, some of my first contacts and activities with those people had to do with operation and maintenance-type activities in what was at that particular time the old 400 Division. Of course, the regions, Denver, Washington, all had 400 Divisions which dealt with operation and maintenance-type activities. Frequently, when there was something unusual going on, we here in the region had direct contact with Washington. And at the same time, of course, you had direct contact with Denver on the same issues. That's one principal group that I worked with quite extensively for several years.

Interaction among the Safety of Dams Offices within Reclamation

Then after that, almost the same thing occurred with the Safety of Dams Program, where we had a Safety of Dams Branch here in the Regional Office, a Safety of Dams Unit in Denver, and a Safety of Dams Group in Washington, and with that particular organizational structure, why, we had a lot of contacts with both Denver and Washington, granted many more contacts with Denver than Washington, but at the same time, as I recall back, there were numerous times, I would say, you know, a couple times a month when we were in contact with Washington regarding safety of dams somewhat. Of course, that was also at the infancy stage of the Safety of Dams Program, so there was a lot going on as far as decisions on how the program was going to run, those kinds of things.

Storey: That was in '78?

Van Den Berg: That began in 78.

Storey: Right after Teton.

". . . the dam failure in Georgia, in the President's home state, when Jimmy Carter was President, that also caused the loss of some lives. I have an idea that had as much to do with it as Teton. The combination of the two events, I think, was what really got the Safety of Dams Program off dead center. . . ."

Van Den Berg: Right after Teton, and that was part of the reason that that program was triggered, but the dam failure in Georgia,[5] in the President's home state, when Jimmy Carter was President, that also caused the loss of some lives. I have an idea that had as much to do with it as Teton. The combination of the two events, I think, was what really got the Safety of Dams Program off dead center. Other programs, you know, we've worked a lot with the technical group in Denver, the designers, the construction reps. Many of our environmental people have been involved in industry and flow-type lawsuits where some of our Denver experts on fisheries and those kinds of things provided us some assistance when we were dealing with those lawsuits.

Issues about Use of Herbicides, Pesticides, Biological Controls, and Weed Control

We have, off and on, had good relationships and lots of activities on agronomy-type issues, the use of herbicides and pesticides throughout the Bureau, projects. Most of those types of chemicals and stuff that we use have gone through a pretty severe testing program, particularly through E-P-A [Environmental Protection Agency], and then in addition to that, the states and the Bureau, and the Department of Interior have had some additional controls. I don't mind going on record as saying I have a problem sometimes when we have two-, three-, and four layers of–I'll just call them bureaucratic controls to deal with a substance. It appears to me that in most cases, if the Environmental Protection Agency allows the use of a product under certain conditions, we as another agency of the Federal Government probably shouldn't be imposing stricter regulations on that use. That doesn't mean to say that EPA is always right, but their rules are awfully damned restrictive in the first place, and it seems like our additional requirements are sometimes just another effort in bureaucratic red tape.

5. Referring to the Kelly Barnes Dam failure on November 6, 1977, above the town of Toccoa, Georgia. Thirty-nine people died as a result of the failure.

Storey: Just too much, huh?

Van Den Berg: Yeah, just too much. But there's been a lot of good come out of those programs. We've had a lot of research that we've been involved with Denver, use of grass carp, then field trials took place in California and other places, but we've had some field trials with the use of grass carp here in the Pacific Northwest Region. I don't know how you'd categorize that. I guess maybe you wouldn't categorize it as a biological form of control, but we've also dealt with those kinds of controls where we've actually imported beetles and bugs and stuff to deal with some of the noxious weeds.

It was interesting how many flags that raised the first time we decided to go out somewhere and buy a bunch of beetles, getting approval through our acquisition groups to go to the University of Montana and buy a whole bunch of beetles that were used to control star thistle. There were an awful lot of people raised a lot of questions about our authority to do those kinds of things, but since this type of activities have been proven and they work, we've stepped out in front a little bit and tried to use them.

Storey: Is this when you were with O&M?

Van Den Berg: This is when I was with O&M and also as Project Superintendent down at Burley. I believe that was during the time when we actually went in and brought the beetles in for the first time. We had a severe infestation of thistle in the area of Ririe Dam over in Eastern Idaho, and so we brought in some of these beetles that like only that particular plant, and they live on them, and they destroy them, and it never kills them totally, but it controls their spread pretty substantially.

Storey: And that proved pretty effective, huh?

Van Den Berg: Proved pretty effective, yeah. That's some of the activities we've had with Denver. Myself, I go back to the days of design hydrology when I was doing inflow design flood studies and working with the people in the Hydraulics and Hydrology Department in Denver in developing those design floods for spillways on the major dams.

Storey: How would you characterize relations between Denver and the regional office, for instance, and how they have changed over the years?

Van Den Berg: Well, I guess, first of all, I'd say they ***have*** changed. They've changed

drastically. Some of the changes, in my opinion, have been very good. Some of the changes, in my opinion, haven't been. But early on, at least in my career, I saw Denver as a tremendous resource for assisting us on issues out here in the field. You could make a phone call to Denver and get responses back very quickly. As time went on, it seemed to become more and more difficult to get those answers out of Denver.

The Denver and Washington Offices Changed over the Years as Their Staffs Evolved from Having Extensive Field Experience to Having Little or No Field Experience

I think part of the problem was that in the early years of the Bureau of Reclamation, people didn't wind up in the Denver office without having spent a great deal of time in the field. It was almost a progression. You started off in the field somewhere on a construction project. From that, you went into a, probably a project office somewhere out in the field, and from there, the next progression, probably into the regional office and eventually into Denver. So back there in those early days of my career, Denver was almost totally staffed with people who had a great deal of field experience. Beginning, I would say, in the mid-1970s on up, an awful lot of people were going to Denver right straight out of college into the design areas, into the different disciplines, and through no fault of their own, they didn't have that benefit of that field experience. So it was just more difficult sometimes for some of the people to grasp the concept of what needed to be done out in the field.

And I'd also say that, you know, in the early years, that transition didn't take place just to Denver; it also applied to Washington. You didn't make it to Washington without having spent time out in the field and going through Denver and then eventually into Washington. Now, it wasn't always the case, but for the most part, the people that were in our Denver or in our Washington office had been people who had been out in the field. They understood what was going on. I'll go on record as saying some of our political appointees don't understand that at all.

Storey: Many people have mentioned what I guess I would refer to as a regulatory aspect of the Denver office. Was that ever an issue in the areas where you were working?

Issues Regarding Herbicides and Pesticides

Van Den Berg: It very definitely was in the use of herbicides, pesticides, because we had a

function there in Denver just the last few years that the responsibilities came down from a management group within the Department of Interior and essentially imposed some regulations on the use of those products. There were some other–I guess you could call them regulatory-type functions, at least earlier on. If you had a problem with a dam, let's just say, take that for instance, the Denver engineers usually had the final say on what the decision was going to be. That isn't always the case today. If you want to call that regulation, I don't know, but I would say it's more technical.

Storey: I think I'm thinking more in terms of development and oversight of Reclamation instructions and things like that. You might not think of that as regulatory.

". . . I always felt the Reclamation instructions were guidelines. . . ."

Van Den Berg: I guess I never did. In a lot of ways, I always felt the Reclamation instructions were guidelines. Some people would say, "Well, they're policy." But if you took the Reclamation instructions as a written and say that, "well, you have to do it exactly the way that says," then sure as hell, they're regulatory.

Storey: But you as a person out in the field, as a Project ~~Manager~~ [Superintendent], for instance, as I recall you worked on River Regulation and those kinds of things, you didn't see these as the cookbook, so to speak, that had to be followed one, two, three?

Van Den Berg: No. Absolutely not. No.

Storey: Talk to me about the way you did envision them and implement them.

Van Den Berg: Well, Reclamation instruction, the part that I dealt with that was geared toward operation and maintenance, when it came to operating what I call live facilities, dams and reservoirs, where you have water running at you and you have to make some decisions on how you're going to release that water, how you're going to store that water, there are places in your Reclamation instructions where it talks about flood control and, you know, you will follow the agreed-upon flood control procedures agreed to between the Bureau of Reclamation and the Corps of Engineers because the Corps is the flood control agency for the Federal Government. (Storey: Sure.) And you took that to heart, but at the same time, I don't believe that the instructions were written in such a manner that it says you have to do it exactly this way or exactly that way. With that particular function, they were written in a more flexible manner that allowed

you the flexibility to operate those systems.

"If we had to operate a major system like the one in Eastern Idaho, the Minidoka Project, *exactly* according to all of the rules and regulations that are on paper, we would not have nearly as good an operation or as efficient an operation as we have today. . . ."

If we had to operate a major system like the one in Eastern Idaho, the Minidoka Project, ***exactly*** according to all of the rules and regulations that are on paper, we would not have nearly as good an operation or as efficient an operation as we have today. Much of that flexibility also comes because of the flexibility with the state and the state water rights. That flexibility allows exchanges between water rights, where one water right can be substituted for another or you can change bases. If that were not the case, then the efficiency of the system would go down pretty substantially over in that part of the country, because there are *multiple* exchanges within that project that make it possible to operate on a more efficient basis than what you actually see on paper. I rank that flexibility very necessary.

Storey: Especially for the managers.

Van Den Berg: Especially for the managers, yeah.

Storey: So I gather you didn't see much in the way of conflict between the Denver office and the regions, the Washington office and the regions, for instance.

Occasionally Personalities Caused Issues but the Various Reclamation Offices Otherwise Functioned Together Pretty Well

Van Den Berg: No. Generally speaking, I would say no. Now and then, we had some personalities show up in one place or another that created conflict, but they were more due to the personalities of the individuals involved than of the way the organization was supposed to function.

Storey: Of course, sometimes those can be very troublesome, however.

Van Den Berg: Very troublesome, yeah.

Storey: When we talked back in December, I guess, you mentioned that you were on the scuba team while you were in the O&M Group. Would you tell me more about the scuba team, and what it did, and how it trained, and all that, please?

The Dive Team in the Pacific Northwest Region

Van Den Berg: Yeah, that was a very interesting experience for me.

Having the Dive Team Function as a Collateral Duty Within Reclamation Has Advantages over Contract Divers

A little background. I would first of all say that the scuba teams, particularly the one that we've had here in the Pacific Northwest Region and I think generally bureau-wide, was made up of, for the most part, geologists, engineers, and sometimes others as a collateral-type duty to where we could send people down to look at structures underwater, and they knew what they were looking at. They could read blueprints. They could read drawings. There's been a lot of discussion about using contract divers to do that same work as being more effective, but I will go on record as saying–I won't say it's ***impossible*** to find people that can do that, but for the most part, your divers out there are not professionally trained engineers and geologists. I just feel very ***strongly*** that the people that we've had on the dive team, and I would exclude myself from that even though I'm an engineer, the people that we've had on the dive team have been professionally trained engineers, geologists. They have a really good understanding of that facility, how it was built, what it's supposed to be, what it's supposed to look like, what might be a problem. Even sometimes when you're in water where you can't see, when you can feel, I still believe that the trained professionals that go down there know a lot more of what they're feeling than somebody who doesn't have any idea about how these structures were built.

I'll get off my soapbox now and talk a little bit about how these things came about. There was a need to have some method of inspecting these underwater facilities. Many of the reservoirs, particularly on the upstream side of the dams, those facilities were not dewatered for years and years and years, and so you needed to go down and look at those to see how they were functioning. So there was a need there, and that's pretty much how the underwater dive teams came about. In addition to that, even on a downstream side, in the stilling basins and the outlet works, the low powerplants, there's times when you need to look at those facilities and it's either impossible or it's extremely costly to try to pump those things dry so you can look at them in the dry. You can put a scuba team down there maybe a day or two of time for a team to go out there and go down and look at those particular facilities. I know cases where I've been on dives where we easily did in a day what it would have taken at least a week to do under other conditions where you had to pump it dry

in order to look at it, and I've seen it as a real ***benefit*** to the Bureau.

"We did a lot of training. As an underwater diver, you're required to do a certain number of hours every year to maintain your proficiency. . . ."

We did a lot of training. As an underwater diver, you're required to do a certain number of hours every year to maintain your proficiency. We've have Bureau-wide diving seminars that were sometimes three or four days long, where you went out as a group, you trained. We had professional divers from outside the Bureau that would come in. Mostly their function was to teach safe, really safe, diving techniques. The technical part of the dives themselves, as far as looking at the facilities, we felt like we always had the people that knew that, engineers and geologists, but we did bring in people from outside to help us to make sure that we were doing everything as safe as we could do it.

Along with that went everything from rescue, rescue of a diver under hypothetical conditions, doing CPR on a diver out in the middle of a lake with no support other than your buoyancy vests and those kinds of things. To me, it was exceptionally good training. I never categorized myself as really a top diver. I could go out there and do the job. We've had a number of people, Brent Carter, right here in this region, undoubtedly is recognized probably as the best diver in the Bureau. Put a wet suit on the guy, and he's more fish or duck than people. You know, he's just exceptional. And he's also our head geologist.

How the Dive Team Assisted with the Seepage Issue at the Rebuilt Ochoco Dam

We had an incident I would like to share with you for the record. This problem we're having over at Ochoco Dam, which has just been rebuilt, all of a sudden one night we start getting more seepage through the toe drains, it almost doubled in five hours, and we said, "Hey, we've got a problem." The next afternoon at two o'clock, we had divers in the water over there down seeing what they could find, doing dye tests. Those dye tests did show us that there was some seepage in certain areas, provided us more comfort in knowing what the hell was going on with that particular structure. If we had not had that dive team, we could have been two-, three-, four days in getting contract divers on site just because of the requirements from requisition, paperwork, contracts, all those kinds of things. This has just been a recent example of what I categorize as the value of having inside dive teams of knowledgeable people that you can put out there in a half a day's time or even sooner if necessary and have them doing the work.

Storey: And so they went down and identified what was going on, or at least part of what was going on?

Van Den Berg: Part of what was going on. We don't 100 percent know for sure, but we know where this additional seepage is coming from. We've got some proposed fixes on it. I don't think we maybe would have got that with contract drivers.

Storey: Let's see. You went on the team, I believe it was about '77?

Van Den Berg: I believe so, yeah.

Storey: Was the dive team established in the region by that time and you just joined it, or were they establishing it?

Van Den Berg: It was already established, and I joined it at that particular time. I don't know for sure when this regional dive team was established.

Storey: Do you remember any of your dives that were particularly interesting?

Van Den Berg: Yeah.

Storey: Would you tell me about some of them, please?

Van Den Berg: The first dive I went on–well, this was a training dive that was kind of interesting. We were diving in Payette Lake up here in Central Idaho, and the dive master at that particular time told us, "Well, you go out there a little ways and down in about thirty feet of water there's an underwater cliff, and that cliff is two or three hundred feet high." He says, "It's okay to swim out to the edge of that cliff and look down, but don't go down any further." That's very interesting when you've never done that before, and you're swimming around underwater and the water's very clear, and you can swim over to the edge of a 300-foot cliff and look down, and I guess you feel kind of like a bird that's flying above a cliff and can look down over the edge of it. You can do the same thing underwater with a dive suit. That was extremely interesting, to participate in that.

Conditions at Some of the Dives in Which He Participated

Some of the dives on the facilities, the first actual inspection I went on was not one of those that was a very desirable part of your duty. It was in a stilling basin below one of our concrete dams. We needed to inspect the

downstream toe. You couldn't do it during the summer months when they were running irrigation water just because of the turbulence and the velocity. So you had to wait until fall, when the water was shut off, and almost immediately that pond filled full of algae, and I guess to categorize it, it was almost like swimming in a cesspool, I guess, but we went out and we inspected the toe of that particular dam. You couldn't see anything, but you could feel. You knew whether the concrete was being eroded, whether there was any undercutting of the downstream toe, those kinds of things. I share that particular one so that people don't get the idea that being on the dive team is all just fun and games, because it isn't. Sometimes it's a lot of hard work under some pretty adverse conditions.

Other dives I've gone on, you broke ice to go in and look at the structures. Of course, you have dive suits on. They're much better now than they were back there in the late seventies and early eighties, where you actually have dry suits. Diving under the ice is another challenge that is rather fascinating, because you want to make sure that you have some sort of a tag line so you can always find your way back to the hole where you went in. If you come up under a sheet of ice and you happen to run out of air or something and no air up there, you could be in trouble.

I've dove in other places where–once we had to actually excavate some material down twenty feet under the water with shovels. It was pretty difficult. About the only way you can do it is to have one diver kind of sit on your back to provide an anchor while you run the show, because you just don't have that weight and stuff there.

Storey: Why would you have to shovel material underwater?

Van Den Berg: Well, in that particular case, we had some rails for a boat ramp at one of our recreational facilities that the wave action had moved sand to the point where it . . .

END SIDE 1, TAPE 1. JULY 25, 1995.
BEGIN SIDE 2, TAPE 1. JULY 25, 1995.

Storey: You were talking about the rail system on the boat ramp.

Van Den Berg: The rail system laying on the bottom of the reservoir, that the boat ramp essentially floated up and down on rollers, and that rail system got covered up with sand and gravel from wave action during low water and didn't function the

way it was supposed to, and the easiest way to correct it was send divers down there with shovels and remove that sand and gravel from over top of that rail. That was another one of those functions that you do. It was a working dive.

There have been some other dives that sometimes you wonder what you're doing there. I've gotten caught in currents and got slammed into concrete walls, and it spooks you for a little while until you figure out what's going on.

Storey: I guess it would.

Van Den Berg: But, you know, diving below Grand Coulee Dam, when they're running 125,000 cubic feet per second down the river, is not an experience for the faint of heart, I can tell you, but it's extremely interesting. Grand Coulee is a place where we do a lot of diving because of the fact that you have that downstream side of the reservoir, you have that channel downstream, and it's just necessary to be able to go down there and look at that downstream toe and the flip bucket on the spillway and those kinds of things periodically, but we have good young, strong divers that do that without a second thought.

Van Den Berg: What are they looking for?

What the Dive Team Is Looking for

Storey: Well, actually, in most cases they're looking for signs that there's something that isn't right–erosion of concrete, undercutting of downstream toes, offsetting of joints. Those are the types of things that you look at. Erosion of concrete happens with cavitation, and it's pretty easy to find that. The other places you might look, you'd be looking for debris, you know, debris in the downstream area, rocks in the stilling basin. You get too many rocks in a stilling basin, and as you release water, those rocks, along with that turbine of water, it's like a hammer mill, just like a grinding machine, and those rocks will just be agitated around in the water, and they'll erode the concrete out, so it's necessary to go down and look and see what's down in that stilling basin. Sometimes, after you look, you make a decision that, hey, we need to dewater the stilling basin and remove all that material before it does any further damage to the stilling basin.

We've had a lot of those kinds of problems, because, traditionally, a lot of people, when they visit a structure and they see a stilling basin and water running through it, one of the first things they like to do is throw a rock in it. Little rocks wash right out, but big rocks have a tendency to stay there and

operate like a ball mill.

Storey: But, for instance, the dive team wouldn't remove the material itself?

Van Den Berg: Not always, depending on the size of the job. There's been times when, yes, the dive team has removed the material. They put maybe some sort of a bucket on a crane or something down, and the divers would fill the bucket full of rocks, and it could be moved out. If it's a big, big job, then you'd dewater the stilling basin and move it out.

One Stilling Basin Was Designed so it Was Actually Pulling Rocks Upstream into the Basin

Other times we've almost done research to find out what was going on with the materials. We had one stilling basin where we could clean it out, and the first thing you know, there'd be rocks back in there again, and even after protecting the stilling basin from the publics, we still had rocks coming back in the stilling basin, and we found out by using the dive team and doing some periodic monitoring of some rocks that had been marked, we actually took rocks down below the stilling basin, painted them with different colors of paint, placed them in strategic locations, and then we would go back in and monitor those for movement, and we found out that the way the water was functioning or . . .

Storey: Circulating.

Storey: . . . circulating and those kind of things, that it was actually drawing rocks from just downstream of the stilling basin and actually working those rocks back into the stilling basin. So by doing some things, we've been able to eliminate that and, as a result, prevent some of the problems and some of the erosion that was taking place.

Storey: How big was the dive team when you were on it?

Van Den Berg: When I was on it, we probably had eight to ten people, probably more like about eight. I don't remember for sure.

Storey: And how often did you dive?

". . . the *dive team* was probably diving on the average of maybe about twice a month during the late summer, early fall. . . . from late fall to spring, down into

late summer . . . we didn't do a lot of diving because of the fact that we had water running out of the reservoirs and they weren't accessible. . . ."

Van Den Berg: That particular time, the ***dive team*** was probably diving on the average of maybe about twice a month during the late summer, early fall. There's periods of the year from late fall to spring, down into late summer when a lot of times we didn't do a lot of diving because of the fact that we had water running out of the reservoirs and they weren't accessible. Now, part of the dive team was used very extensively as part of the operation and maintenance program or the ***review*** of operation and maintenance program where periodically all of these structures would be inspected, the underwater structures would be inspected by the dive team. So there were years then and there are still years now, we still do that.

"There were times in the fall when the dive team was diving maybe almost weekly sometimes, not the same people, because we had a number of people with collateral duty so that we could rotate them. The requirement normally is that you have at least three divers, two that go down and do the inspection and one that rides shotgun up on top for safety. . . ."

There were times in the fall when the dive team was diving maybe almost weekly sometimes, not the same people, because we had a number of people with collateral duty so that we could rotate them. The requirement normally is that you have at least three divers, two that go down and do the inspection and one that rides shotgun up on top for safety. So quite often when we would be doing dives we'd be doing them with a party of three, and, of course, that responsibility then rotated among the divers as to who was available, who had time that they could dedicate to that.

". . . during the time you're diving, they do get hazardous duty pay for that. . . ."

Being on the dive team, during the time you're diving, they do get hazardous duty pay for that. We've never had a fatality in the region or, I think, on a Bureau dive team anywhere that I'm aware of.

Storey: How often did you train?

Dive Team Training

Van Den Berg: Well, there for a while, we were having a divers' seminar, Bureau-wide divers' seminar, about every year, but then in between that, we would go on some training dives at least quarterly. If we didn't have actual work dives to go on

for a period of three months, then we needed to go out and do a training dive to meet the requirements of the diving proficiency.

"You're required to do some sort of dive at least once a quarter to maintain your proficiency. . . ."

You're required to do some sort of dive at least once a quarter to maintain your proficiency.

Storey: And is that a Reclamation requirement?

Van Den Berg: That's a Reclamation requirement, yeah. It meets with the normal standards for diving. Diving isn't something that you can just lay off for two or three years and then go back and do it. You need to stay actively involved in it because there's an awful lot of Ps and Qs that you have to pay attention to when you're diving. If you don't stay current and you don't stay active, why, you have a tendency to forget some of those things, and some of those things are the safety–issues, safety requirements.

Storey: And we still have a team?

Van Den Berg: We still have a team, yeah.

Storey: Do you know about how many people are on it?

Van Den Berg: I think we have about eight or nine people on in this region now.

Storey: And they still dive quarterly and all of those kinds of things?

Van Den Berg: In most cases, I believe they do, yeah. We have worked them tremendously hard on this Ochoco mission. They're a very dedicated bunch of people.

Storey: I keep seeing the news stories and things coming across.

Van Den Berg: A lot of times they dive on weekends because it's a way that we can accomplish the dives and it doesn't interfere with their other duties.

Storey: Do you remember any more of your dives?

A Training Dive below Hoover Dam

Van Den Berg: Oh, there were a lot of dives. I think one of the most interesting dives for me was a training dive that we did down at Hoover Dam, and one of the exercises actually took place below the dam or just downstream from the powerhouses, and we had to essentially go in on one side of the river, swim halfway across on the bottom, go down to the bottom, stay on the bottom, swim halfway across, surface out in the middle of river of the river where the current was fairly strong, and then go back down and essentially reach the same point at the bottom where you left and exit out the other side of the river to surface in the river just downstream from Hoover Dam where the water is right at your nose level when you stick your head out of there and you look upstream and see Hoover Dam there above you. The perspective of looking at that dam, it's just unreal, it's totally different than even just standing on the bank and looking at it when you're down in the water at that particular level. You get a sight of the Hoover Dam that's just hard to explain, really.

Storey: Is there a lot of noise from power generation there?

Van Den Berg: Oh, yeah. There's a pretty good rumble in the water from the power generation.

Storey: Have you ever run across big fish?

Van Den Berg: Not big ones. You know, you hear stories where people say, "Well, the divers seen fish down there they were afraid of." I think most of those stories are expanded by non-divers who have a tendency to embellish it. I know that there's some divers that have seen some fairly good-size fish, but not the kind that would swallow the diver. I don't think I've ever seen a fish over a couple of feet long down there, and certainly others have seen bigger fish, but you hear these stories about divers that go down places and they see fish they were afraid of, you know.

Storey: They wouldn't go back in the water, that kind of stuff?

Van Den Berg: Yeah. I think most of those are stories by non-divers. I can't say that for sure, but . . .

Storey: You started to stay something after talking about Hoover and the noise.

". . . when you go into a powerplant . . . it's noisy, and that noise projects itself out into the water downstream. It's dampened quite a bit, but . . . you definitely hear that noise of the powerplant. . . ."

Van Den Berg: Oh, the noise you hear, you know, when you go into a powerplant, you know, just walk into one . . .

Storey: It's noisy.

Van Den Berg: . . . it's noisy, and that noise projects itself out into the water downstream. It's dampened quite a bit, but when you're down in the water below a powerplant, you definitely hear that noise of the powerplant.

Storey: What else were you doing in the O&M program? You were there for about a year or so, I guess.

Van Den Berg: Yeah. I was there at least a couple of years, mostly inspections and working with the irrigation districts, doing what we call a review of operation and maintenance inspections on distribution facilities ***and*** on our major storage facilities.

While working operation and maintenance in the region from 1976 to 1978 " My responsibility was more on the . . . dams and reservoirs, than on the distribution systems, . . . inspecting them for adequate operation and maintenance . . . that . . . inspection also essentially was the safety inspection at the same time. . . . when Safety of Dams came along, it didn't lessen the operation and maintenance inspections, but it was another layer of maybe a more technical-type inspection than what we'd been giving it before. . . ."

My responsibility was more on the major structures, on the dams and reservoirs, than on the distribution systems, and in that particular capacity, why, we were out there looking at those structures, inspecting them for adequate operation and maintenance, is what it really amounted to. Prior to the Safety of Dams Program, that review of operation and maintenance inspection also essentially was the safety inspection at the same time. I think when Safety of Dams came along, it didn't lessen the operation and maintenance inspections, but it was another layer of maybe a more technical-type inspection than what we'd been giving it before. That was the majority of the work in that particular job, was inspections out there on the facilities normally.

Storey: When you say inspections, do you mean the facilities that Reclamation was operating, or facilities that water users were operating?

Van Den Berg: Both. Both. We inspected what we call the reserve works, the ones that the Bureau was still operating, and we also inspected the transverse works. Really,

there was ***no difference*** in the frequency that we looked at those structures.

Storey: Did you find that one or the other of those categories required improvements in operation and maintenance?

"There were water user-operated facilities that were taken care of *exceptionally* well. There were water operator or user facilities that weren't taken care of at all, and I can almost say the same thing about some of our Bureau structures. . . ."

Van Den Berg: Oh, yeah. But it's interesting that I can't say that it was always the water user-operated structures that required the most. It varied. There were water user-operated facilities that were taken care of ***exceptionally*** well. There were water operator or user facilities that weren't taken care of at all, and I can almost say the same thing about some of our Bureau structures. We had places where they were taken care of exceptionally well. We had other places, because of the philosophy of the local managers, sometimes they just weren't taken care of. I think we've gotten past some of that, and I believe that almost all of our structures are very well taken care of now.

". . . there was a time . . . that some of our local managers really hesitated to do any *major* maintenance-type items that had a high cost figure because they were going to have to pass a large part of that on to the water users, and they were trying very hard to hold costs down to the water users. . . ."

But there was a time, and I'll say for the record that some of our local managers really hesitated to do any ***major*** maintenance-type items that had a high cost figure because they were going to have to pass a large part of that on to the water users, and they were trying very hard to hold costs down to the water users. In some cases, it's kind of like, you know, you don't want to spend the six dollars for a Fram oil filter, and you wind up spending two thousand dollars for an engine. But those are days gone by, I think.

". . . we've realized over the years it's a lot better fix the facility today than it is to wait ten years and fix it later, because generally, when things start going to hell, they only get worse at an accelerating rate. . . ."

I like to think, at least, that we've come a long ways and we've realized over the years it's a lot better fix the facility today than it is to wait ten years and fix it later, because generally, when things start going to hell, they only get worse at an accelerating rate.

Storey: What kinds of maintenance problems would come up when you were doing inspections?

Kinds of Issues That Came up During O&M Inspections

Van Den Berg: Oh, everything from finding some pretty severe concrete erosion, you know, where maybe the bottom of the stilling basin was almost totally eroded out and you'd have to insist that whoever, whether it's the Bureau people or whether it's the water users, that they dewater that and rebuild the bottom of that stilling basin. That sort of an activity, electrical problems, ventilation-type problems, instrumentation. Sometimes the instruments that were in these structures weren't being taken care of, and I guess you could almost go the full roll, noxious weed-type problems. I spoke earlier about importing the beetles to deal with the thistles, those types of problems, everything from noxious weeds, I guess, to concrete erosion and mechanical breakdown of facilities.

Storey: Do we still do these kinds of reviews?

Van Den Berg: Yes, we do.

Storey: Let me ask you a concrete example from a perspective that I don't know much about all of this. Last September, I was fortunate enough to be able to tour Arrowrock, and it has the little seep holes and all of that and the water running out, and, I mean, it was just as clean as a whistle, all the way through.

Varying Levels of Maintenance at Different Facilities

Storey: Yeah. Built in 1911, 1912, that era.

Storey: Then we went down to Owyhee, which is a similar concrete structure with the seep holes and all of that, and what I saw was a lot of mineral build-up in the drainage channels and that kind of thing. It looked a lot different.

Van Den Berg: It is.

Storey: Is it really different?

Van Den Berg: Yeah. Owyhee is not maintained as clean as Arrow.

Storey: But it isn't a problem?

Van Den Berg: In most cases it isn't a problem, but it's not something that we like. We would rather see the facility kept fairly clean all the way through. Of course, the irrigation district operates and maintains Owyhee, and if there isn't a structural need or something to do some of that stuff on the inside of the dam, they don't spend the money on it unless it's necessary to do it.

Storey: So what we're talking about, if I'm understanding correctly, is that these are cosmetic things, but they are not issues of safety of the dam or safety of personnel and that kind of thing?

Van Den Berg: No. If they were issues of the safety of the dam or safety of personnel, we would make strong recommendations that they be taken care of and insist that they be . . .

Storey: I see. I was just wondering how much latitude there is in all of this.

". . . one of our irrigation districts . . . Rogue River Valley Irrigation District. . . . The manager . . . Glover Pendleton [phonetic]. . . . you could have gone to that structure and inspected it with white gloves, and if you found anything that needed to be fixed and you made a recommendation to Glover to get it fixed, most of the time, if at all possible, he'd have it fixed before we got back to Boise. . . ."

Van Den Berg: We used to talk somewhat about one of our irrigation districts over in western Oregon, Rogue River Valley Irrigation District.

Storey: Down around Jacksonville and Ashland?

Van Den Berg: Yeah, right. The manager of that particular district at that time was a fellow by the name of Glover Pendleton [phonetic]. I swear you could have gone to that structure and inspected it with white gloves, and if you found anything that needed to be fixed and you made a recommendation to Glover to get it fixed, most of the time, if at all possible, he'd have it fixed before we got back to Boise. That's just the other side of the coin, where you had a district that just did an ***exceptional*** job. But what I'm saying is you find both: Bureau-operated and water user-operated. Arrowrock has not always been spic and span. There were times that we had dam tenders there that evidently weren't as ambitious or didn't pay as much attention as some of the recent ones.

Storey: Well, and, you know, what looks spic and span to me may not look spic and span to somebody who knows what they're really doing with the dam.

Van Den Berg: Yeah.

Storey: . . . but the contrast with Owyhee was very obvious.

Van Den Berg: And having been at both of those structures, I know exactly what you're talking about.

Storey: What else would you be doing in O&M besides inspections? Would you be designing work for operation and maintenance, for instance?

Van Den Berg: Some. At that particular time, some minor-type designs, anything that had really much basis for professional design, too involved would go over into our D&C group, our Design and Construction group, our design branch.

Storey: But here in the region?

Van Den Berg: Yeah. Here in the region. ***Major, major*** O&M type stuff would go to Denver for design. Now, you know, when you start talking about what constitutes operation and maintenance, sometimes if you have a total rebuild of a powerplant or a total upgrade of a powerplant or rebuilding of gates or something, that type of a design would probably go to Denver, but it would still be operation and maintenance-type activities.

Storey: Could you characterize where the cutoff would be, what would be done here in the region, what would be done in Denver?

Van Den Berg: In most cases, that's fairly difficult, even to establish a cutoff. I guess maybe one way to compare that, if we had a gate system where we needed some modifications to it which would require some design and some analysis of the strength of materials and how you were going to make those modifications, we would probably do that in-house, in our design group, but if you had a situation where you were going to totally replace those gates, not in-kind but with a different style gate, or maybe you had a need for maybe redoing the concrete around the gates and those kinds of things, then that would most likely go to Denver.

Storey: Now, this would be true historically. Would it also be true now?

Van Den Berg: Less now than then. We would do more of the design now than what we would have done maybe ten years ago.

Storey: What about canals? What kinds of O&M would we have on canals?

Canal O&M

Van Den Berg: Well, if you think about a canal, you start at the headworks, and the first thing you would do, you'd look at the diversion structure and the headworks, and you'd look at the same thing you'd look at on a dam: you'd look at the concrete; you'd look at the gates; you would check the oil in the gear boxes; you'd make sure that they were draining those things periodically and changing the oil, or at least cracking the drain plug to release any moisture that might be accumulating in those boxes. You would check the electrical motors for cleanliness, to see whether or not they were adequately protected from the dust and the birds, because, you know, birds and bugs and stuff will build nests inside those electric motors and those kinds of things if they can get in them. Cables, you'd check the cable systems and lift gates. You'd check the hydraulic systems of the lift gates. You look at the overall general appearance.

You would look at it even from a safety standpoint for the operators and for the general public, like around the headworks, and then as you go down alongside of the canal, there's a lot of things you look at. You look for erosion. You look for weed control. As you go down the canal, periodically there are always check structures in that canal that check the water up so it can be delivered out of certain sections. You inspect those check structures.

"You look very closely at the embankments. . . . burrowing rodents. . . . Trees on an embankment are a no-no. . . ."

You look very closely at the embankments. You pay close attention to see whether they have a problem with any kind of burrowing rodents. Ground squirrels and badgers have caused failure of ***numerous*** canals throughout the Bureau of Reclamation, and those have to be controlled. Trees. Trees on an embankment are a no-no.

Storey: Why?

Van Den Berg: Well, as long as the tree is alive, it's fine, but when the tree dies and the root decays, when that root decays, it leaves a hole in the ground, and quite often a decaying root can create the conduit that causes an embankment to fail. And so trees on earthen embankments and canal banks is a no-no. You want to take care of those things as soon as you see one growing. Quite often we inspectors would carry a small set of nippers in our back pocket as we were inspecting

things, and if you seen a little two-inch tree growing on a canal bank, you'd nip him off, take care of the problem before it got started. And if there were bigger trees, well, you would recommend that the district remove those before they got any bigger, because ***eventually*** they're going to cause you a problem.

And there are other reasons. Trees are heavy consumers of water. A tree-lined canal, particularly certain types of trees, heavy cottonwoods and those kinds of things, in the heat of summer, a big tree can gobble up a thousand gallons of water in a day. So from a water standpoint, too, sometimes you do that. Now, I recognize, you know, from an environmental standpoint, a lot of times it's a lot nicer to see those trees along a canal, and, you know, they provide wildlife cover, they provide shade for the canal, and some places you can live with them if there's not an embankment involved. If your canal is a ***cut*** section in natural ground, you can live with trees in that kind of a section, but if you have an elevated embankment–the New York Canal here, along the eastern side of Boise, southeast Boise, you wouldn't for a minute tolerate trees growing on that. You might let some bushes and stuff. Some of your bushes are very shallow-rooted, they're very fine-rooted. If they're on a downstream embankment they wouldn't send roots clear over to the water, but then it's just because they're of that particular species. Other things will go many, many, many feet to water, send a big old tap root right over to it. That's when you have problems.

Storey: What other kinds of things would you be looking for?

Van Den Berg: I mentioned the trees, the rodents.

Storey: You mentioned something about erosion.

Van Den Berg: Erosion. Anytime you have running water, you at least have the possibility of erosion.

END SIDE 2, TAPE 1. JULY 25, 1995.
BEGIN SIDE 1, TAPE 1. JULY 25, 1995.

Storey: This is tape two of an interview by Brit Storey with Max Van Den Berg on July the 25th, 1995.

. . . talking about erosion and the fact that the canals are straight.

Van Den Berg: Yeah. In most cases, the canals are fairly straight when they're built, and the in

slopes are protected, sometimes with sands and gravels and cobbles, sometimes with concrete. Other times they're just clay-lined, but you always have to be on the lookout for places where erosion might start, particularly in a bend or a curve on the canal, and you can easily start the typical meander that we see in a stream, and if you don't nip that in the bud right away, eventually that meander is going to take your canal out. So you look for those kinds of erosion problems, particularly, you know, in your earth-lined canals.

You look for seepage at the downstream toe of the canal. You're always on the lookout for that. Most of the time, that's pretty obvious because you'll see water weeds, and the grass will be green and lush where maybe not too far away it'll be dry and burnt up.

Concrete canals are a different story. Concrete canals, you look for separation between your backing material and your concrete liner. You look for symptoms of frost heave, which indicates that maybe your drainage system underneath the canal isn't working the way it's supposed to. Concrete canals, ***generally***, particularly in the Pacific Northwest, require a lot higher maintenance than do earth-lined canals because of your freeze, thaw, frost heave. But there are places, because of the underlying material, the fractured lava, the fact that you'd lose most of your water if you didn't line it with concrete, there are these places where you really need to use it.

Granted, you know, you have a lot less ***loss*** out of concrete canals than you have out of earth-lined canals in terms of water loss. But in a lot of cases, they're also more hazardous because they're harder to get out of if people have a tendency to fall in them or something. The sides are slick. The sides will have moss on them. My opinion is that if you can build an earth-lined canal that will do you a good job, they're probably superior to a concrete-lined canal because of reduced maintenance, a little bit less hazard, and more eye-appealing in some cases, particularly environmentally. You know, fish and stuff can live in an earth-lined canal. They can live in a concrete-lined canal, too, but they don't have the cover. And some of our canals are recognized as some pretty good fisheries.

Storey: Really?

Van Den Berg: Oh, yeah. Oh, yeah. I just talked to a fellow the other day who said they were getting four- and five-pound trout out of his canal over here eastern Idaho.

Storey: I'd like to catch a four- or five-pound trout out of anything. (laughter) How

often would you be inspecting canals and dams?

". . . the requirement under the Review of Operation and Maintenance Program is that we give them a very thorough inspection once every three years. . . ."

Van Den Berg: Actually, the requirement under the Review of Operation and Maintenance Program is that we give them a very thorough inspection once every three years. So it's on a three-year rotation.

". . . we normally would . . . want to inspect a facility when it was full of water. Then the next time we would want to inspect the facility when it was empty . . ."

The way we normally would do that would be that on one of those three-year periods we would want to inspect a facility when it was full of water. Then the next time we would want to inspect the facility when it was empty, if that was possible.

Storey: At three-year intervals we're talking about?

Van Den Berg: Right. Right. At three-year intervals. So what it would really amount to is that every six years you'd inspect them when they're full and every six years you'd inspect them when they're empty. You have that opportunity with the canals, particularly. You don't ***always*** have that opportunity with the reservoirs, but you do have the opportunity with reservoirs to inspect them when they're ***completely*** full and in the fall when they're partially full. So you do have that trade-off there. But there's benefits to doing both of those, because you see things when they're empty you can't see when they're full, and you see things happening when they're full that you can't see when they're empty, particularly with regards to seepage and those kinds of things and how the water is flowing.

Storey: Speaking of seepage, tell me about water weeds.

Van Den Berg: Water weeds?

Storey: Yeah.

Water Weeds

Van Den Berg: You know, water weeds, in an awful lot of cases, our most noxious weeds have been introduced into this country, have been introduced by man in certain areas because somebody at some point in time thought they were of some sort of

value or somebody at some point in time bought this pretty plant down at the local nursery, liked it for a while, had it in their back yard, the canal run by the back yard, seeds from that plant would drop into the canal, and it would start spreading.

". . . water weeds restrict the flow in a canal substantially. . . ."

The reason you don't want water weeds, first of all, water weeds restrict the flow in a canal substantially.

Eurasian Milfoil

Eurasian milfoil can do that, but at the same time it's not a very desirable weed from the environmental standpoint.

Purple Loosestrife

We're dealing with one right now, purple loosestrife. Nobody likes it. The Fish and Game people don't like it. It has no value. The only value it has is cover. It has no feed value for birds or anything like that. It does have cover because it's a weed, but it will totally take over a wetlands. It'll just absolutely choke out a wetlands. It will drive out the cattails. It'll drive out all the desirable species. That plant was planted in a test plot. I'll just say, up in the state of Washington it started from a test plot that was put in by the University of Washington looking for water weeds that might be of some beneficial value. Well, now we have one hell of a problem with a weed that nobody has found to be good for anything, and it even chokes out the ~~less desirable or the~~ more desirable water weeds, if there is such a thing as a desirable waterweed. This thing takes them all out.

Flowering Rush

Flowering rush is another one that its gets started in a canal or something, it can just grow to the point where it chokes the capacity of the canal, you can't get the water down the canal. So you just have to be extremely careful, and you have to be very watchful.

Just not too long ago, when we rebuilt Jackson Lake Dam back in the early eighties, '83 to '87 or something, we even had people on our staff, on our staff in Denver, Bureau of Reclamation people, who were recommending that we plant Eurasian milfoil in Jackson Lake Dam. Well, some of us that

recognized the problem with Eurasian milfoil just come right up out of our seats and raised all kinds of hell until we got that stopped. But, you know, it was somebody who didn't have field experience that thought Eurasian milfoil would be a nice water plant to reestablish in Jackson Lake Dam once we had it rebuilt. That's why we have to be forever watchful of what we're planning to do. We need to know the ***long-range*** effects of some of this stuff, and we don't always know that.

Storey: When you say water weed, you're referring to plants that like water?

Van Den Berg: Plants that like water and particularly plants that grow ***in*** water.

Storey: Plants such as? You've mentioned a few already.

Van Den Berg: Flower rush, purple loosestrife, Eurasian milfoil. They will attach to the bottom of a reservoir. Flowering rush will grow in ten or fifteen feet of water, start at the bottom and go right to the surface.

Storey: What about things like cattails and willow?

Van Den Berg: Cattails, willows, they're a problem. They'll do the same thing, you know, but they're a lot easier to control. They're not as noxious a weed as some of the other stuff. I understand down in the Southwest Region, salt cedar, which is a kind of tree or bush that's very water–

Storey: Tamarisk.

Controlling Water Weeds

Van Den Berg: –just is a tremendous problem down there. But up in this country, most of it is the Eurasian milfoil, the purple loosestrife, the cattails, the typical water weeds. Some of the controls that we have for water weeds in the canal, we're probably going to lose some of those controls because they're not what you call environmental friendly. Copper sulfate has been used for years to deal with water weeds in canals, tear gas, Acroleum, which are gases that you inject into the water for a few hours, and they will essentially wipe out the water weeds, but at the same time, if the concentration is too high and stuff, they will also wipe any fish and stuff that lived in the canal.

Storey: Maybe crops when the water's delivered?

Van Den Berg: Yeah. Most of them, like the Acroleum and stuff, are okay for crops, particularly if you're not sprinkling, if you're just running furrow irrigating those kinds of things, why, they dissipate soon enough. But you have to be careful. There's more and more controls on things like copper sulfate, petroleum, and those kinds of things. We may be back to manually removing a lot of weeds out of canals.

Storey: Or grass carp.

Grass Carp

Van Den Berg: Grass carp. One of the new things that has some real positive effects. Back prior to the time of using chemicals to clean canals, they did it either by hand or by dragging extremely heavy chains, heavy log chains down through the canal, sometimes a team of horses on each side of the canal. We have numerous pictures of them cleaning canals that way, where they'd pull this moss and water weeds and stuff out by the tons.

Storey: Yeah. Pile it up like haystacks.

Van Den Berg: Yeah. But you have to keep your canals clean. Otherwise they won't run water.

Storey: Now, when you went to the Federal Safety of Dams Program in '78, if you were already inspecting the dams, what ***more*** would you be doing in a Safety of Dams inspection?

How Inspection Changed When the Increased Safety of Dam Program Began in 1978

Van Den Berg: Well, when that started, as I said earlier, the Safety of Dams inspections became much more technical-oriented than were the operation and maintenance. The operation and maintenance inspections were looking at the facilities that were there, how they were being taken care of, whether they were deteriorating, whether they needed to be fixed. The safety-of-dams inspections would look at everything from the design, even to the point of doing additional investigations on the embankment. Maybe out of that safety-of-dams inspection we would be looking at some things and reviewing some of the design criteria, when the structure was built, and would say to ourselves, well, there's a question here. You know, if we built this dam today, there's some other things we would need to look at in a lot more depth: earthquake. Was the structure designed to

withstand the type of an earthquake that can happen in this part of the country? And in a lot of cases, as a result of those kinds of questions, we would do on-site investigations core drilling the dam; core drilling the foundation, finding out, you know, for sure how that structure was built, what that foundation was like.

Among Issues Considered in the Safety of Dams Program Are Earthquake Hazard, Spillway Sizing, and the Hazard to the American Public in a Failure

As a result of those kinds of investigations, a number of our dams around the region are being rebuilt because we found out that either–you know, like for maximum credible earthquake, for a big, big flood by today's standards, maybe the dam would not have sustained a large earthquake because of, maybe one of the phenomenon, what we call liquefaction, where if you put that kind of a shake on an earth embankment, it just kind of goes to jelly and falls apart, and if a structure wasn't ***designed*** to ***withstand*** that sort of thing, you maybe had a problem.

Spillway sizing. We have a lot more hydrology data today than we had eight years ago, and we've seen some events. There've been numerous events, the Rapid City, South Dakota, flood of 1972; the Colorado-Big Thompson flood, I think, in 1976; and some other floods around the country now, and with recent data indicate that we can have bigger floods in some of these areas than we ever thought we could have. So you have to go back and look at the spillway on these major structures and see whether they will safely pass those kinds of floods or not. Because the first thing you've got to do is make sure that your facilities will pass that flood and not have it overtop the dam and fail the dam, because a dam failure is a lot bigger flood than Mother Nature will throw at you, even though some of these floods by Mother Nature are way, way bigger than what your channel capacity is and would do a lot of damage downstream, it's still better to pass those kinds of floods than to jeopardize the safety of your dam.

The safety-of-dams inspections essentially were very comprehensive, all the way from just looking at it almost right from the ground up, just looking at it from how the dam was built, what the foundation was like, what the climate is like, what the criteria is like, how big is the spillway, what's the situation downstream.

Part of the Safety of Dams Program was to categorize all of these as to what kind of a hazard they created for the American public–very low hazard,

moderate hazard, high hazard. A high-hazard dam would be one that sits above a heavily populated area, you know, in close proximity that may have some problems. A very low-hazard structure may be one that is clear out in the boonies where, if it did fail, the flood would be so small by the time it reached a populated area, it might not make all that much difference.

Standard Operating Procedures

So that was part of that whole safety-of-dams issue, making sure that all of the structures had good written operating instructions. We call them S-O-Ps or standard operating procedures. That was tied into the Safety of Dams Program.

Storey: And which parts of it were you involved in?

Van Den Berg: All of it.

Storey: You did everything?

Van Den Berg: Yeah. For that period of years, from '78–I didn't actually become the Chief of the Safety of Dams Branch, I believe, until 1980. We had a fellow here who was near retirement who, for at least a year, acted in that capacity, and when he left, why, I took over. From 1980 until 1985, I was Chief of this region's Safety of Dams Branch.

Storey: Now, you mentioned that a number of dams were rebuilt or modified.

Van Den Berg: Yes.

Storey: Could you mention some of those and what was done?

Conconully Dam

Van Den Berg: Yeah. Gee whiz. I'll even go back before the Safety of Dams Program started, there were some things that happened. Conconully Dam up in Central Washington, the spillway was rebuilt on that particular structure because it was not large enough to safely pass the type of flood that could happen there. That was recognized before we ever had a Safety of Dams Program, in the early 1970s.

McKay Dam

Probably, somewhere between–before '77, I think, the spillway over at McKay Dam in Central Oregon was rebuilt for the same reason: it wasn't large enough to pass the type of flood that could happen.

Jackson Lake Dam

Coming on to more current times, Jackson Lake Dam up in Grand Teton National Park was totally rebuilt because it would not withstand a modern type earthquake that could occur in that area. Of course, that particular area, up in the Jackson Hole area, is a very ***active*** seismic area, and so through a number of investigations, analysis, a decision was made that we just had to rebuild that structure up there, and we had to actually had to build a foundation.

The dam was sitting on lousy, just really poor foundation, and as part of that whole program, then, we essentially ***built*** a foundation to place the dam, and we did that with two new techniques that had not been used on dam construction, to my knowledge, anywhere.

Dynamic Consolidation and Soil Cement Columns

One was what we called dynamic consolidation, and this was where we took–I think it was a 32-ton weight, steel weight, and you'd raise that thing up in the air about a hundred feet with a crane, and you'd free-fall it on the ground, and when it hit the ground, the ground would shake for hundreds of feet around, and that was like tamping that foundation to consolidate it so you had a good firm structure underneath that dam. Other parts of that program also was the installation of what we call soil cement columns, and with a rotary drill, drill holes down in the foundation to eighty-, ninety-, a hundred feet, and those holes would then would be injected full of some sort of a soil cement grout-type mixture. That was the way the foundation at Jackson Lake Dam was built then so it would help stabilize that particular structure. The embankment itself, the old embankment itself wasn't as much a problem as the foundation was, but, of course, we had to remove all of the dam, all the earth-filled part of the structure.

Storey: Before you could get to the foundation.

Ochoco Dam

Van Den Berg: Yeah. And we feel that we have a very safe structure there now that will serve for a long, long time. We're rebuilding other structures right now. Ochoco Dam. We just got done doing a modification on that that, for the most part, has

been successful, but we have a problem there now that we need to find out what's going on and continue to fix.

American Falls Dam

We've done a number of dams for the National Park Service. American Falls Dam was totally rebuilt. It wasn't rebuilt under the Safety of Dams Program; it was rebuilt in 1977, a year before that came in place, but eventually somehow Congress seen fit to use Safety of Dams money to pay for the rebuilding of it. So that happened.

Storey: Tell me about safety-of-dams money. Is it reimbursable, for instance, to our water users?

Originally Safety of Dams Projects Were Not Reimbursable, but They Became 15 Percent Reimbursable in the Early 1980s

Van Den Berg: Originally, the first act, 1978, was totally non-reimbursable. One hundred percent of the cost of those safety-of-dams activities just came out of the Federal treasury with no payback. Beginning, I think, somewhere around 1981 or '82, through a major effort by some of our Eastern senators and congressional people demanding that some of that be paid back, the law was changed to where it required the water users to pay 15 percent of the authorized costs of the safety of dams rebuild.

Some people would ask, "Well, why not 100 percent? Why just 15 percent?" And my thinking on that has always been, is that the reason we're rebuilding these is for safety reasons, and the safety is for the American public, and an awful lot of the American public that lives below these structures in these valleys are not really and have not shared in the cost of those structures, but yet they are receiving a lot of benefits from them, either in the way of flood control or recreation or incidental benefits. The business they run may only be there because of the fact that there's an irrigation project near it, and so at least it's my thinking that that's what Congress intended when they provided that 85 percent subsidy on these safety-of-dams issues, is that it was a safety issue that was of far more value to the American public than to the water users themselves.

Storey: Any others that we've rebuilt? American Falls is on the Snake up here by Twin Falls.

American Falls Dam

Van Den Berg: It's on the Snake over by Twin Falls. Actually it's closer to Pocatello.

Storey: Why did we have to rebuild that one?

Van Den Berg: It was concrete deterioration. There was what we call in technical terms an alkali-aggregate reaction. And when the structure was built, it was a time when we weren't as knowledgeable about the chemical composition of some of the material that we used in making concrete, and so if you have aggregate of certain makeup and you use concrete and sand of a certain makeup, there can be a ***reaction*** there that is a slow deterioration of the concrete.

Storey: A chemical reaction of some sort?

Van Den Berg: A chemical reaction, and eventually the concrete–it weakens and it starts falling apart. Perfect concrete will, in most cases, only get better with age. We're seeing some tests in Grand Coulee, when we sample some of that concrete, that it's still improving.

Storey: Still getting better?

Van Den Berg: Still getting better sometimes, yeah. But in other cases where your chemistry isn't quite right, you can get a definite deterioration, and that's what happened at American Falls. And so all the bonding and stuff, you know, between the lift lines, why, of the concrete, there was no bonding there, and the concrete was just essentially beginning to fall apart. So we decided to rebuild that. That was the reason.

Deer Flat Dams

You asked about others, though. We've done quite a few major modifications on Deer Flat, Deer Flat Dams. There are two dams that create the reservoir over here south of Nampa Idaho. We have redone those.

Storey: And those are pretty recent, as I recall.

Storey: Pretty recent, essentially, technically finished this year, physically finished a couple of years ago, but this was the first year that we could totally refill that reservoir. We had enough water so that we could totally refill that reservoir. It's an off-stream reservoir, to test it all out and say, hey, it's doing what we

want it to do, it's performing the way we want it to perform. And so from a technical standpoint, it's finished this year, but physically it was rebuilt a couple of years ago.

Reclamation Rebuilt Dams for the Bureau of Indian Affairs on the Flathead Indian Reservation

We've done a number of Safety of Dams Programs also for B-I-A [Bureau of Indian Affairs], rebuilt some on the Flathead Indian Reservation up in Montana.

Storey: Were those dams we built initially?

Van Den Berg: Um-hmm. Yeah.

Storey: Then they were turned over to B-I-A?

Van Den Berg: They were turned over to B-I-A.

Storey: And what were the safety issues there?

Van Den Berg: Oh, a combination of some of the same things we're talking about here–the foundation, the embankments weren't built right, sometimes there were some serious maintenance problems that required an awful lot of attention, spillway sizing, that sort of thing.

Van Den Berg: I ran across a letter recently, I think it was Ray Walter, maybe, saying, "If Mr. Debler says that the spillway needs to be sized this way, you will size it this way." (laughter)

Van Den Berg: What were the names on that?

Storey: Ray Walter was the Chief Engineer and Erdman B. Debler was the head hydrologist, I think it was, for Reclamation, and somebody wanted to argue about it, evidently. But anyway. Let's see. I think you were there for about seven years, six or seven years in dam safety?

Van Den Berg: I was there from '78, I believe, until '85.

Storey: And then in '85 you went off to Minidoka?

Van Den Berg: I went off to Minidoka as the Project Superintendent down there.

Storey: While you were on dam safety, did you ever run into any situations where people disagreed about the safety of a structure?

Disagreements about the Safety of a Dam

Van Den Berg: Oh, sure. Sure, both in-house and out-house. You know, we've had situations where sometimes some of our technical experts–usually they didn't disagree on whether they had a safety problem or not. What they disagreed on was how to fix it.

Storey: The issue of how to fix.

Van Den Berg: Issue of how to fix. Now, some of the disagreements on whether it was ***safe*** or not, a lot of times came from local people, local users, the water users themselves, the environmental organizations who didn't want you in there mucking around.

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Storey: So they would be arguing that the dam was safe because they didn't want you spending more money or disrupting the environment.

Van Den Berg: Yeah. Both cases. I think that a lot of the environmental organizations, their opposition was because they felt like you were going to destroy a lot of the environmental benefits in those areas and create havoc, you know, when you rebuild the structure, and they just didn't want to see that happen. Water users, traditionally, if it was going to cost them some money or jeopardize their water supply or something for a season when you were doing this, they objected to that, and the layman philosophy, people who don't understand dams and how they function, their philosophy was, "Well, you know, it's been there for seventy-five years. It must be safe."

Storey: "It's done fine so far."

Van Den Berg: Yeah. Of course, during that seventy-five years you haven't had the type of a rain flood that can happen there, you haven't had the type of an earthquake that can happen there. That's when the technical experts have to look at those situations and say, "Well, the risks are too great for us ***not*** to do something at

this structure."

Storey: And do we have a formula or something for determining when the risks were too great?

Van Den Berg: No.

Storey: How is that done?

Van Den Berg: Mostly it's just when you analyze, when our technical people–and I'll say our technical people in Denver–and they weren't alone when they did this because quite often we would have–well, almost always we would hire consulting engineers from outside the Bureau to look over our shoulder to give us a second opinion. Kind of like the doctor, you know. You don't always accept the first doctor. You ask for a second opinion, particularly on very serious, expensive modifications. But our technical people, that's their field. They analyze those structures. You know, they can apply the type of a flood that could occur to that particular location, and it doesn't take long to find out whether you have a structure there that will pass that large flood or whether it will overtop the dam. And the same thing goes for a structure that might be subject to failure from earthquake or maybe also from internal erosion.

"Internal erosion in an earth embankment can take place very quickly or it can take place over a long, long period of time. . . . There was a lot of seepage that was coming through the foundation of these dams at Deer Flat. . . . there was what we call piping taking place, but it was very slow because it was in a very hard material, and it was occurring because that material was . . . being dissolved by the water. . . ."

Internal erosion in an earth embankment can take place very quickly or it can take place over a long, long period of time. I spoke earlier of the repairs that we did to Deer Flat out here. Those repairs were necessary because that structure was subject to a very slow but progressive internal erosion process. There was a lot of seepage that was coming through the foundation of these dams at Deer Flat. I may use Deer Flat and Lake Lowell in the same category; they're one and the same. The lake is Lake Lowell. The two dams that create it are Dear Flat Dams. But there was what we call piping taking place, but it was very slow because it was in a very hard material, and it was occurring because that material was dissolving, was being dissolved by the water. It's almost like a chemical erosion as opposed to a physical erosion, and these conduits maybe start off very small and grow and grow and grow.

Storey: That's what piping refers to, is that there's a water channel being cut somehow?

Van Den Berg: Right, a water channel being cut. Even though it was a very slow process, you knew that ***someday*** that was going to grow to the point where it was going to be a problem. I physically have seen those conduits below Deer Flat Dam, oh, six or eight inches in diameter. So there was a definite problem there, but the average person that would look at the dam would say there's nothing wrong with it, there's nothing going on.

Storey: How are we able to identify something like that?

How Chemical Analysis of Seepage Can Reveal Issues in a Dam

Van Den Berg: Well, there's an awful lot of seepage below Deer Flat Dam in the first place, but that had been there since the structure was built years and years ago. Some of that seepage was increasing, which you can also tell from the chemical composition of the water. You have a certain chemical composition of the water upstream, and when it goes through one of those conduits and comes out in the way of seepage, if it has a different chemical composition that includes some of the materials in that foundation, you know that those materials are going into solution.

Storey: So we're doing chemical tests on these things?

Van Den Berg: We have done some chemical analysis on those waters, yeah. Now, on the other side, you know, you can talk about internal erosion just from material, where you actually have material starting to migrate.

Storey: Where the water comes out murky.

Van Den Berg: When it comes out murky, sands and gravels or clays and stuff are starting to come out murky, that's when you know that, hey, something's happening. Teton Dam failed by internal erosion.

Storey: It's amazing how complicated it gets sometimes, isn't it?

Van Den Berg: It's extremely complicated, you know, and sometimes even when you work in it for years and years and years, we don't recognize that other people don't understand it like we understand it.

Storey: That's true. That's one of the reasons I'm trying to do part of this program,

anyway. I think it's very useful.

Is there anything more we should talk about safety-of-dams issues?

Van Den Berg: No, I don't think so, Brit. We've probably covered that pretty thoroughly.

Storey: And my recollection is we covered your period as manager at Burley fairly well?

Van Den Berg: I think we did.

Storey: We talked about fly fishermen and rafters and all kinds of things.

Van Den Berg: Yeah.

Ririe Dam and Reservoir

Storey: But one of the things that I don't think we talked about was Ririe Reservoir. You talked about compensatory ranges and that kind of thing briefly, initially.

Van Den Berg: Oh, yeah.

Storey: And I believe that was for wildlife?

Van Den Berg: Wildlife, yeah.

Storey: Could you talk some more about that?

Reclamation and Others Created the Tex Creek Wildlife Management Area to Mitigate Habitat Lost Due to Construction of Ririe Dam and Reservoir and Teton Dam

Van Den Berg: The wildlife area up by Ririe, we call it Tex Creek Wildlife Management Area, was created as mitigation for the building not only of Ririe but also of Teton. When Teton was built, a lot of winter range for deer and elk was lost. When Ririe was built, some winter range for deer and elk was lost. To mitigate for that, the federal government bought up a ranch or two up there that was very desirable and subject to quite a bit of winter use by the animals. I think, if I remember correctly now, I'm guessing a little bit, from memory, that the Federal Government bought somewhere around eight or nine thousand acres,

about nine thousand acres of land up there for mitigation for Ririe and Teton. Then there was already existing Forest Service land, existing B-L-M [Bureau of Land Management] land. The state Game and Fish Department, I believe, has purchased some land also with that.

"Tex Creek Wildlife Management Area totals about 27,000 acres, now. It's been one of the *real* success stories as wildlife management. . . ."

Tex Creek Wildlife Management Area totals about 27,000 acres, now. It's been one of the ***real*** success stories as wildlife management. The wintering elk herd has gone from 200 in the late 1970s to probably around 3,000, 2,500 to 3,000 today. Deer, golden eagles, coyote, moose, you can see almost everything up there except grizzly bears. What's interesting about it, there are some exchange agreements with some of the local ranchers up there that just work ***exceptionally*** well, a cooperative-type thing where some of the lands that they have, that they have title to or grazing rights to, are exceptionally good lands for winter grazing for elk and deer. Tex Creek Wildlife Management Area, through research and history and knowledge of grazing, there's a need to periodically have enough animals in those areas where it really crops the grass and the brush and everything down, and it kind of rejuvenates it. Otherwise you get too much big stuff. And so there were some agreements up there where they will allow the ranchers to bring their cattle into some of these areas on the Tex Creek Wildlife Management Area during the summer months or the fall of the year and graze those areas quite heavily in exchange for him not grazing some of his own lands that the deer and elk can use then that winter. These cooperative ventures up there, I think really set the stage for a lot of things that we could do a lot of places.

Storey: And very successful?

Van Den Berg: Very successful, very successful.

Storey: That's great. And this is managed by the state?

Van Den Berg: Yes, managed by the state Fish and Game.

Storey: Let's see what else there was I needed to talk about. Oh, you got the Commissioner's Natural Resources Award, don't I recall?

Van Den Berg: I did, yes.

Storey: Tell me more about why you received that and how it was awarded and all that kind of thing.

Received the Commissioner's Natural Resources Award

Van Den Berg: Well, I guess how it happened was that some information came out from Washington at one time about the Commissioner's Natural Resource Award, and some of the staff that I worked with both here and on the project over in Eastern Idaho, I guess, felt like I had had a lot to do with some of those things, Tex Creek Wildlife Management Area, some of the work that was done below Island Park to save the trumpeter swans, some of the changes in water management to try to meet ***all*** of the needs more. So they put together some information of some of the things that I'd been involved in over the years and shipped it into Washington, and lo and behold, here it came.

Storey: And when was this?

Van Den Berg: This has been about a year ago.

Storey: Did the Commissioner actually come?

Van Den Berg: No, he did not. John Keys made the presentation.

Storey: That would have been about the time you all reorganized up here.

Van Den Berg: Yeah, I think it was maybe even before that, probably a little bit before the organization started, I think. I'd have to go get the paper to tell you exactly.

Storey: Tell me about the reorganization for this region.

Reorganization under Commissioner Dan Beard[6]

Van Den Berg: There have been a lot of changes. It came about, of course, I think driving force from Washington, the Commissioner's philosophy that there needed to be some major changes in the organization.

"I don't mind going on record as saying I believe that some of those changes were necessary. Some of them weren't. . . ."

I don't mind going on record as saying I believe that some of those changes

6. Commissioner Dan Beard participated in Reclamation's oral history program.

were necessary. Some of them weren't. We could accomplish the same thing without some of the major changes, but that's neither here nor there. In this particular region, we looked at some changes, consolidation of project offices into area offices. In a couple of cases, we took two different projects, essentially, made one area office out of those. Well, in ***three*** cases we did that. We created a new area office, what we call the Lower Columbia Area Office, which is essentially the western half of Washington and Oregon.

Storey: Vancouver, Washington?

Van Den Berg: Vancouver, Washington. And there were a lot of changes here in the regional office. The division that I managed at that time, which was the 400 Division, which was the Water, Power, and Lands Division . . .

Storey: The old O&M?

Van Den Berg: The old O&M, essentially gutted. It took the biggest hit. A number of those functions went into what we called Resources Area. Other parts of it stayed in what we call Technical Services. I went from managing a staff of sixty or seventy people, to becoming a Program Manager with a staff of two or three. Or maybe I should just say supervising a staff of two or three, and that was Program Manager for Resources or for the Technical Services part.

The reorganization, I believe, created essentially three groups. We had an administrative group, we had a technical services group, and we had a resources group. That was pretty much the regional office. That was the way it started out, and these groups were all under an Assistant Regional Director.

Storey: Each of them had an Assistant Regional Director?

Van Den Berg: Well, one of them was an Assistant ***to*** the Regional Director. The other two were Assistant R-Ds. After, I don't know, maybe a year, maybe less than a year of that, there appeared to be a need for some changes. John Keys[7] decided not to have any Assistant Regional Directors but to have a Deputy Regional Director who would truly be a deputy to his position, and consolidated the organization then into two units, one that was still the administrative part, and the other that combined the resources ***and*** technical service functions all wrapped into one, and asked Max Van Den Berg to manage that. Now I'm going from essentially overseeing, doing the Program Manager's job, up to managing this function here, which is 238 people as of yesterday, has all the

7. John W. Keys III participated in Reclamation's oral history program.

technical and resources activities here in the regional office plus two construction offices, one at Bend, Oregon, and the other one at Yakima, and the Columbia River Systems Operation Review Office in Portland, Oregon. So that's what the reorganization is meant to be, and it's been quite a yo-yo. I would say I like it a hell of a lot better today than I did a year ago.

Storey: Am I understanding correctly, a year ago you had two or three people you supervised?

Van Den Berg: That I directly supervised, but as a Program Manager, I was responsible for a large part of the program without any of the authority.

Storey: And now you have the authority, too?

Van Den Berg: Yeah. Now I have the authority, too.

Storey: Has the organization been flattened?

Van Den Berg: I think it's been flattened substantially. We've gotten rid of one [GS-]15. We've gotten rid of numerous [GS-]14 positions.

Storey: How did we get rid of these positions?

Van Den Berg: By attrition, consolidation. I haven't really counted, but the job that I have today, you can look at it two ways. I'm either doing the job that two 15s were doing less than a year ago, or I'm doing the job that about thirteen 14s were doing two years ago. Now, if that isn't flattening the organization, I don't know what the hell is.

Storey: And most of these people have retired or moved to other positions or what?

Most of the Reorganization Took Place Through Attrition and the Buyout

Van Den Berg: Most of it's been through retirement. When there's been an opportunity to consolidate, we've done that. At one time, we had like the Assistant Regional Director, we had three Program Managers, and then we had Branch Chiefs for a lot of different–well, this one position of the Assistant R-D was eliminated. The three Program Manager jobs were eliminated.

". . . I'm essentially, I'll just say, *trying* to manage what these three Program Managers and those two Assistant R-Ds were managing, with the help of a lot of

good staff. . . ."

Well, there's two Assistant R-D positions essentially eliminated, and I'm essentially, I'll just say, ***trying*** to manage what these three Program Managers and those two Assistant R-Ds were managing, with the help of a lot of good staff.

Storey: Did this region have to go through a RIF [Reduction in Force] in order to get to this?

Van Den Berg: Not yet. The ***buyout*** helped quite a bit. We had a number of people take advantage of the buyout, and people that are still going to take advantage of it.

Storey: Of course, the area offices have been sort of projected into a completely new responsibility. Do you see any tensions between the area offices and the regional offices that are new?

Van Den Berg: Very definitely. Very definitely.

Storey: In what ways?

Van Den Berg: Just because of the changes. And here again, Brit, I think it has as much to do with personalities as it has to do with how we're organized, but we have individuals, who, as far as working relationships and stuff, nothing's changed much. They work very well together. "Hey, I'm here to help you and you're here to help me." We have other individuals who, if I try to categorize it, the empowerment has gone to their head pretty damned quick. "We're the area office. Nobody tells us what to do. We can do whatever we damn please. Regional office, take a flying hike."

There Are Personality Issues Rather than Organization Issues in the Reorganization

But I think it has a lot more to do with personalities than it has to do with the way we're organized, and those kind of situations that I just mentioned, they're certainly not the rule. But, yeah, there have been some definite tensions.

"There have been programs that have always been regional office programs that area offices have been *reaching for*, sometimes getting and sometimes not getting. . . ."

There have been programs that have always been regional office programs that area offices have been ***reaching for***, sometimes getting and sometimes not getting.

There's a message out there that we need to transfer as many functions as we can out to the area offices, and I think that's good.

". . . as public servants, we have a responsibility to look at where is the most efficient place, the most cost-effective place to get that job done. If it's the area office, that's where the work ought to be. If it's in the regional office, that's where the work ought to be. If it's in *Denver*, that's where the work ought to be. . . ."

I think we still, as public servants, we have a responsibility to look at where is the most efficient place, the most cost-effective place to get that job done. If it's the area office, that's where the work ought to be. If it's in the regional office, that's where the work ought to be. If it's in ***Denver***, that's where the work ought to be.

"I have a real fear that we're going to lose all of our real what I call our super technical experience in Denver. . . ."

I have a real fear that we're going to lose all of our real what I call our super technical experience in Denver. I feel very strongly that we need a nucleus of really good technical professionals at some spot in the Bureau. And I don't think we can afford to have it in each region. I think we need to have it in Denver. I'll also say that I think Denver does need to have some downsizing, it still does. But there's a ***need***. There's a ***need*** for that technical expertise.

We ***are*** the dam-builders of the nation. We're recognized worldwide. We have 366 major structures. We have lots of super big powerplants. We need to have people that ***know*** the intricacies of those facilities and what makes them tick and when they have problems. Kind of like your doctors, you know. You don't go to a general practitioner when you have a real serious heart problem; you go to a cardiac specialist. That's what we need in Denver.

Storey: You've mentioned downsizing, and you've downsized naturally, it sounds like, without any RIFs, but still you've downsized.

Van Den Berg: Still we've downsized.

Storey: What has that meant in terms of your programs?

". . . more often than not, we're not able to lay work aside, but even with the downsizing, we're getting more work, requirements for more work to be accomplished: title transfer, waterspreading, high, high involvement, workload-type objectives. . . ."

Van Den Berg: There's been some reduction in funding on some of the programs, unfortunately, with the downsizing. We have not been able to effectively set aside some of the things that we're doing that need to be set aside, and this is a matter of opinion, really. Sometimes when we think something does need to be done, we don't have the money to do it or we don't have the staff to do it. We're working our staff tremendously hard. We always have, but even more so today. Sometimes we want to say, "Hey, we really don't need to be doing that anymore," and somebody somewhere in their ultimate wisdom says, "Oh, yes, we do." What I'm telling you is that more often than not, we're not able to lay work aside, but even with the downsizing, we're getting more work, requirements for more work to be accomplished: title transfer, waterspreading, high, high involvement, workload-type objectives.

Storey: But the reality is something has to be let slip, or something has to change, I should say.

Van Den Berg: Something has to change. I can remember pushing at least one issue clear to Washington, saying, "This is of no value anymore," and somebody in Washington says, "We have to have the blanks filled in." We still don't have that resolved.

Storey: Well, I'd like to continue, but we've already run a few minutes over as it is.

Van Den Berg: I would like to also, Brit, but I'm going to have to run out of here and take a break or something.

Storey: Why don't we discontinue for today, and I'll ask you again whether or not you're willing for the information contained in these tapes and the resulting transcripts to be used.

Van Den Berg: Sure. I don't have any problem with that.

Storey: Thank you.

END SIDE 2, TAPE 2. JULY 25, 1995.
END OF INTERVIEWS.