ORAL HISTORY INTERVIEW

Jim Andrews
Regional Engineer, Central Valley Project

October 14, 1994
Sacramento, California

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Interview Conducted by:
George Petershagen
Historian
Bureau of Reclamation

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Oral History Program
Bureau of Reclamation

Andrews, Jim. ORAL HISTORY INTERVIEW. Transcript of tape-recorded Bureau of Reclamation Oral History Interview conducted by George Petershagen, Historian, Bureau of Reclamation, October 14, 1994, at the narrator's home in Sacramento, California. Transcription by Barbara Heginbottom Jardee. Edited by George Petershagen. Repository for the record copy of the interview transcript is the National Archives and Records Administration in College Park, Maryland.

INTRODUCTION

James (Jim) Andrews was born in Syracuse, New York, in 1924. The son of a New York Central Railroad worker, he was raised in the rural communities of upstate New York where he attended schools through his graduation from Eastwood High School. Following service in the U. S. Navy during World War Two, he attended Syracuse University where he earned his B. S. in Civil Engineering. Upon college graduation, Andrews successfully competed for employment with the Bureau of Reclamation.

Andrews' Reclamation career includes assignments on the Central Valley Project's Trinity and San Luis Projects as well as extensive service in Sacramento. He was a "charter member" of the Mid-Pacific Region's diving team, Reclamation's first in-house dive group. This wide variety of assignments with Reclamation led to his selection as Regional Engineer, the position Andrews held from 1972 until his retirement in 1986. Although retired, Andrews continues an active lifestyle that includes serving as a docent along with his wife at the California State Railroad Museum and recreational diving.

George Petershagen, Bureau of Reclamation historian, interviewed Jim Andrews at the Andrews residence in Sacramento on October 14, 1994. Barbara Heginbottom Jardee transcribed the interview, and Petershagen accomplished the editing.

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Oral History Interview of Jim Andrews

This is George Petershagen conducting an interview of Jim Andrews on behalf of the Bureau of Reclamation. This is Friday, October 14, 1994, and this is Side 1, Tape 1.

Petershagen: Jim, would you please acknowledge for us now that you do consent to this interview being recorded?

Andrews: I do so consent.

Petershagen: And you did sign the Deed of Gift that gives this interview to the government of the United States?

Andrews: I signed it.

Petershagen: Thank you very much. Now with that, if we could begin with where and when were you born, please?

Andrews: I was born in 1924 in Syracuse, New York.

Petershagen: And you grew up in Syracuse?

Andrews: In and about Onondaga County and Cortland County, upstate New York.

Petershagen: I see. And then where did you graduate from high school?

Andrews: Eastwood High School in New York in 1941.

Petershagen: And did you go straight on to college from there?

Andrews: No. That was a fairly bad time of the century (Chuckles) for our country, so I worked for the airport, as I went out to Syracuse Airport, and I was going to get my "A and E" license, and I got my "A" license and then the war interrupted things.

Petershagen: I see. So, you went into the service?

Andrews: My brother and I joined the service early in '42.

Petershagen: And which branch of the service did you go into?

Andrews: Navy.

Petershagen: What did you do in the Navy?

Andrews: I was a turret gunner on a torpedo bomber.

Petershagen: Oh, my goodness!

Andrews: This is not going to be a war story. (Laughs)

Petershagen: A number of movies that I recall about that sort of thing, like *Midway* and *Wing and a Prayer . . .* (Andrews: Yeah.) So how long were you in the Navy?

Andrews: Oh, three-and-a-half-plus years.

Petershagen: So you were discharged in '45?

Andrews: Yeah.

Petershagen: At what rate?

Andrews: I was an Aviation Ordnanceman Second Class, at that time -- a little better in other times! (Laughter) And we won't go into that! (Laughter) I was an enlisted man, yeah.

Petershagen: So then what did you do once you were discharged from the Navy?

Andrews: I took advantage of the GI Bill of Rights and went to Syracuse University and graduated in the Class of '49, June, in the top ten percent of my class. (Petershagen: Very good.) (Aside about volume.)

Petershagen: You maintained some association with the Navy through the Reserves after that? (Andrews: No.) Or did you just make a clean break?

Andrews: I mustered out.

Petershagen: And what was your major in college?

Andrews: Civil Engineering.

Petershagen: Why that, if I may ask?

Andrews: I don't know! I probably had enough credits both in Chemistry and Civil Engineering to take my choice, and I had studied the Bureau and knew what the Bureau did before I graduated. As a matter of fact, I decided on Civil Engineering, whatever.

Petershagen: What was your first real contact with the Bureau of Reclamation?

Andrews: Well, I'd have to go back to '44 or so. Before the last tour of duty, I had a month off, and I met my wife in Yosemite and knew that was it. I never saw her again until I graduated from college and came back out here. And like I say, I made some inroads to what the Bureau did while I was going in my senior year there in Syracuse, and I called the Department of Interior in Washington, and they sent a person up to interview me. I think I was the only one they interviewed. Of course, I don't think anyone else (Chuckles) in the college knew what the Bureau was. And they hired me there. I told them I had to work in California, because I wanted to come back out here. I graduated June 10, and July 1 I started working essentially in our Elverta Office here at Sacramento, and they sent me up to Shasta in a week or so. (Petershagen: Interesting.) And we wrote back and forth for five years. (Chuckles)

Petershagen: Let's be honest about it now: Was California the great attraction, or this lady you met out here that has become your wife?

Andrews: Oh, it was the lady. She was a native daughter -- Redwood City.

Petershagen: Otherwise, I think -- and you mentioned it a little bit -- probably people in the East, very few, would ever hear of the Bureau of Reclamation. Is that

correct?

Andrews: That's right, and even in those times, in the '40s and '50s, you'd tell people who you worked for -- Bureau of Reclamation. They'd say, "Oh, the Reclamation Board," and things like that. People out here really didn't know of the developments that the Bureau was doing in the so-called "arid West," from the Mississippi west. A lot of them didn't.

Petershagen: So then you showed up at Shasta, essentially right after you went to work for the Bureau (Andrews: Yeah.) -- a brief stop here in Sacramento -- just about the time that the dam was finished.

Andrews: Yeah, we got tied into the completion of the switchyard and basically the transmission line and some access roads and stuff like that. Yeah, the dam was essentially finished, and the powerplant.

Petershagen: Now, there were a number of facilities built to support the building of the dam. (Andrews: Oh yeah.) Were you there to see some of that taken apart?

Andrews: You mean like the relocation of the railroad and all that stuff?

Petershagen: Well, the relocation of the railroad, but even more, the belt that carried the aggregate up from Redding.

Andrews: No, that was done.

Petershagen: That was all gone by the time you got there.

Andrews: Yeah. The structures were still there. Very interesting.

Petershagen: Yeah, it is interesting.

Andrews: No, this was essentially the final completion of the switchyard, and then what we call the Westside Line and the Eastside Line, down through Oroville, and the Cottonwood Tap Line I put in. As a matter of fact, I worked . . . . After we got through with some minor road work and switchyard work I was on the transmission line all the way down to Tracy for a number of years.

Petershagen: How many years?

Andrews: About two years, two-and-a-half years, and I was in Tracy switchyard.

Petershagen: Were you married by that time?

Andrews: Yeah, we got married in 1950.

Petershagen: This sounds to me like it was kind of a transient sort of a lifestyle almost. Did you live in a lot of the towns down the valley working on that?

Andrews: We got married when the transmission line was in the Red Bluff-Williams area, up in there. We first

lived in Chico when we got married -- lived in Chico -- and then we moved over and lived in Redding. Yeah, I was away a lot, but not like a lot of the Bureau people. I spent my whole -- I had forty-two years of government service when I retired, and it was all right -- you know, I lived right here, essentially, for all that time. But we did live in Chico and Redding and downtown Sacramento, and that's about it. And we moved out to the Country Club area here, and then we moved to this place.

Petershagen: Now, when you said you lived in Chico, were you assigned to the Chico Office at that time?

Andrews: When we lived in Chico the office was in Corning.

Petershagen: My goodness!

Andrews: I commuted to Corning. It's not a long commute.

Petershagen: So now was that a separate office strictly associated with the transmission line?

Andrews: Yes, strictly. Up in the Redding area we had a little office there where the old (U. S. Highway) Ninety-nine went under the railroad tracks there, south of town. We had an office there. Then we moved to Artois. We had an office in Artois. Then we moved to Williams and finally got down to Corning, and then we had one over here at Winters. Then we had one at Vacaville. Then we had one in the Stockton area. You know, they

leapfrogged down. As one got . . . . But I commuted. We lived in Sacramento, essentially, all the time.

Petershagen: Interesting. And how many people would each one of these offices employ?

Andrews: Oh, probably ten, maybe twelve. And then the labs followed us, and they probably had three people, maybe four.

Petershagen: And were all of these people full-time, career, Bureau people?

Andrews: Oh, absolutely.

Petershagen: There weren't any local, temporary hires?

Andrews: No. The one thing that the Bureau did, which a lot of people should follow that are in business, is that when you graduated from college and you went to work for the Bureau as an engineer, you were an inspector for maybe three, four, or five years, or maybe more, before you got involved in . . . . Not that inspection didn't involve engineering work, but you were an inspector. You weren't an office engineer, or you weren't this or that. And I was an inspector, and I got to be chief inspector on this transmission line, essentially from Shasta down to Tracy. You pulled your tour of duty as inspector (Chuckles) before you did anything else, period!

Petershagen: And as an inspector, you followed up on

contractor installations (Andrews: Oh, absolutely!) to make sure they met the specifications, correct?

Andrews: Oh, absolutely. That was the prime thing, yeah.

Petershagen: So if I wanted to know something about those transmission line installations, if I came to you, you'd probably -- given the prints -- you would probably know just about every nut and bolt involved, correct?

Andrews: The initial designs, of course, on that Westside Line, were done by Bethlehem. And we modified them and changed them as we went along and hopefully made them better. But there was a lot of engineering work involved, but you were still called an inspector. The same way with mechanical people and electrical people on powerplants and whatever. We had some, like on this position chart [Refers to 1942 Kennett Division Organization Chart], you can go and look at the inspectors and whatever, and they're fabulous. They turned out to be high administrative people in engineering and whatever, and they all were engineers.

Petershagen: How many people would you say are on this chart?

Andrews: Oh, I never have counted them up. (Laughs)

Looks like a hundred.[1]

Petershagen: As I mentioned before we started the interview -- and I guess I should identify this as an organization chart from Shasta that we're speaking of.

Andrews: The Kennett Division. The old Kennett Division.[2]

Petershagen: Yeah, the Kennett Division. And I was just fascinated at the number of people that are listed on here. I didn't expect nearly as many government employees . . .

Andrews: Well, what you want to do, when you have time or whatever, look at these headings here and what responsibility they have and the number of classifications and headings that were involved. Just keeping track of the contractors' payments and quantities and whatever was a chore. Of course the inspection itself was . . . . I forget how many inspectors are on there, but there's a lot of them.

Petershagen: Uh-huh! Now, on this chart it refers to people by

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1 U. S. Department of the Interior. Bureau of Reclamation. "Central Valley Project - California Kennett Division Organization Chart as of July 1, 1942." The organization chart contains over two hundred personal names plus dozens of position titles without incumbent names. (Ed.)

2 Shasta Dam was built near the former town of Kennett. Prior to the formal selection of its current name, Shasta Dam was referred to as Kennett Dam. (Ed.)

grade number?

Andrews: Those grades are the old system, and they don't . . . .

Petershagen: They don't correspond to GS grades at all? (Andrews: No.) Okay. But there are a lot of recognizable names sprinkled around in here.

Andrews: Oh, yeah. For years, you know, we were "P's." I was hired when we were P-1, P-2. (Petershagen: You started out as a P-1.) Then you went up to, actually, P-7s, P-8s, and some of those guys were P-7s, which was probably equivalent to a [GS] 14 or maybe 15, you know.

Petershagen: So about the middle '50s, say, the Central Valley Project -- I'm just going to say -- was essentially done as far as Shasta Dam, transmission lines, that sort of thing?

Andrews: No, the Central Valley Project, as I remember, embodied the San Luis Unit and the unit over at Berryessa. They weren't separate appropriations, as I remember.

Petershagen: I knew you were going to argue with me on that!

Andrews: They were? They were separate?

Petershagen: No, no, no. Those things, as they're added on, they're part of the project. You're right.

Andrews: So you say that the Central Valley Project wasn't completed until, oh, late '70s -- middle '70s or so -- late '70s.

Petershagen: Okay. Then let's set that aside.

Andrews: Are we arguing? Or do you agree with that? (Laughter by both)

Petershagen: No, I agree with it. The point I was leading up to was about the middle '50s you really became a full-time resident of Sacramento, I think.

Andrews: Before the mid-'50s. Yeah, we've lived right in this house for thirty-seven or -eight years. And then we lived in another house for four or five. Yeah. And I rejected and got a certain amount of umbrage for refusing to transfer. They wanted to ship me off to Washington. I don't know if that's a way of getting rid of you or what, but I just refused to move.

Petershagen: Do you mean to a project in Washington State, or back east to Washington, the capital?

Andrews: Back east. And you know, in the latter stages of the Bureau they had qualification lists that when jobs would open, like the project construction engineer in Minidoka or whatever, someplace, they would contact you and say, "You're on the list for possible transfer as head of this office" or whatever, and I said, "No thanks." We had six kids here, now gone. It was important to be with

them all the time, and I did. I progressed up the ladder satisfactorily, I think, just staying here.

Petershagen: And what kind of jobs did you have here in Sacramento?

Andrews: The Elverta Office was essentially in charge of all that transmission line construction, and when it closed up, I was RIFed [reduction in force] out of there. And I forget what grade I was -- must have been a P-2 or some damned thing. We had an office down at 2430 "J" Street -- and at that time we were doing a lot of riparian studies -- and I was transferred down there, no longer as an inspector, as an engineer that was going out and investigating riverside irrigation pumping plants and draining pumping plants and getting data on them on whatever, and Q's and all that kind of stuff. And also (Chuckles) I did some crop surveying for them, and we were drawing riparian maps and photographs and whatever on it. I was in charge of the groundwater wells in this area here, big area in eastern Sacramento.

And after that office was closed and I got another RIF, I ended up in the Planning Division in the main office that was on Fulton Avenue. I think it was 3333 -- it was the old building on Fulton Avenue by Town and Country Village.

Petershagen: Where the shopping center is now.

Andrews: Yeah. And I was there until they built the new office down on Cottage Way, and I was in the

Planning Division there for, oh, I guess four or more years, five maybe. And I finally got sick of it, I said, "You got to send me someplace. I ain't going to put up with none of this crap!" (Petershagen chuckles.) We were doing, you know, planning for irrigation systems and canalside pumping plants and all that stuff. It was kind of interesting for a couple of years. Then I went and transferred over to Design and Construction Division.

Petershagen: About when would that have been?

Andrews: Oh, boy. Well, let's see, I was Regional Engineer for about fourteen years. Well, I don't know. We can back up later maybe. (Petershagen: Okay.) But I went over there and got working for this [William J. McCrystle] Bill McCrystle. He was the Regional Engineer. I was assigned to the Structural and Architectural Section. The Regional Office -- I don't want to get off the track here -- but, you know, there are design responsibilities in Denver, and then there are design responsibilities in all the Regional Offices, and Denver does all the highfalutin' stuff like on arch dams and big dams and all that good stuff, and the Regional Office has minor pumping plants, and we had minor dams, smaller dams, and did a lot of canal works and whatever. So the Structural and Architectural Section there did some fairly interesting and sophisticated design work. And after a while I was in charge of that Section -- I was the head of the Structural and

Architectural Section for a number of years. Then a Branch Head opened -- the head of the Construction Branch -- and I was head of the Construction Branch, and that had to do with contract administration and a closer relationship with our project construction engineers that were doing works that were designed, and, oh, had the basic design responsibility in Denver. But we would have the contract administration and all the stuff out here. And I worked as the head of the Construction Branch for (Chuckles) six, eight years, I guess. That entailed a lot of trips to Washington and Denver. I always did do a lot of travelling to Denver.

And then the Regional Engineer's Office . . . . Mr. McCrystle -- that was 1972 -- he had to retire, he was seventy-two, and I know he was born in 1900, so in '72 I was essentially Regional Engineer from there until I retired in '86. The Regional Engineer had a lot of . . . . In the Design and Construction Division, we ran from 90, let's say, to 120 people, and that involved . . . . Are you interested in the breakdown?

Petershagen: Certainly, go right ahead.

Andrews: Involved all disciplines of engineers and geologists. We had a Canal Section that was essentially civil and hydraulic engineers. We had a Mechanical Section that was, of course, mechanical [engineers]. We had an Electrical Section that was electrical [engineers]. Plus we had an electronic-type person there. And then

Structural and Architectural -- at that time when I was in the Structural and Architectural I had a classification as a structural engineer -- and they were all structural engineers. And we had a Dam Section that was basically civil types that had dam experience. And then we had a landscape architect, and we had a bona fide architect. And the people in the Construction Branch, and the people in the Geology Branch. Now Geology, like this Bob Trefzger that you had, he was the head of that for a long time. And we had plain geologists, we had engineering geologists, and then we had this Nikola Prokopovich, who's a Ph.D.-type geologist, and then the drill crew which was anywhere from ten to fifteen or more people. And all those people were in this Design and Construction Division, so I had responsibility for all of the different fields of engineering and geology -- really interesting.

Petershagen: And that was in the capacity of the job that is known as Regional Engineer?

Andrews: Yeah, and this was limited to the confines of our Region, which used to be Region II and is now the Mid-Pacific Region.

Petershagen: Now, can you give me a general idea of the projects, then, that you oversaw while you were Regional Engineer?

Andrews: Oh, I guess the main project that was going was the . . . . Can you stop that while I think?

Petershagen: Certainly! (Laughter. Tape turned off and on) Okay, Jim, we took a minute there for you to think about some of the projects you were involved in, so if we could just tick some of them off, and you mentioned the Corning Canal. I suggested San Luis, and maybe we can come back and talk about that as a separate issue later on. You were starting to talk, though, at the time I turned the tape on, about some of the preparatory things that needed to be done such as moving cemeteries and so forth. Would you care to continue with that line of thought?

Andrews: Yeah. We're maybe getting ahead, but up at the Trinity Project, the San Luis Unit, Placerville, and over at Berryessa, a lot of the things that Denver wanted no part of was all the preliminaries -- road relocations . . . . Like you were saying, we moved a lot of cemeteries. And I mean, you had to document which way they were facing and how deep they were and everything and move them exactly the same. And then everything from high schools to churches and railroads. And especially in the Trinity area, up where you live. I don't know if you've ever made a documentation -- back in the late '50s or '60s -- how many different telephone companies there were up there. (Both chuckle) And we had to move and relocate just scores of those telephone companies and whatever. But the big thing was road relocations. And then we would have to do the bridge designs and go and deal with the state, Caltrans [California Department of Transportation], and the counties

and a lot of administrative legwork on getting the bridges the way they wanted -- and they always wanted them better and wider and higher, and oh, God . . . . So you'd have to argue with them on what was betterment and what was replacement. It took a lot of time. Any facilities or utilities or whatever were going to be underwater we had to deal with. And there's fifty-eight counties, and we dealt with at least half of 'em here, you know. And like I say, Denver didn't want any part of that, and that was all our job. And we dealt with school districts and water districts -- really a pain sometimes. (Chuckles) Like I say, they all wanted a free ride.

Petershagen: You mentioned a couple of terms there that maybe we should explain. One, you talked about "betterment" and "replacement." As I understand it, the Bureau would pay to replace facilities that had to be moved or were going to be flooded anyhow. (Andrews: Yeah.) But then if there was betterment involved, that was up to the agency of jurisdiction to pick up that part of the cost, correct?

Andrews: And you just can't look at betterment. Now, if a bridge was designed in, let's say, 1910 or so and you were going to flood the darn thing and you had to replace it, you would certainly replace it better than it was designed and built in '10, but that really wasn't betterment. That was just replacement. If you wanted to go from a two-lane to a four-lane, or if you wanted to go . . . . If you

wanted to put in provisions for enlarging or whatever, they'd have to pick up the cost of that, and that was always an argument. And they had some pretty tough guys. Most of the counties had people on their payroll that could be tough at times. (Laughter) They seemed to be always the ones you met! But yeah, betterment -- the Corps of Engineers gets involved in that a lot. Like you have a big flood, and they come in and they work their butts off and fix it up. And then they get personally harassed by auditors or a GAO [General Accounting Office] or whatever on betterment, and they really get the end of the stick sometimes on this "political harassment," if you want to call it that. Five years later it comes up -- betterment. Gee! I know that happened a number of times, like at Hoopa when we did a lot of work up there. And over on the Carson River where they got involved in a betterment struggle and whatever. But that's another thing that we got involved a lot with, was . . . . For flooding, FEMA [U. S. Federal Emergency Management Agency] always turned the construction in this area over to us to do, the Bureau of Reclamation. And we got involved in, like I mentioned, Hoopa. But we got involved in communities and whatever that needed sewage or water facilities rebuilt, communications and whatever, and actual houses and foundations and whatever, and we could do that.

Petershagen: Now, let me take you off to the side a little bit here and talk about the Trinity Division. You were involved in that?

Andrews: Very much so, yeah.

Petershagen: But you never had to move to Lewiston or anything like that?

Andrews: Oh, no. The first office was in -- we set up an office in the Forest Service. What's the town over there?

Petershagen: Oh, in Weaverville?

Andrews: Weaverville, yeah.

Petershagen: That's where you started from.

Andrews: Right. So we had our first office there in the Trinity Project in Weaverville. And then, of course, we built our own pretty nice office there at Lewiston with employee housing and everything else. There was, again, a lot of relocation. Well, now all the planning work -- before you get into construction there's a lot of planning stuff involved. Regional Offices were always responsible for that. We had to have a Planning Report and all the costs and whatever to justify appropriations. And of course that went through Congress.

What did you want to know about Trinity? (Chuckles)

Petershagen: You had mentioned to me when we talked on the phone about one of the big floods up there.

Andrews: Oh, Douglas City.

Petershagen: Douglas City Bridge. And you had mentioned that the Bureau of Reclamation . . . . You said, "We did a lot to help replace the bridge," or words to that effect.

Andrews: That was just a week's job, you know. (Laughs)

Petershagen: Tell me about that a little bit. What did you do?

Andrews: Well, we had a source for emergency construction equipment, different sources -- agencies, contractors, and whatever -- that we always kept on hand, and maybe once every six months we'd call them and remind them, or maybe a year or whatever. And when the Douglas City Bridge went out . . . . And we had a source for Bailey bridges, which is the old standard World War II bridge or whatever. Did they have that in World War I? I don't know.

Petershagen: I don't know when they were invented.

Andrews: Anyway, the people there in Douglas City, as I remember -- or maybe it was the county -- yeah, it was the county -- contacted us to see what we could do, and within a half a day or less, we had a Bailey bridge all lined up with the proper lengths and sizing for the loading they wanted on the structure. Our participation was getting a bridge for them and getting it down there and helping them erect it. Like I say, it was a half-day to find

it and probably a week or so, two weeks, to put it up.

Petershagen: Interesting.

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BEGIN SIDE 2, TAPE 1. OCTOBER 14, 1994.

Petershagen: Jim, as we finished the other side of the tape, you were talking about getting that Bailey bridge put in across the Trinity River at Douglas City. Now, were you personally involved in that?

Andrews: In finding the bridge? We tore loose some of our construction crews to put it in, and I think Caltrans had a . . . . It wasn't Caltrans then, it was . . . .

Petershagen: It was still the Division of Highways then.

Andrews: They had some people and equipment there, too, but it was a joint effort. But we, I think, initiated the whole thing. Like I say, it wasn't that big a deal.

Petershagen: It's pretty big if you live up there, though, and you're dependent on that highway (Both laugh) as a way of getting in and out of town.

Andrews: There was a lot of water. That was a big flood!

Petershagen: Now, did that flood . . . . Where were with we regard to construction of the dam [Trinity Dam] at that time, do you recall?

Andrews: I think the glory hole was finished. This is at Trinity. I think the glory hole was done and operable, and if you're familiar with the flip bucket on the glory hole there . . . . Well, anyway, we had a major (Chuckles) disappearance of material downstream in the flip bucket. But there was no problem that I can remember with the embankment up there, you know, as far as overtopping and all that crap. But we were involved in some major floodings. This is a different project, but boy, over here at Berryessa -- now that's a concrete arch structure -- and the falsework . . . . That arch was about half-way up, and this must have been in the 1955 floods. The arch was about half-way up, and it overtopped that structure, and it washed all the falsework downstream, (Chuckles) and the structure maintained itself admirably. And I think we had, God, I think ten feet of water, maybe fifteen, over the top of that structure.

Petershagen: My goodness! And when you say you lost all the falsework downstream, you say it like it was really gone, way downstream.

Andrews: It was downstream. And this is like on Putah Creek, which is a fairly small tributary of the Sacramento River.

As long as we're talking floods, you know, there was another flood incident over at Nimbus Dam. I guess that was '55, too. We were involved in Folsom and Nimbus, too, of course. We did lose one of the left abutment spillways at Nimbus.

There was a lot of water in the river. We had, I think 100,000, 105,000 or so, second-feet in the American River. I think originally the levies were designed for 85,000 or so. We were pretty close to overtopping those suckers.

Trinity. Well, Trinity, okay.

Petershagen: Well, that's alright. (Andrews laughs) We got the floods taken care of pretty much.

Andrews: Yeah. A lot of water. As a matter of fact, getting back to Folsom . . . . They figure that Folsom paid for itself in that first year.

Petershagen: I've heard that from other people. (Andrews: Yeah.) So maybe this would be a good time then to go on to Folsom. Were you involved in Folsom's construction?

Andrews: Not Folsom, but Nimbus. Now, Folsom was built by the Corps of Engineers, you know, and the powerplant was built by us. Have you ever talked to anybody about the different responsibilities of these two agencies? (Petershagen: Yeah, I think to a pretty good degree.) It's enough. Yeah, we were involved in Nimbus quite actively and the Folsom South Canal. There again, we had relocation problems on the Hazel Avenue Bridge. That was just a continuing thing on relocations.

The Trinity Project now, getting back to Trinity . . . . (Petershagen: Okay, I thought maybe you were done with that.) Oh no! Trinity, you've talked, I guess, to people that have

described the project and the facilities involved?

Petershagen: Not very much. If you'd care to, go right ahead.

Andrews: Of course, the Trinity Project was started with Trinity Dam and went downstream to Lewiston Dam. And Trinity . . . . Now, at Trinity we had a two-unit powerplant, and at Lewiston we had a little small powerplant, and there's been an added unit recently. And then we had two major tunnels involved: the Clear Creek Tunnel and the Spring Creek Tunnel. And then we had Whiskeytown Dam, or the [Judge Francis Carr] Carr Powerplant and Whiskeytown Dam, and that's had a powerplant added recently and then Spring Creek Dam and Powerplant. And Spring Creek was essentially a debris-type dam to meter out the flows from . . . . What's the name of the mine up on the hill there?

Petershagen: The Iron Mountain Mine.

Andrews: Iron Mountain Mine, yeah, into the Sacramento River upstream of Keswick. But that project had so many interesting and varied aspects to it, just the tunneling that we did there was . . . . And we're talking about a big tunnel -- big to me, I guess. They were fifteen, eighteen-foot tunnels, or twenty-foot, I guess, whatever. Like I say, we had a number of powerplants. We had some very innovative energy dissipation structures at Spring Creek and at Trinity. All of the dams were embankment structures, and all the borrow areas,

that was another responsibility we had on all structures that were in our region. We had to find and locate appropriate borrow areas for embankment materials and sources for concrete aggregate and all that stuff. The people up there originally were kind of . . . . Jeez, they'd meet you with a shotgun sometimes, you know. (Petershagen laughs) And it was on the transmission line, too.

I know I'm going all crazy here with my account of this, but on that Westside Transmission Line that we talked about out of Shasta one time, on the other side of the tape, we had the Federal Marshall up there for months at a time. (Petershagen: My goodness!) Oh, they'd shoot at us! Yeah! They didn't like that damned transmission line coming across the ranch. They thought it'd sterilize their cows or whatever the hell. I don't know.

I'll have to inject this back at the Westside Line. We were down east of Ono -- that's up near Redding -- and I had to go in and talk to these people, telling them that we were going to be coming through and building foot foundations for towers and everything. And I walked into this ranch area -- there's always these dogs that'd meet you with their teeth showing. God! This gal in there was castrating sheep. They used to do it by their teeth, you know, bite them off. (Chuckles) She looked around at me, and she saw that government truck, and she spit a couple of those gonads at me. (Chuckles) She said, "Get the hell away from here!" She wouldn't even talk to me.

So a number of people like that . . . . We had to go back with the Federal Marshall. Very interesting. But, back to Trinity!

Petershagen: That's an interesting greeting.

Andrews: It really is! (Laughter) It was less harmful than two-ought buckshot or whatever.

Petershagen: You were saying that at first people in the Trinity area seemed to be opposed to the project, and I think you were going to say, "But then they started to come around."

Andrews: Yeah, they thought we were going to . . . . And maybe we did, I don't know. You know, at Lewiston there, we built what at the time was a pretty nice hatchery and the state is running it. No, that's Fish and Game. Who'd we turn that over [to], the state or the feds?

Petershagen: State Fish and Game, I believe.[3]

Andrews: Yeah, okay. And yeah, I think after a while when they saw that we weren't going to rampage through the forest and thresh around and kill everything, doing whatever, that we were a fairly responsible organization, and I think a lot had to do with a guy by the name of [G. D. (Rock)

3 The Trinity River Fish Hatchery, Lewiston, California is operated by the California Department of Fish and Game. (Ed.)

Atkinson, Jr.] Atkinson that was our first Project Construction Engineer up there. He went as far afield as Redding -- Redding and Weaverville and other areas -- and he'd have groups of people come in, specifically to show them around and spend a whole day with the project. And he was very good at that. He was a good engineer, too, but he was to be really a proponent of having a mixed engineer-administrative type run these things which a lot of people don't like, you know. They keep the ad people (Laughter) out in a different building. But, yeah, I think in general you'd go into a restaurant there in Weaverville, or even . . . . There used to be the Seven Gables there between Douglas City and Weaverville . . . . (Petershagen: That's burned down.) Oh dear. Well, we used to go there and eat, and they'd always enjoy . . . . talk to us. So I think they did turn around 180 degrees. I don't know how they are now.

Petershagen: It's interesting. I think from what I've read, anyhow, and what I think I know about it, the biggest objection was probably that building the lake, putting the dams in and so forth, was going to result in the water going someplace else.

Andrews: Yes, we had more . . . . I think even throughout the whole project we had more resistance from the people that were on the coast than we did from the local people. They didn't really lose the water.

Petershagen: People downstream on the Klamath that were really more affected by it than those in the Trinity

area.

Andrews: We got a lot of umbrage from those people -- still do, I guess.

Petershagen: Now, do you recall at all, during the time you worked for the Bureau, were there problems associated with Spring Creek and the Iron Mountain Mine? (Andrews: Oh, absolutely.) That's been an ongoing thing, almost since that debris dam was built, correct?

Andrews: Yeah. And we're in the process right now of enlarging the dam and putting another dam . . . . (brief interruption) Got another little saddle dam, I guess. What the hell is it? We're going to divert the water to the north, I think, and we're going to have another little retention dam up there. You probably know more about that than I do.

Petershagen: (Chuckles) There's been all sorts of things going on. The mine owner, I think now, has been required to cap the thing with concrete, or at least certain parts of it.

Andrews: He has done that I think. That was part of our study. That's right.

Petershagen: It's leaching out underneath the concrete now. I don't know that . . . . From what you read in the newspapers and so forth, it sounds like it's just not fixable, no matter what you do.

Andrews: I don't know what the status of the superfund money is, but when I was there, we went through and we made, again, a bureaucratic study of what to do there, and it was pretty complex on the solution of that problem. And while I was there, we never . . . . We got a promise of superfund money, but we never got it, and I don't know if they ever got it, to help the EPA [U. S. Environmental Protection Agency], you know, whatever, to fix the darned thing. And like I say, I've been through all that with Trefzger, the geologist. He and I went through that whole Iron Mountain area in detail. We spent two, three days. And I think at that time it was . . . . Between the (Chuckles) two of us, we said, "Man, we got something by the tail here, we never will solve it." And I don't know if they will or not.

Petershagen: I think what's going on right now is more in the legal arena than anybody trying to fix it from an engineering or a geology standpoint.

Andrews: In our region, the Iron Mountain Mine problem and the Kesterson problem down in the San Luis area -- I don't know where else we're really raising havoc with the environment -- over maybe in the Newlands area we treaded on some toes on the habitat area, but we're usually pretty careful. And thinking back, you know, forty or fifty years, I don't think we were the type of organization that ever went and deliberately destroyed any habitat or whatever. I think the people in the Bureau were always knowledgeable enough that other things

were important besides throwing a dam up. But some of these dams did do a lot of downstream damage that we didn't even know about. It's like the Aswan Dam over on the Nile. (Chuckles) That sucker is causing lots of problems!

Petershagen: Yeah. I don't want to get you that far out of the country, but let me get you out of the Bureau of Reclamation a little bit and talk about the State Water Project.

Andrews: The State Water Project? Before we do that, I'd like to go down and list the projects, as well as I can, sequentially from north to south, that we were, in this region, involved significantly with.

Petershagen: Surely, go right ahead.

Andrews: First of all, we had the Klamath Project that, I think, was Project Number Twelve, a very early project. And up there, of course, we're dealing with a very agricultural -- farming communities and whatever -- and we had about six dams up there that we built, and had M&I [municipal and industrial] distributions and ag [agricultural] distributions of water from -- not much in the way of power developments. We had a few powerplants, but there south of Klamath Falls we had -- God, we must have had forty pumping plants that we built -- both distribution and drainage. They were . . . . Gee, they've been up there for sixty years, I guess, and some of them still have the original pilings under them, you

know, whatever.

And the Klamath Project, I don't know if that's ever been paid off. Have we ever paid off any of them? (Laughter) I try to tell people that the Bureau of Reclamation may have been one of the only agencies in the government that tried to stay in the black, and I don't know if we ever did it, but the repayment schedules were . . . . The philosophy when the Bureau started . . . . You know, everybody says that we're subsidizing the water and we give these forty-year contracts that are meaningless in the way of repayment, but, you know, we were trying to get people to do farming and to get them enough water to change the picture of California. And if you saw California in the thirties it isn't like it is now, believe me! (Laughs) They had dry-farm wheat and maybe some oats and row of corn and that was it! Anyway, these people that comment and think we did a lousy job . . . . What we were trying to do, of course, in the early days like in Klamath and the Newlands Project and Orland Project is to develop the source of water, which is the source and the feasibility of bringing the farm into a viable manner of life for the people. And these people that are sniping the last twenty, thirty years, they don't go back far enough! (Chuckles) They're all these new college people. They think they know, and they don't know the history of water. But Klamath Project was a very interesting and old -- it's getting to be pretty old -- and I don't think they've had any major new construction up there for a long time. They had Gerber Dam and

Clear Lake Dam and . . . . (Swears under breath) Forget that stuff!

Petershagen: That seems almost kind of like a "no man's land" anyhow, because I think most people associate the Central Valley Project with this region and kind of tend to put blinders on, and that's all we see is the Central Valley Project.

Andrews: Yeah, I know. And then, coming south from there, of course, the older project was the Orland Project. And (sigh) Stony Gorge and East Park. I wonder how many canals we built up there.

Petershagen: Well, really, the big Orland Canal.

Andrews: Oh yeah, the Orland. Well, the Orland . . . . We didn't build that. We did? I don't think so.

Petershagen: Who do you think built it?

Andrews: I thought the District built the darned thing.

Petershagen: I think that they built most of the distribution system, yeah.

Andrews: Did the District build the Orland Canal, or did we?

Petershagen: I think the Bureau did.

Andrews: Gee, I'll be damned. That was before me, anyway.

Petershagen: That was before you and me both. That's for sure.

Andrews: Forties, wasn't it?

Petershagen: Well, actually, there was a CCC [Civilian Conservation Corps] camp in Orland. It was one of those units that was associated with the Bureau of Reclamation, and they did a lot of work on even the District facilities.

Andrews: Oh yeah. Well, you fly over there now, and that Orland Canal is a pretty good-sized canal. Yeah, they have relifts and a hoist raise and the whole thing.

And then as I remember next we got involved, of course, in the Newlands Project over in Nevada. That has some really interesting structures. You ever been to Lahontan Dam? That's one of my favorite dams. The drainage system at Lahontan is very complex. I made a point of studying that for a while, and I think I understand it pretty much, and we had to explain it to a lot of people. I always liked it a lot.

And of course the Carson River and the Washoe Project. And then the El Dorado, the Placerville area, where we got involved in a lot of -- we had one dam there. What the hell is the name of that dam (Laughs) out of Placerville?

Petershagen: Well, now you're talking about Sly Park?

Andrews: Sly Park, yes, Sly Park. But we did a lot of pipeline construction recently out of Sly Park and whatever. And going south out of there we had . . . . I don't know of any old southern projects

that were in the region. Oh, Friant.

Petershagen: Yeah, you have to get all the way down to the Fresno area.

Andrews: What project, aside from Central Valley, was Friant in? They had a project name too, didn't they?

Petershagen: Well, I think it went under it's own name, I thought.

Andrews: Oh well, that's something . . . . We had two or three dams there, too, and most of them aren't . . . . Just Friant Dam.

Well, then we had, of course, the major components for the Central Valley Project, and then the Trinity Unit, and then the San Luis Unit. Berryessa -- was that a unit? We had an office in Winters. The Regional Office and I, myself, we were involved in most of those -- maybe not in initial construction -- but O&M, the operation and maintenance problems and engineering chores can be maybe as severe or more severe than the original construction, if you know what I mean. Of course, the regional offices or regions, all the O&M stuff, reconstruction, rehabilitation, modification, whatever, were our regional office's problems, and we did all that -- all the design and stuff on that. And all of the O&M centers, like the one at . . . . Oh, up at Shasta, Toyon, the big O&M centers that we built out of Corning. Oh, and all the O&M centers down through the valley.

We did all those.

Well, I'm through rambling for awhile. What's the next question? (Laughs)

Petershagen: Okay. Well, before we went on with the project list, I had said, "State Water Project." The reason I bring that up is, as somebody that worked for the Bureau, when this started coming on with the State of California now going to build it's own project, what did you think of that? Was there a feeling that, "Hey, we ought to be doing this"?

Andrews: No. No. You know, we lost a lot of people to the DWR [California Department of Water Resources] originally. Why we never developed or had a thought of doing an Oroville Dam . . . . Well, you know, their responsibilities were basically to spread water outside of the San Joaquin and Sacramento Valley, you know. Their waters essentially get pumped over the . . . . (Petershagen: Tehachapis.) Tehachapis down there. And they are <u>really</u> taking northern water to the south, you know. (Laughter) We kind of stay (Laughs) north of the Tehachapis, anyway. But I guess Region III down there, the Lower Colorado, gets over into Southern California. But no, I don't know . . . . I can't remember anybody in position voicing real dissension. Have other people said that they had?

Petershagen: No, I ask the question merely because it seems almost natural to me that you might look at things, maybe the Bureau's kind of winding down a little

bit and (Andrews: No, it's just the opposite.) you say, "Hey, wait a minute. Here's this other guy doing our business!"

Andrews: When the State Water Project was planned and developed we had work coming out of our ears. Really, we didn't give . . . . Let them! I mean, if that's what they want, let them. The only thing that I can recall that was a problem to us, a hydraulic problem, was that . . . . You see, we use the Delta here as a part of our conveyance system, and then they were going to use it, too. The only thing that I could see is that if they were going to do that, then they should pick up some of the costs for saltwater intrusion. They should pick up some of the costs that tipped over from us to the Corps for levy maintenance and all that stuff. I don't think they ever did. (Both laugh.) But that's another interesting thing that maybe nobody has talked about. I'll bet Nick did -- Prokopovich. Utilizing -- and this goes into the Peripheral Canal and all that stuff -- but the utilization of that Delta . . . . You know, our system, the Sacramento River stops at the northern end of the Delta, and then we have to use all that channels and whatever to get down to our Tracy Pumping Plant. And they have to use it to get to the Delta Pumping Plant, and if you got Nick started on subsidence (Petershagen chuckles) he will predict that the Delta . . . . I don't know what number of years, but I'll say that the Delta in thirty or forty years will be exactly like it was in 1890 or 1900 . . . . It'll be totally saltwater, totally submerged, totally

swamplands, and your conveyance of water to the south better use something beside that body of water as your link (Laughs) or they ain't gonna get any water! They will, but it'll be kind of salty.

Petershagen: Right. If you ascribe to that theory it makes it sound like we were all pretty foolish for not supporting the Peripheral Canal.

Andrews: Well, I think so, yeah. One of the things, of course, that may have been solved later was the fish -- what's the word? -- loss of fisheries through the Peripheral Canal, but it wouldn't have been any worse than the Delta Plan or whatever. We did a lot of work on louvers, you know, fish louvers and things to help the fisheries, whatever.

Petershagen: Were there any thoughts in the Andrews mind of going to work on the State Water Project?

Andrews: Oh no! Absolutely not.

Petershagen: Didn't explore that at all?

Andrews: No way. And I've talked to some of the older retirees around here lately, and a number of them in particular . . . . You know, there was a feeling that once you were in the Bureau you didn't want to leave it really. And you talk about it . . . . I was really surprised the number of people that left the Bureau to go to the state because I didn't see the longevity in the state project at that time that I saw in the Bureau unless these guys wanted to go into

an O&M status. Of course there was a lot of interesting things in that state project: the pumping plants and the dams they had down south of the Tehachapis there. You know, it's like we were doing. (Petershagen: Right.) But I guess they had a better pocketbook at the time, and these guys left.

Petershagen: Yeah, I think the people that I've talked to that are in that situation either saw it as a promotion where they never saw themselves getting around you, for example, or somebody else -- nobody's ever mentioned your name -- or perhaps those that felt that they were going to get sent to Washington. They didn't want to leave California -- various reasons like that. (Andrews: Oh, a lot of them, you know, had . . . .) I don't think I ever heard any unhappiness with the Bureau, so "that's why I want to go to work for the State" kind of a thing.

Andrews: No, no. You know, part of my collateral duties in the Bureau was as a diver for thirty years plus. I do a lot of diving with a couple of them. I was out this week, over at the coast a couple days. But, you know, we were talking that the "loyalty," if you will, or the dedication of the older Bureau employees, like the people on this . . . . (Searching through papers for Mid-Pacific Region roster.)

Petershagen: I have the list.

Andrews: There you got dedication. (Points at roster.) I

mean, those guys, they would never think of leaving the Bureau. Maybe it was because of a lack of (Chuckles) something in the people themselves. But those people would never leave the Bureau. And boy, you couldn't find anybody that would bad-mouth the Bureau on that list -- maybe on this one. (Points first to Kennett Division Organization Chart then more recent region roster.) But it was a good place to work -- interesting work. They always treated you fair. Whatever. Like I say, I had three-and-a-half years in the Navy and thirty-nine years with the Bureau. I'd never leave them. And I contracted with them for about four years after I left. I contracted as a diver, an underwater photographer, and a report writer for them. (Both chuckle)

Petershagen: Okay. Let me stop you again, because the tape is about to run out on us once again.

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BEGIN SIDE 1, TAPE 2. OCTOBER 14, 1994.

Petershagen: Jim, in between times here, you had mentioned that you were a diver for the Bureau. (Andrews: Oh, yeah.) I know I've talked to at least one other Bureau diver, Larry Boll, and I think Larry and I talked a little bit about why it wasn't contracted. Why didn't you rely on contract divers? Why did you want to do it yourselves?

Andrews: Well, on more than one occasion, like when we were contracting, we would contract for initially

an inspection dive, whatever, and that would be the limit of the contract that they would go down and document . . . . We do get, still do, and historically I've had a lot of hydraulic problems on some of our structures -- not only cavitation, but physical damage from erosion and whatever. But anyway, we go down and hire a diver under contract to do an inspection and document what he saw and all that good stuff, and then we would go out and advertise for a construction diving firm that would go to do the rehabilitation work or fix the problem that was found. (Chuckles) More often than not -- we didn't have that many, though -- I say more often that not . . . . Maybe two or three times, or whatever -- enough to get us upset -- the construction diving outfit would go down and they'd have the report from the first diver, and they'd say (Chuckles), "Is this the right report?!" What they saw had no relation to what the first guy reported. You know, they figured that it was underwater -- nobody would see it. They were just . . . . If they were working on the hull of a ship or some other thing they were fine, but when they were examining engineering and structures to relate serious or nominal or if they were going to report a failure of some type or condition that was not supposedly as built, you were relying on them to say, "This is serious. This is not serious. You've got to shut the dam off," or whatever. They were not good at that. As a matter of fact, they were seriously lacking in the proper education. So we finally decided about the late '50s or 1960 or whatever that it would be easier to

teach engineers to dive than (Chuckles) divers to be engineers!

So I was on the original team. We had a guy by the name of Frank Howland that's on that one and on here. (Indicates rosters.) As a matter of fact, the guy I was diving with this week, Tom Morris, whom I would like to have you interview if you want -- I'll give you his name later. Frank Howland, Tom Morris, me, and Brent Carter. Brent Carter was the Regional Geologist that was working here and has since gone to Boise. And so we started -- and had adequate training for diving -- and started our own underwater investigation team.

And we did that for, I think, on certainly all of the major structures in the region many times and all of the minor structures at least once and maybe twice. This went right down from the examination upstream and downstream of major concrete and embankment dams or whatever, to intake structures, powerplants -- we'd dive up into the powerplants -- pumping plants, tunnels, siphons. You know what a siphon is? We'd dive through the siphons and document them all, and anything that was underwater. And we made, I think, proper evaluations on whether you should really spill through this structure again or that we should dewater. And the recommendation to dewater some of these (Chuckles) was a pretty major thing, you know. Not only did you have to build a cofferdam and pump the damned thing out, but then the structure could not be used and so there's some pretty serious thinking, then,

involved in some of these. And a lot of our structures, even in the '60s, were getting to be sixty years old, you know, especially over in the older projects I was talking about -- Newlands and Orland and whatever and Klamath. So after that we always had about, oh, five or six, and we always had a mechanical . . . . This first group I'm talking about that started with Frank Howland. He was a civil [engineer], and he really didn't do much diving. He was kind of the nucleus that started it. He was sick of this crap we were getting from commercial divers.

Petershagen: Was this really his idea then?

Andrews: Yeah, it was. And then this Tom Morris was a diver in the Navy, so he got him on the payroll finally. The first people on the team were myself as a structural engineer, Brent Carter as a geologist, and a guy by the name of Tom Spiker who was a mechanical engineer. Throughout the life [of the team], and even now -- I don't know if they're still -- they were talking about disbanding here this year or next year -- we always had at least one structural engineer. No, let's take that back. I don't think they've had any structural since I left, but we'd always have at least one civil, maybe two mechanical and an electrical engineer. When I say an electrical engineer, I mean like a powerplant, a heavy electrical engineer, not electronics or house wiring and all that crap. We not only did work in this region, but we did work in all the regions. We've been diving in Texas and

Colorado and Arizona and Montana and Washington and Oregon -- all over. And that was a wonderful collateral duty. I really enjoyed it.

As a matter of fact, when we first started this, Bill McCrystle -- he always did kind of cotton up to me or whatever -- but I was in there working on something with my head down and ass up on the drawing board -- and he says, "I got a new job for you. You're going to be this." (Chuckles) That's how I got involved in it. That was about 1960.

Petershagen: Well that's interesting. Now what did your wife say about this when you brought that news home?

Andrews: Oh, she didn't . . . . She probably didn't understand what we were going to be doing! (Laughter) She said, "This sounds great!"

Petershagen: Okay. Did extra pay come with this similar to the way the military does it?

Andrews: Oh, we got . . . . Yeah, we got . . . . Jeez, how can I forget these things? We got a ten percent or so, whatever. But it had to be . . . . You know, again, like I say, my division went from 90 to 120 people all the time, and we had sometimes complaints about overtime and all that stuff. My position on that -- to them and to myself, too -- is that you're getting an annual salary, and whatever it takes, that's what you give, you know? But sometimes you give them overtime. Well, the drill crew, of course, was a Wage Board, but yeah, I think we

got ten percent -- it wasn't much. Of course, we got per diem and all that. And I was tapped more than once to be the head of that little group, but I figured I'd better keep a pretty low profile, because I got a lot of . . . . Some of these Regional Directors gave me a lot of horseshit on somebody in my position shouldn't be doing that. (Chuckles) You know? So I was pretty low, but I was on it for thirty years, and then four years after I retired.

Petershagen: Now, was this mostly "hard hat" kind of diving?

Andrews: We did everything.

Petershagen: Did you use scuba?

Andrews: Oh, we did everything. This is a hard hat picture. (Indicates photograph of dive team at work.) It was primarily scuba and single tank, double tank, and lots of times on some of these pipes and stuff we went in, you'd have to take your tank and push it ahead of you and whatever. But we did probably ninety percent scuba. We did full face mask with umbilical to the surface. We did hard hat, we did hookah. Some of them, we just skinny-dipped. You know, whatever.

You ever hear of Tektite? (Petershagen: Uh-huh.) Oh, I was on Tektite. I was working with the General Electric rebreather down there, and they would let the military people use that thing for twelve hours routinely, and up to twenty hours, I think, in emergencies, without recharging. And they limited us to, I think it was four hours,

on the rebreather. But I used a rebreather -- everything.

Petershagen: Now what kind of depths are we talking about? At first brush, it sounds like it's pretty shallow stuff, but then when you think about it, when you get down to the base of a dam or something, that's a long ways down.

Andrews: We were limited to 130 feet. And you could time your dives, you know, when the reservoirs were down and whatever. There were some structures we couldn't get to the base and whatever. And we cheated a little, you know. (Laughter) But in the middle of this OSHA [Occupational Safety and Health Administration] started maybe in the early '80s or sometime. OSHA got involved, and they would require a chamber at the surface when you were a hundred feet or deeper. So then the cheating got worse. (Chuckles)

Petershagen: Yeah, that was probably a major change in your operation -- or at least you saw that as being a major change.

Andrews: Well, we just manipulated the time of the year more. Like right now, you could get to the bottom of Folsom probably, and whatever. A lot of our diving was essentially a very heavy schedule in the wintertime, where you could shut the units down and do this and that. We did a lot of ice diving up in the northern states -- under the ice.

Petershagen: How about vision down there? Could you really see what you were doing?

Andrews: You got very adept at feeling, yeah. Freshwater diving is -- especially on the canals, like on the siphons and stuff like that, totally black -- you wouldn't even take a light with you. But we got pretty good at . . . . And we made a lot of recommendations and whatever on siphons. You could feel . . . . What you'd do is go around . . . . You'd get down there, and you'd go right around the joint and feel the joint. It's all you were interested in, really, was the joint. We'd have probes for this -- hacksaw with a little handle on it was pretty good -- where you could go down and feel. Maybe you had to go that far to get to the water stop or whatever. We got pretty good at doing siphons. A lot of the guys . . . . You know, that's another thing, you had to know the people, and we all got adequate training. Like when we wrote the thing that governed the organization -- what do you call it? Whatever. (Petershagen: Whatever, your instructions?) Yeah. We made sure, we wrote in there that we had to have outside training at least every other year. So all these trips here were good training trips, but it was a kind of a break where we'd go different places -- Puget Sound, or we'd go to Catalina, or we'd go some other places for training. (Petershagen: Interesting.) And we'd contract with professional divers to do that for us. But, again, in that thirty years plus, and even up to now, we never had what we called a reportable incident, and we did a lot of

serious stuff.

Petershagen: That's a pretty good record. Let's just say Shasta, for example -- you're going to make a dive up there. Now, I don't care when you go to Shasta, once you get down there towards the base of the dam, even right now when there's essentially no water it looks like. Once you get down to the base of the dam, you notice there's a lot of water movement going on. So what, they stopped all water release, altogether, when you were going in?

Andrews: It depends on the heads involved again. You're talking about inspection of trashracks and stuff like that in front of the units, generally we would get there a day early and go through the -- jeez, I forget these! -- the procedures that we use to shut down everything. We'd tag everything out, and we'd look at the tags and whatever and identify the guy's name that was on the tag and who he was. And the tagging and shutdowns of the facilities were very important. We've had some pretty close calls because that wasn't adhered to. As a matter of fact, I was talking with Tom yesterday that we had a pipe out at Folsom that was broken that we had to go down and document -- details and drawings and whatever -- and what it'd take to fix it. And the son of a bitch, the guy at Folsom, had forgotten to shut the valve off just downstream, and I was there, but again, see, I wasn't coordinating that one. We had a guy that was fairly new that almost got his head sucked into that pipe. You know, things like that.

But where you got . . . . At Trinity now -- at the intake structure at Trinity -- we calculated a curve for the velocities on the intake structure there. You know what I mean -- the tower up on the river? (Petershagen: Right.) And we were a little off on that. And what you do is, when you're on a trashrack structure like that where you're inspecting corrosion of different kinds, you do it kind of slowly. And if there's a lot of debris on it, like at Keswick -- there was really a lot of debris -- you try to go from the top down. Otherwise you usually go bottom up. But we calculated our curve on it, and we were a little less than adequate in our calculations, and one of the guys got his feet sucked into the trashrack, and it took a couple of us to get him loose. Those things do happen. But you can dive like at Nimbus and some of the smaller dams with the powerplants running. The trashracks are big enough that the velocities are probably no more than two or three feet per second.

Petershagen: That's certainly an interesting sidelight to break up the monotony of office kind of work!

Andrews: Oh yeah. And another thing, as far as I was concerned, where I had to deal with all these . . . . It really got me involved, not in just a hierarchy in the office, but on the working levels of the people in all the different offices of our region, you know, where I would know them and they'd know who I was by sight. It wasn't just a name.

Petershagen: So you did a lot of what we now call "networking," I guess -- getting to know people.

Andrews: I don't want to put . . . . This guy here (Indicates photo). I would make a point of going down through the different branches and sections, and I would almost supervise people, which is probably bad, on a one-to-one, a hundred people or more. And you know, I'd show up and I'd talk to all of them. He's never been down to the branch level or the section level. Maybe it's the computer's fault. He sends them whatever the hell it was. What do you call it? (Petershagen: E-mail.) (Andrews chuckles) It'd show up in your box or something. Of course, I was gone before we had any of that stuff, and sometimes I hear about some of these people that have come up through the ranks. Well, some way or other. They just don't relate down the line. I guess they think it's below them or something. I don't know.

Petershagen: Yeah, I think that's something that we all kind of fall into, just with the press of getting work done. You tend to ignore the personal side of things.

Andrews: Well, I was a pretty good delegator. (Both laugh) We'd have a dive coming up at Boulder Dam or someplace down -- Boulder. I said, "Gee, I have a list of things," and, man, I'd give it to somebody. I wouldn't even worry about it! (Laughter)

Petershagen: Well, I don't imagine you expected me to start asking you about your diving career.

Andrews: Mid-Pacific Region was the one that started it, and it became Bureau-wide. At one time, each Region had their own diving team. Since then, I think a couple of them have eliminated them. At these seminars that we would go to, we would have, looks like a whole shitpot of people, but all the regions had six or seven people, and they adopted our . . . . What the hell were the rules that we had? Anyway, they were pretty much formed after our organization and they worked out very well. Now some of those did have some reportable incidents. We were pretty strict. We didn't mess around.

Petershagen: Okay, let's get back into the projects for a few minutes if we can. I asked you about the State Water Project and your reactions to that. How about San Luis itself? At least that part of the project, in my mind, must have required a whole lot of coordination between both state people and Bureau people. You had to be able to get along and work together through that whole process, I would think.

Andrews: Well, the San Luis Unit . . . . You're talking about interfacing with the State. I don't remember too much of that. We were isolated geographically from them. They had the Delta Pumping Plant, of course, and their canal was separate from ours. Their power plant was four, five, six, eight miles or whatever from Tracy.

Petershagen: So maybe there wasn't this necessity for

cooperation?

Andrews: Well, I'm sure that there was cooperation wherever it was required, but it wasn't an ongoing thing where we were interrelated that I can remember. We did all of our own separate -- again, the investigations for materials, for like San Luis Dam, where we tried to get a lot of it from the reservoir area. And the other, O'Neill Dam. And we had the intake structure, intake canal, from the Delta-Mendota Canal to the O'Neill. The state now has their O&M office right there at San Luis Dam, you know. (Petershagen: Right.) And I think some of the buildings we gave to them -- maybe all of them, I don't know. But I'm trying to think where the hell their main office was. Where was their main office, during construction?

Petershagen: I don't know. (Laughter)

Andrews: I don't think I ever went to it! And they must have had an office over there by the Delta Pumping Plant, because it was a major effort, you know. The office there at San Luis was an O&M center, I think. I'm not sure. Maybe all the design work was right out of Sacramento, and all they had was field offices, but I don't think I was ever in the office in Sacramento.

Petershagen: It seems intuitively that the Bureau and the State Water Project guys would be working hand-in-hand on that. It was just almost like anything else, I guess, is what I'm hearing from you. You did

your part of the work and that was it.

Andrews: We got more involved with them, I think, on the O&M aspect than the construction.

Petershagen: Let me ask you about some other projects (Andrews: We did some diving for them.) that the Corps was involved in. Of course, the Corps built Folsom and New Melones, and some of those. Was there ever a sense at that time that maybe people at the Bureau would rather have been involved in the planning and construction of those things.

Andrews: It had to do with authorization, you know. Apparently we couldn't justify Folsom or New Melones on M&I water or power or anything else, and it had to be basically flood control. So that's the way it got through Congress, and they just built them. We had people on site at New Melones for the powerplant, and I think that was . . . . God, I am getting old! (Laughter) Was that the responsibility of us or the Corps? I think that was still the Corps.

Petershagen: Well, I thought it was just the opposite, but . . . .

Andrews: I know we had a number of people there, but not a lot. I think I remember the people on board there were primarily to assure, because we were going to have the powerplant, we were going to run it and all that stuff. I think our responsibility was to make sure that they gave us what we wanted

because we didn't have that many people there. Maybe I am getting forgetful. But I was involved in a lot of the embankment work and the powerplant and the valving. I remember we had some valve problems on the outlet works and the sloping intake structure. I was involved in a lot of that. Jeez, at New Melones we had that stupid environmentalist-activist that chained himself to the tree. I'd have drowned him if it was up to me. That guy cost us over a million dollars damage by releasing out of the outlet works there at the powerplant before it was finished. We lost most of our afterbay, and we lost our access road and all kinds of stuff. (Andrews under his breath. That son of a bitch.) He would have found the key, don't worry. (Laughter) If his feet got wet, I think he'd have got the key out of his pocket. But we give in to a lot of things like that we shouldn't -- not just the Bureau, government in general.

Petershagen: If I asked you to name one individual that you may have looked to as sort of a mentor to your career at the Bureau, who would that be?

Andrews: Well, in the formative years, it certainly would have been Mr. McCrystle. Going back, again, fifty years, when we first started you asked me what service I was in. My brother and I enlisted in the Navy in early '42 on the same day that my father was killed on the railroad. My father was a railroad person. So from eighteen on . . . . And I think Mr. McCrystle became a (Chuckles) father image to me. (Laughs) Oh dear! My mother was

still alive. She used to come out, oh, every other year maybe and visit us, and we'd go back there, too -- cart our passel of kids there. But I kind of missed my father, you know, writing . . . . Up to eighteen years old, he's not your father, he's your administrator (Laughs) and whatever, you know -- whacks on the head. But after that, you know, you start getting to know him and appreciate him as a person. I never had that.

Yeah, to answer you, Mr. McCrystle in the early years. Later on, I think, Ed Horton. Ed Horton is over here. (Refers to organization chart.) He was Assistant Regional Director and essentially in charge of -- they split these Assistant Regional Directors' responsibilities up -- and he was Design and Construction, if you will, and a wonderful person. He died a number of years ago. But those two. Jeez, there's so many interesting and knowledgeable and just nice people in the Bureau. You know, just really . . . . It's hard to pick a couple. Mr. Horton and Mr. McCrystle were top people.

Petershagen: I see, just looking at some of your books here and what's on the table and so forth, a lot of references to the word "train" and "railroad." This comes from your father -- your family's association with railroads?

Andrews: My father was on the New York Central for . . . . That was his life's work. He and one of his brothers, one of my uncles, and one of my cousins were all killed in there. And just for this now, my

wife and I work at the railroad museum downtown.

Petershagen: Oh, you do?

Andrews: Yeah.

Petershagen: I'm surprised I've never seen you there.

Andrews: Oh! You work there?

Petershagen: No. No, but I pass through as often as I can.
As you worked for the Bureau, were there ever any times when you really felt like the Bureau was changing?

Andrews: Oh yeah, the last . . . . You see, the Bureau hasn't had a new start in fifteen years, probably, or more. The Definite Plan Reports went out of existence, who knows, a long time ago. I probably shouldn't say this, and I'm not close enough to know, that's why I'll say it. I don't know what the Planning Division does now.
Yeah. If there's one thing -- if the Bureau's dead -- that killed the Bureau or is going to kill it, is the way that we fund our projects. You've got to have full funding on our projects. I know San Luis, especially, more than Trinity -- gee, they fight -- and God, they'd have to get in there and kneel down for the next year's funding sometimes. Gee, that's ridiculous! And that's how we got into -- and I might as well say it -- <u>that's</u> how we got into the big problem on Kesterson, if you know

about Kesterson. The authorization for San Luis required, REQUIRED, that simultaneously with building canalside pumping plants, that we build drainage systems. Did you know that? And we didn't do that. We finally ran out of money for their drainage system, but we kept building those goddamned plants! And as far as . . . . Is this really going to end up in the *Congressional Record*? [National Archives.] (Laughter) That really wasn't the way to do it. It bordered on the illegal, if you will. Really! Then we finally got all this drainage problem that hasn't been solved yet, probably never will be solved, and the leaching of the whatever. I'm not sure how that San Luis Unit is going to end up, whether it's going to satisfy the agricultural needs twenty years from now or whether the land is going to be down the tubes, I don't know. But that was a result of funding and the way we do it. I don't think the Corps does it that way. Don't they get full funding for their projects? (Petershagen: Well, yeah, but . . . .) I think we're the only stupid agency that has to go back and fight every year. We've had to lay off major contractors because of no funding. It used to be in August. Now it's in November or whatever. (Petershagen: First of October.) But you know, no money in October, and gee . . . . (Laughs) Then in December you get a claim about this high, and shit! It's ridiculous!

Petershagen: When do you think you started to notice this change?

Andrews: Well, it had to do with no new starts, really. The people in Denver, you know, they're most astute people. I have so much respect for those Denver people. And sometimes you'd get some of them that would come out and think they knew everything -- a lot of them did! (Laughter) Denver, they'd be fumbling for something to do, and then they'd really start encroaching on . . . . See, every year we'd have a meeting in Denver where I would go back, and we'd fight for the delegation. Everything we got of any major importance, that they . . . .

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Petershagen: Jim, I let the tape run out on the other side because I was trying to get everything you said there about . . . .

Andrews: Appropriations? Or what were we on?

Petershagen: That's fine. About how you sensed changes coming about, and the Bureau slowing down. Did you notice any other changes?

Andrews: Personnel. They were imposing ceilings on people that we could hire.

Petershagen: When you say they were imposing ceilings, you mean more direction from Denver or from Washington?

Andrews: Oh, this was from Washington. Oh, yeah. OPM [Office of Personnel Management]. Denver had nothing to say about our ceilings or anything. Yeah, and the hypocrisy that would arise on the circumvention of some of these regulations. You can't believe the footwork that would go on, on trying to circumvent these things. Not just to do it, but to get the damned job done. They'd give you appropriations for major construction, say, up in the Corning area or whatever, and then they'd impose these restrictions on you personnel-wise that you couldn't staff the construction people to do adequate . . . . And we'd have to contract out for our soils work and lab testing. It's just ridiculous. And this annual (Laughs) -- what's the word? -- degradation of meeting in Congress to get our damned money for next year. Ridiculous!

Petershagen: Did you ever have -- you did mention that you went back to Washington on several occasions for meetings and so forth -- did you ever have the opportunity in front of you, you thought, to go back to Washington to work?

Andrews: Oh, I was asked to many times.

Petershagen: And you just, no interest at all?

Andrews: No. I told them this is my home.

Petershagen: Did you ever get detailed back there for any (Andrews: No.) three months, six months details, anything like that?

Andrews: No. I just didn't want that part. It didn't interest me. It seems like three-quarters of the people on that whole list (Indicates organization charts and rosters) that were engineering-oriented, not finance or accounting or anything, worked for me at one time or another. They branched out and went everyplace. And the guys in Washington right now, there's a lot of them probably worked for me at one time or another, unless they're all retired.

I went to a wedding here . . . . Let's see, it was last Saturday. It was one of the geologists. His daughter got married, and he had a bunch of us. And everybody that was there used to work for me. (Laughter) About twenty of them!

Petershagen: Kind of the "godfather" at the wedding, huh?

Andrews: Well, maybe.

Petershagen: Is there something else I should ask you? What would you like to talk about if I wasn't here, and you were just going to say something on your own?

Andrews: Well, I think there's perhaps a lack of incentive of some of the people in Washington to realize the importance of the O&M work. Denver, of course, is out of that. They don't care about O&M. And the only other source that you have to go to, between yourself and bankruptcy, is somebody in Washington. And then you talk about sending people there -- I'm not that familiar about the

turnover there in Washington -- but you can't run an organization by detailing. You know. You detail them there for a year, and in the fourteenth month, maybe, they're up to speed. Then they're already gone. And since we've got no starts, the O&M funding and realization that you can't give all this stuff to districts, which we're doing, we're turning the Central Valley Project over to the districts, we're rearranging our offices in the area here now, and I've lost track. I see we're going to have Shasta and Folsom and Fresno. Is that it? (Petershagen laughs.) We're eliminating a number of the offices, anyway, grouping them together some way. Whatever.

O&M. O&M is very important. And again, I have to hark back to . . . . (Laughs) I've been harping on that funding for forty years. Stupid! (Pause) You know, the Bureau should get involved in some of the more viable alternative power sources that we have. You know, the wind machines that we had in Wyoming that, as far as I'm concerned, they did an excellent job in providing a work statement and inspection and whatever for things with Boeing and some other company that made those wind machines. And then they were running and doing well as far as I know and then no funding. Next year there wasn't even a damned program. So they're probably sitting there now, rotting. I don't know whether they took them down or not. Stupid! You know, really dumb.

I think we should be studying tidal plants, solar . . . . You know, you go down through

Boron . . . . Do you know where Boron, California, is? You ever seen the solar installation there? (Petershagen: Uh-huh.) I don't know if we're involved in any of that or not, but sometimes I wonder that the scope of intuitive thinking in the Bureau has gone downhill, too. (pause) If we're not going to have new starts in the way of construction then we got to have new starts in the way of developing new technologies, or else you shut the damned Bureau down. That's what I said before we were on tape here. (Laughs) Two hours ago! These interviews, maybe, are the forerunner of shutting us down, I don't know, so that they can look back and say, "This is what they used to do."

Petershagen: (Laughs) Well, that's an interesting thought. It's a far cry from what you're talking about in the way of power generation, using wind and solar and that sort of stuff, from the reclamation law that started all this off. There's a lot in between there.

Andrews: There's thermal generation out in the ocean -- all kinds of things you can think of -- that we're, as far as I know, not involved in.

Petershagen: Alright . . . .

Andrews: One of the really interesting things we're involved in, of course, was in the transfer of waters from north to south was the underwater aqueduct that I was involved in. You hear about that?

Petershagen: Oh, now, I didn't realize you were involved in that. Tell me about that a little bit.

Andrews: Well, all of the planning and planning design work, and the hydraulics and the onshore pumping and the canyon crossings and the arrangements for post-construction inspection and all that stuff was done out of my office. When I say my office, I think the planning people were given the initial responsibility, but essentially a major part of all the engineering for planning is done in D&C. That was really something. And, you know, we worked on that for, God, I guess a full year or maybe a year-and-a-half -- got a report out someplace -- and someday I think that would be feasible. That was a filament structure you know.

Petershagen: And where were you going to get the water for that?

Andrews: We had the Klamath and, jeez, I don't know whether we went to the Columbia or not. But the big rivers. In the Klamath area, what's another river?

Petershagen: Well, if you go north, let's see, above the Klamath you'd hit . . . . You start getting into the Oregon rivers: the Rogue and the Umpqua and some of those.

Andrews: They don't sound familiar. I don't know if we tapped along the way, things like the Russian River or others. I guess probably mainly the

Klamath. I forget. What kind of flows do they have to the ocean? Second-feet-wise, do you know?

Petershagen: Gosh, I have no idea. Maybe it would have included some of the rivers immediately to the south, like the Eel?

Andrews: Oh yeah, the Eel, yeah.

Petershagen: And of course the Eel, that was another big battle with the State, as far as moving water. That plan didn't go too far.

Andrews: I think the Indians won that one, didn't they?

Petershagen: Well, a lot of people, I think, won that.

Andrews: Indians swung a pretty wide swath up there on the terminal flows in these rivers. (Laughs) Well, anyway, we could be innovative in a lot of areas.

Petershagen: So you still see a role for the Bureau in the future?

Andrews: Oh, absolutely. Oh yeah. The initial role, of course, was to "bring waters to the arid West," and there's a lot of the West that's still arid, believe me! (Laughter)

Petershagen: Okay, I think I'm at the end of my recipe list here. I don't think there was anything else that I wanted to talk to you about. So before I shut this thing off, is there anything else that you want to add?

I'll give you one more chance.

Andrews: Yeah, I think there's a feeling in the Bureau, and probably in total government, that all you have to be is a manager to run anything. That's a crock of shit, you know. It seems to have gone further in our organization than in like Fish and Wildlife or . . . . Well, maybe Indian Affairs is pretty bad on that, yeah. (Chuckles) Bad. The person running Folsom right now, the management of Folsom, I know very well -- very adequate person in his field -- but he doesn't know much about powerplants. I mean, he <u>really</u> -- and it's nothing against him -- shit, a lot of people (Laughing) don't know much about it. But he's in there, managing that place, and I was out there looking at the pumping plant the other day, and it doesn't take much nosing around and talking to people I still know, that -- you know, he's a nice guy -- but there's things that the requirements should maybe have been a little different. I know they're giving him that position to give him field management experience. Anyway, I think some of the hierarchy positions that are doled out routinely to the non-engineering background people in engineering-required positions are a little out of hand.

Petershagen: So can I turn this all around? What I think you're saying is that probably to be a manager, or a senior manager, in the Bureau you need to first be an engineer and have lots of . . . .

Andrews: It's not just engineers. It could be in programs, or it could be in planning. The head of the Planning Office here -- the person has never had any planning experience. The head of the Design Branch in D&C has never had any design experience. The same way with the Construction Branch. He wouldn't know a damned D-10 from a D-8. And they're getting management experience, but what are they? The people under them have nobody to look to.

Petershagen: I guess when I said "engineer," I misstated it -- somebody with a lot of field experience, with a lot of hands-on experience . . . .

Andrews: No, you still haven't got it.

Petershagen: I still haven't got it. Say it again for me.

Andrews: You've got to have a manager of an organization that has a background and a history of <u>what</u> the organization does. Like I say, whether it's programs or whether it's design or whether it's planning. You couldn't take, you <u>shouldn't</u> take, a guy out of a Structural and Architectural Section that's had thirty years designing and put him in charge of a planning group, when he doesn't have any planning experience. Things just go disarray. Like I said, the guy in charge of construction over there now is probably a hell of a manager, but doesn't know construction. Am I mumbling so it doesn't record adequately? (Petershagen laughs) No, that's an important thing, but it's a position

that, maybe, like I said, total government has taken that if you're a good manager you can do anything. Well, that's not true. In my opinion it's not true.

Petershagen: So you think we need to more stay within our specialty as we work our way up?

Andrews: Especially if you're interfacing with other agencies from the city, county, state level. You know, you can't get in there and interface with them appropriately and properly and have the proper look in your eyes that you know what you're talking about if you don't know. You know what I mean? (Petershagen: Uh-huh.) It's like talking to a contractor on a claim. If you go in there and you don't really know the history of that construction, whatever the hell he's doing, and whether he's right or wrong, and just look him in the eye and say, "That's a bunch of shit, and you know it is." And he can tell if you know, you know. I used to . . . . (Chuckles) Turn that thing off! (Laughter)

Petershagen: Well, as I said, I think I'm at the end of my menu here, so it's time to say thank you very much for taking the time for this. Thanks for all the information you've provided both on the tape and the paper documentation, also.

Andrews: Oh, here's some . . . . What time's your appointment? I'm sorry.

Petershagen: With that I'll just say thank you very much and turn off the recorder.

Andrews: It's been a pleasure.

END SIDE 2, TAPE 2. OCTOBER 14, 1994.