ORAL HISTORY INTERVIEWS

DARRELL MACH

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STATUS OF INTERVIEWS:
OPEN FOR RESEARCH

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Interviews Conducted and Edited by:
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Senior Historian
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STATEMENT OF DONATION
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DARRELL MACH

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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.

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 in this interview 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.

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.

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

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Oral History Interviews
Darrell Mach

Storey: This is Brit Allan Storey, senior historian of the Bureau of Reclamation, interviewing Darrell Mach of the Bureau of Reclamation, in the Bureau's Washington, D.C., offices in the Main Interior Building, at about one o'clock in the afternoon, on October 6, 1993. This is tape one. [Three-minute gap in tape.]

Early Life

Mach: . . . harvest fields. The country I grew up in was wheat country, and a neighbor that knew me wanted to know if I would drive truck for him in the wheat harvest, and so I did that for about a month, and then started looking for a job more in my field of engineering, and had got some information from my, at that time, girlfriend, [who] became my wife–but she was working for Geological Survey in Denver, Colorado, at the Federal Center. And in corresponding with her, she indicated that she had seen a vacancy notice for the Bureau of Reclamation who were hiring graduate engineers in what they called an Engineering Rotation Training Program. So she sent me one, and on the basis of that I applied to the Bureau of Reclamation for a job. And being in Denver and where she was at made it kind of convenient from that standpoint. So that was basically how I went to work for the Bureau of Reclamation.

Storey: Well, I hate to say this, but my tape recorder was not functioning! (laughter) Could you go through

your early life in Oklahoma again for me please? I'm sorry.

Mach: Yeah, okay. I'll start over again. Got to get my thoughts back to where I was at. (Storey: Yeah.) I was born and raised in Oklahoma, grew up on a farm there in the state. We were living in the west central part of Oklahoma in what's considered to be the Wheat Belt in the state. Went to school at a little two-room schoolhouse through grade school. In fact, by the time I was going to school, it was down to *one* room. There was only enough students to fill one room–had eight grades all in the same room, one teacher. Went to high school at a small country high school. It was sitting out on the corner of a section of land. There was no town involved with it although there was a post office about three-quarters of a mile away. And to give an indication of the size of the high school, the year I graduated there were fifty-four students in the whole high school, that's grades nine through twelve, and my class was a class of thirteen students, seven boys and six girls. That kind of gives you an idea what the size of the school was. (Storey: Uh-huh.) Again, upon graduating from high school I entered the University of Oklahoma in civil engineering and enrolled there and started to college at the University of Oklahoma. Graduated from the university five years later as a civil engineer.

Does that cover the part you were missing?

Storey: Yeah. And then you were drafted?

Local Draft Board

Mach: Yeah, as I indicated, the county I grew up in was small enough that the local Selective Service Board, or draft board as everybody called them, knew most of the boys that were in the county that were eligible for draft and those of us that were going to college. As long as we stayed in college and were pursuing a full-time college degree, they didn't bother us as far as being drafted was concerned. So I remained classed as 1A all during college, but I never did have to ask for a deferment because they never bothered me. But literally, the day after I graduated, I received a letter in the mail indicating that I was to report for an induction physical for the Army.

So about a week after I graduated I was in Oklahoma City being examined as a draft inductee. In my case, I wound up being classified as 4F because of my eyesight–I'm totally blind in one eye and didn't meet the sight standards that the Army had set at that particular time. So I wound up not having to go into the military. But also in the process, because I had gotten my induction notice right after graduating and knew this was going to happen, I didn't have a job upon graduating. So when I found out that I was classified 4F and wouldn't have to go into the Army, I started looking for something to do. We lived in wheat country and our neighbor knew I was there, so he asked me if I would drive truck for him that summer during wheat harvest. So I spent about a month driving the wheat truck. I was probably the best-educated truck driver they had around there at that

particular time. But it worked out alright.

Getting into Reclamation

In the meantime, my girlfriend at that time, who later became my wife, had taken a job with the Geological Survey in Denver, Colorado, at the Federal Center. And in corresponding, she had indicated that she had seen a vacancy notice or announcement that the Bureau of Reclamation was hiring civil engineers as rotation engineering trainees. So she sent me a copy of the notice, and I applied to the Bureau of Reclamation and they hired me. So that's how I came to work for the Bureau of Reclamation. It was convenient from my standpoint because that's where my girlfriend was at and we had intended getting married. So it made it nice that she was there and we both were in essence working in the same place.

Storey: Did your family farm have anything to do with a Reclamation project, by chance?

Mach: No. The area that we lived in was all dry-land wheat. The average rainfall is about thirty to thirty-five inches, so it was good wheat country and there was no irrigation going on in the area. I had never heard of the Bureau of Reclamation prior to applying for the position. My wife was probably ninety percent of the reason for applying to the Bureau because she was in Denver and the Bureau was *also* in Denver.

Storey: What was the name of your high school?

Mach: The high school was named Omega and that was

the post office also. I mentioned it, it was about three-quarters of a mile away. We always laughed about it because it was, again, a two-room schoolhouse about five miles away, whose name was Alpha. So we always figured we had the beginning and the end. You started at Alpha and ended up at Omega and that was the completion of your high school education. (laughter)

Storey: Well how did you get interested in civil engineering as a profession?

Small Country School

Mach: Well, that's kind of (chuckles) sometimes a strange story, I guess, as much as anything. Again, going to a very small high school, the educational opportunity was limited. We only had a fixed number of teachers and you took the subjects that they could teach. At that particular time our superintendent was a business major and so we took bookkeeping. I even took typing and shorthand. I graduated from high school and my intent, Brit, in high school was probably to wind up as maybe an accountant, a C-P-A or something like that dealing with business, because that was the orientation of the school.

The last year of my high school, when I was in the twelfth grade, the state of Oklahoma made a decision that it needed to do something to aid these small country high schools that they had scattered throughout the state, that most of the kids graduating from these high schools were simply not going any further, as far as their

education, because of a lack of counseling, a lack of opportunity, limited education and everything. So they sent a team to all of these high schools to test all of the senior students that year. They tested the manual dexterity and it was a type of test, part of it was the California Mental Maturity Test, I think is what they called it. It was supposed to measure your I-Q, but they also run us through a series of tests that was supposed to give an indication of what you were suited to do, what your mental attitude and your manual dexterity and everything said you ought to pursue. Again, we had thirteen of us in high school there in the senior class that year.

Interest in Engineering

This is the part that I'm really kind of embarrassed about. When I was in grade school I skipped a grade simply because they needed something to keep me busy, school was very easy for me. And in these tests that I took I scored in the top five percent in the state of Oklahoma. So the counseling that they gave me was that I should pursue some scientific field. They were suggesting engineering, law, or something like that, and that this was my aptitude. Also at the same time–it was kind of several things coming together at the same time–my parents took the *Life* magazine as a subscription and I read an article on the civil engineers graduating from Georgia Tech, and they indicated that graduate engineers were being offered $500 a month. To me that sounded like a fortune. We were basically sharecroppers and had very little money, so $500 a month sounded like great. So I

decided on that basis that civil engineering was my field, that that's where I was going to go. So it was fairly late in my high school time that I decided to do an engineering career. I knew nothing about it. I didn't know what a civil engineer did, other than what I'd read in this article in *Life* magazine.

It became a real burden in the end, because when I got into college at that time if you were a resident of the state you did not have to take an entrance exam. You automatically were admitted into the state colleges, and the University of Oklahoma, of course, was a state college. So they allowed me to enter, but when I got into college or got there, they did make us take basically an entrance exam, although it wasn't used to decide whether or not you could be enrolled in the school. It was to look at what your deficiencies might be and what you needed to take to strengthen your deficiencies. In my case, because of the orientation of our teachers in high school, they discovered that I had very little mathematics, had no geometry, no physics, and none of what are generally considered to be the science subjects, general science or anything like that. I had bookkeeping, shorthand and typing and some History and English, but none of these other subjects that I needed very badly to even begin to start my engineering school.

The other aspect of it was that I was fortunate in one sense, but also unfortunate in another sense, to have the Chairman of the School of Civil Engineering as my advisor. When he saw these test results and what I needed to do to get a

degree in civil engineering, he decided that I had to get to work. So my first year in college was really a series of subjects to make up for what I didn't take in high school. I took plane geometry, solid geometry, trigonometry, basic mathematics and then evolving to college algebra and all of those subjects, just to get myself up to a point where I could *begin* to really start on what they considered to be the normal civil engineering curriculum. The other aspect of having him as an advisor, his basic philosophy was that no self-respecting engineering student should take less than twenty-one credit hours a semester. So I was kind of busy the first couple of years in college.

The other aspect of it was because I had skipped a grade [in grammar school], and [because of] my birth date, in college I was sixteen years old when I entered into college and obviously was not the kind of a person who was going to sit down and argue with the Chairman of the School of Civil Engineering about what I should or should not do. So I was a very meek lamb being led to the slaughter my first couple of years of college and was able to continue the work and begin to enjoy it. It opened up some doors that I didn't know were there. The library we had at the high school I was in was basically fiction-type books–but I had literally read every book in the high school library. But [I began] to discover things like mathematics and then eventually working into calculus and physics and chemistry that I didn't know existed, and found that I was beginning to enjoy it. So the further I went into school, the more I enjoyed it and the

more I realized I'd made a good choice. But the first couple of years it was just blind luck that I went the way I went.

Storey: Do you mind my asking when this was?

Mach: I graduated from high school in 1953 and entered school that fall, I entered college the fall of 1953 and graduated in 1958.

Storey: Was this chairman influential in developing your career, other than just being a counselor?

College Counselor

Mach: He was very encouraging as far as supporting civil engineering as a field, realizing and understanding a little bit of my background. And I was not unique, in the sense that a lot of the students were farm boys like myself, never been in a big city, literally. So he was very encouraging and very supportive in that sense. And talked about the kind of things that engineering could do and the challenges that were there. And of course he was very sold on *civil* engineering, obviously, and obviously supported that type of a thing as well.

So, yes, I think he was encouraging and supportive in that sense and not just assigning me to certain subjects and certain classes that I had to take. He took the time to talk about it, and in fact, before I graduated I actually worked as a student assistant to him in teaching some surveying classes in my last two years of college. I think I was classified as a student assistant to

get some money to be able to stay in college, and I actually worked for him. The one surveying class that I worked with him, he taught one hour of lecture and then I took them out for two hours to the field and did the field exercises with them. So I came to like him quite well and enjoyed my association with him.

Storey: What was his name?

Mach: Keely was his name. K-E-E-L-Y, I believe it was. He was probably about sixty at that time so I'm sure now, that by this time, he's probably long gone. He retired, probably about ten years after I left school he retired from the university. I really lost track of him. His first name was Jack, Jack Keely.

Storey: Jack Keely. Did you ever think about going back to the farm or anything like that?

Mach: Well, I have to admit that, you know, when in high school farming was probably my real interest in the sense of if someone would've asked me what I would like to be at that time, while I was in high school, I would have said a farmer. The problem was that even at *that* time it was necessary to get some kind of aid and assistance from your parents to be able to get started in farming. To start with nothing was very difficult, and of course my parents being sharecroppers we really had nothing there either. So there was no hope of really being able to go into farming as a whole-time occupation and to be able to even get started. I mean the cost of machinery, the land, and all the other things that

go along with it, it was prohibitive then as it is now. So I did think about it, but only to the extent of understanding and realizing I wouldn't be able to do it.

Storey: So you went to Reclamation in Denver. (Mach: Uh-huh.) And did you go into the rotation program?

Engineering Rotation Training

Mach: Yes. I started out in the Engineering Rotation Training Program. I was supposed to be in the program for about twelve months. My permanent assignment that they gave me at the beginning was to be in the Canals and Headworks Section of the Canals Branch of the Chief Engineer's Office. I spent three months in that assignment to begin with, and then they had a rotation program set up to assign me to various different things to do. I then went into, the next three months was in Earth Dams Design. And then I went to the Hydraulics Laboratory for three months, and then they sent me to Thermopolis, Wyoming, to work on Anchor Dam of the Owl Creek Project as a construction experience.[1] That was for the

1. Owl Creek Unit of the Pick-Sloan Missouri Basin Program is in Hot Springs County in north-central Wyoming. The unit comprises a narrow valley extending about 30 miles westerly from the mouth of Owl Creek and provides supplemental water to 12,740 acres of irrigated land to stabilize the agricultural economy of the area. Principal features of the development include Anchor Dam and Reservoir and pumping facilities to deliver water to the three distinct areas of the unit. For more information, see Wm. Joe Simonds, "The Owl Creek Unit, Big Horn Basin Division, Pick-Sloan Missouri Basin Program," Denver: Bureau of Reclamation History Program, 1999, (continued...)

summer. I went out around the end of June and came back in October.

Storey: That would have been the summer of '59, would it?

Mach: That would have been the summer of '59. And then when I got back to Denver after that field assignment, then my last assignment was to be in the Earth Laboratory working in there. I was in there for about a month-and-a-half, maybe close to two months.

Special Assignment in the Earth Laboratory

At that time one of our designers in Earth Dams was a man by the name of Dr. Jack Hill. And he was doing some major kind of innovative research work on what they called negative pore pressures and its impact on embankments and stuff, and he wanted to do some laboratory testing. I'm not really sure why, but I got to work with Jack Hill on doing this. What we did was to build what he called a one-dimensional consolidometer, and we encased it in a container so that we could impose a vacuum on it. And by doing that then we were able to measure the negative pore pressures within the soil sample that was in this one-dimensional consolidometer. And I worked on that for about two months. They kept me in the Earth Labs over the three-month term because they wanted me to finish this work that I was doing for Hill. It was very

1. (...continued)
www.usbr.gov/history/projhist.html.

enjoyable. I found it very interesting.

So anyway, after I finished this assignment, it was a little over four months long, then I supposedly went back to my permanent assignment. But as part of the training program, each time you completed an assignment you were evaluated and you had an opportunity to evaluate the assignment, both. And then at the completion of the total program, you had an opportunity to decide whether this was what you wanted to do, whatever it was you were assigned to. And so they asked me if I wanted to go back to Canals and Headworks. And really at that time I didn't have a real clear idea of what I wanted to do, so I did go back to the Canals and Headworks Section and went to work there as a, quote, "full-time design engineer." Of course, I had been with the Bureau almost eighteen months in the field assignment and this long assignment in the Earth Lab, it took me about eighteen months to get off the training program. So I was still pretty green yet, no doubt about that, but considered myself to be an engineer at that time.

Storey: And what projects were you working on? Do you happen to remember?

Canals and Headworks Section

Mach: Yes, some of them. I worked on the intake tower for the Whiskeytown Dam and Reservoir doing design work.[2]

2. Whiskeytown Dam and Reservoir are part of the Shasta-Trinity Division Unit of the Central Valley Project in northern

(continued...)

Storey: California, I believe?

Mach: California, right, on the Trinity [River] and upper Sacramento [River] area. I worked on doing rehabilitation of a project in, I think it was the Klamath Project up in Oregon.[3] I'm not real sure now. I'd have to do some real digging to go back into it. (Storey: Uh-huh.) I worked on individual structures on a variety of different projects, would work on just one structure within the whole project, so I never really worked on a total project at that particular point in time.

Let's see, I came back there in '59, so I guess I spent about five or six months in Canals and Headworks as a designer. That was probably where I made the major shift in my career. Even after six months, I found myself doing the same thing over again, and was getting very bored. An interesting aspect of this–I've told this story a number of times, so I won't have any problem with it getting told. But at that time we were all in Building 53, and we all sat at drafting tables and we were in one wing of Building 53, and you couldn't hardly see from one end of the wing to the other end, it was that long. And everybody

2. (...continued)
California. Whiskeytown Dam is on the Clear Creek drainage basin north of Redding, California. For more information, see Eric A. Stene, "Trinity Division, Central Valley Project," Denver: Bureau of Reclamation History Program, 1996, www.usbr.gov/history/projhist.html.

3. One of Reclamation's oldest projects, the Klamath Projects provides irrigation water to roughly 240,000 acres lands south central Oregon and north central California. For more information, see Eric A. Stene, "Klamath Project," Denver: Bureau of Reclamation History Program, 1994, www.usbr.gov/history/projhist.html.

was lined up one right behind the other, everybody sitting at drafting tables, no partitions, no nothing. It was open space in the absolute.

Need for a Change

But sitting one row in front of me and to my left was a man that was, I would guess, late forties and early fifties, somewhere around that age. This person, I used to watch him with fascination. He would–oh, the other aspect you need to understand was at that time, the Chief Engineer's Office, they rang a bell at seven-thirty in the morning, that was when you were to go to work, and you worked until four o'clock in the afternoon. They rang a bell when you were to quit. So it was like a factory, an assembly line. A bell rang, you went to work, a bell rang and you quit. Interesting attitude toward personnel and human resources and human relationship.

But anyway, this man would come to work, and I'll characterize him in the wintertime because that was always the most interesting time of the year for me to watch him. He would come to work dressed very formally. He had a felt dress hat on, he had a dress topcoat on, he wore a full suit and tie. He would come into the office at; I don't know the exact time but I'm going to say seven-fifteen. He would walk up to his desk, his drafting table. He would take his hat off, he had a place to put his hat; he would take his topcoat off, he had a hanger in his drawer and he'd take it out and put the topcoat on and hang it on the coat rack. He would take his suit coat off and take a hanger out of the drawer and hang it up

next to his topcoat. He'd take his tie off–and drafting tables have one long flat drawer and one narrow drawer that you put your pencils in–and in this pencils drawer he had a space there that he would fold his tie up and lay his tie down in that drawer. And also then all of our desks were covered with an oilskin tablecloth type of a cover so that if something happened the water wouldn't get on the drawings and stuff that you had on your desk. And he would start rolling up his top and he had this down to such a science that when he had it all the way rolled up and put in the hanger at the top of the desk the bell would ring. And he had this timed out perfect.

In the afternoon, it was the exact opposite of that, except he started at about three forty-five. And he would take his tie out of his drawer and put his tie on, he would tie it up and everything and put it on; take his coat off of the coat rack and put his coat on and put the hanger away; take his topcoat off, put it on, put the hanger away; put his hat on. He would reach for the cover and it was like the bell was attached to his hand, when he touched the cover the bell would ring and he covered up his desk and he left. I mean, this man was a robot. He had this timed perfect. Every day I'd sit there and watch him fascinated. Never came a minute early and never left a minute late.

And of course, you know, there was several layers of supervision at that particular point in time. We were in a subsection so we had a Subsection Chief, and then there was a Section Chief and then there was the Branch Chief. And the Branch Chief was–I don't even know where

his office was, it was somewhere else in the building. You *never* talked to the Branch Chief, he was too high up the ladder. But the Subsection Chief and the Section Chief, there were times when they would come back and look at what this person was working on and discuss what, you know, what was good or bad or what they wanted to change or whatever it was. During that process this man would simply push himself back away, completely away from his desk and not participate in the discussion. He'd simply sit there and look out the window and his immediate supervisor and his supervisor's supervisor would sit there and talk away and they'd finally come to an agreement. The top supervisor would leave, the immediate supervisor would turn to him and tell him what they want done and he'd leave, and the guy would pull up to his desk and go back to work again.

And I'm sitting there looking at this, you know, and saying, "Is this what I'm going to be doing in twenty years from now?" (chuckles) I mean, it was very discouraging. It was like a robot, like a machine, and like he had no interest in what he was doing. I mean there was no commitment to what he was doing. And I decided I had to get out of there. I just couldn't watch that day-after-day. I was doing the same thing I'd done, you know, a month before. Lost the challenge. And I had an immediate supervisor that I really appreciate because the man had enough sense to understand where I was coming from: a young engineer, I was looking around.

At that time, when you went to work for the Bureau, you came in as a GS-5 and if you didn't do anything too bad, six months later they'd promote you to a GS-7. And again, if you didn't do anything too bad, a year later they'd promote you to a GS-9. So in eighteen months you'd go five, seven, nine. But that's where the fun stopped. And I could look around at these men–there were no women at that time–I could look around at these men and these men were in their fifties, mid-to-late fifties, some older, some younger, and they were GS-11s and GS-12s and I'm already a GS-9 and I'm barely in my twenties and I'm saying, you know, "What is my future here?" There were just a lot of things about the Chief Engineer's Office that were bad.

END SIDE 1, TAPE 1. OCTOBER 6, 1993.
BEGIN SIDE 2, TAPE 1. OCTOBER 6, 1993.

Storey: . . . have some sort of excuse to do that.

Decided to Leave the Chief Engineer's Office

Mach: Yeah, you had to have some reason to be wandering around in the hallways. Otherwise you were at your desk, I mean that was it. You worked or you didn't work. And they had what they called "Mahogany Row." This is where the Chief Engineer and the Assistant Chief Engineer, those kinds of people had their offices and you didn't go up there unless you were invited. I mean, you didn't even walk down the hallway. It was like it was forbidden, I mean that's the only way you could describe it.

Anyway, I decided I had to get out of there and my immediate supervisor suggested that I try an assignment in the field office. He said that things wouldn't be quite the same in the field as it was there in the Chief Engineer's Office. And he knew where the Bureau kept vacancy notices at the time, and so he brought me this vacancy notice for a job in a place called Grand Island, Nebraska. And it was to be part of what they called an Engineering Analysis Section and it was a GS-9, the same grade I was, and he suggested I might give some thought about applying for it.

Well I did, I did apply for it and was selected for the job. And when I got to Grand Island I found out that engineering analysis was really planning. So I had made a major shift in my career from what I had thought I was going to be, i.e., a designer, to getting into the planning field. And I actually remained in planning for about the next twenty-some years after that. So that was a major shift in my career with the Bureau of Reclamation. And it was out of desperation rather than a wise, learned decision.

Storey: When was that that you went to Grand Island?

Transferred to Grand Island

Mach: I went to Grand Island in 1960, and was there for five years and, like I say, I discovered the world of planning and found out that I really liked it. It was enjoyable, it was something that I considered more challenging, and it was something that I enjoy to do.

The other thing that happened in Grand Island, it was a small office at the time I went there. It was considered to be an area office. While I was there it was upgraded to a projects office. We had two major construction projects underway and it became a projects office. And I worked in Engineering Analysis for three years and when we upgraded the office to a projects office, in essence everybody was lifted one grade. So myself and a man by the name of William C. Klostermeyer[4] were engineering analysis, the two of us were the planning group at that time. And our boss, who's long since retired, was promoted to a Branch Chief, so then they had to have a Section Chief. Well, since Bill Klostermeyer and I were the only two in the section, obviously we both applied for it and Bill got selected and I didn't. And that didn't sit real well with me because I considered myself to be as good as Bill, and not detracting from Bill, he and I have been friends ever since then, when we met in Grand Island.

But because of that I started looking around and thinking, "You know, I would like to be promoted also." I was still a GS-9. And so there was a position came open as head of what

4. William C. Klostermeyer served as Assistant Commissioner Administration and Liaison from 1988 to 1989. Mr. Klostermeyer also participated in Reclamation's oral history program. See William C. Klostermeyer, *Oral History Interview*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, and Donald B. Seney, California State University-Sacramento, from 1995 to 1996, in Washington, D.C., edited by Brit Allan Storey and Donald B. Seney, 2006, www.usbr.gov/history.oralhist.html.

they called the Design Data Section. They were collecting design data for the Chief Engineer's Office for these two construction projects that we had underway. So I applied and was selected for *that* job and for the first time became a supervisor. I was Chief of the Design Data Branch, a GS-11, and I supervised about twelve or thirteen basically technicians. I think there was one engineer in the group; the rest were all civil engineering technicians. So I was introduced to the world of supervision and being a supervisor. [I] discovered it was a *lot* more fun to be a supervisor than it was to be a worker, and stayed in management ever since then, and have always held a management or supervisory position ever since then. And that was about in 1963.

Storey: If we could go back to your time at the Denver Office, or then I guess it was known as the E&R Center.

Working in the Chief Engineer's Office

Mach: No, it was called the Chief Engineer's Office then.

Storey: Okay. Good.

Mach: It was not the E&R Center.

Storey: Did you know the Chief of Engineers?

Mach: I knew who he was. I never met him and, you know, obviously I saw him. Grant Bloodgood

was the Chief Engineer at that time.[5] And I think not too long after I went to work, I think that actually became Assistant Commissioner and Chief Engineer. (Storey: Uh-huh.) Had a dual title back then.

Storey: Yeah, I think that may have happened in '63, but I'm not sure.

Mach: I'm not sure either.

Storey: It may have happened earlier. Did you ever see Mahogany Row?

Mach: I saw it once, as much by accident as anything. When I was working in the Hydraulics Laboratory on the training program, any time we had to get drawings or reproductions done, it had to be done in Building 53, and the lab was in Building 56. And I think they still do, but at that time they had bicycles in Building 56 and you'd jump on the bicycle and literally ride down the hallway, across the street into Building 53, down the hallway to where the reproduction was and pick up the drawings that had been printed. So I did get sent over to pick up some drawings and I went down what was called Mahogany Row on my bicycle at that particular time, *one* time. That's the only time I ever was in that area.

Storey: What was it like? Was it actually paneled wood?

5. Grant Bloodgood was Assistant Commissioner and Chief Engineer for the Bureau of Reclamation from 1958 to 1963.

Mach: No, not really. It was mostly like the rest of the building although all their offices were individual. They had walls and doors and I guess the thing that probably impressed me at that time more than anything else, they had individual window air conditioners. Nobody else did. (Storey: Uh-huh.) The building wasn't air-conditioned at that time. But those few that were on what everybody referred to as Mahogany Row had window air conditioning. Some of the offices were paneled but I really didn't see the insides of the offices.

Storey: Yeah. Was riding your bicycle through there considered a mistake or anything?

Mach: Well, probably if I had done it on any kind of regular basis they would have stopped me. It was a one-time occasion and so it was one of those things that nobody bothered me at that particular time.

Storey: Yeah. Okay. Go ahead with Grand Island then, if you would.

Major Projects in Grand Valley

Mach: Well, Grand Island was a small field office there in Nebraska. We had two major projects under construction: the Ainsworth Project[6] up in the

6. The Ainsworth Unit of the Pick-Sloan Missouri Basin Program is located in North-central Nebraska. The storage facilities are on the Snake River approximately 14 miles upstream from its confluence with the Niobrara River, in Cherry County southwest of Valentine. The irrigable lands extend 22 miles from west to east and (continued...)

northwestern part of the state and then the Farwell Project[7] which was more in the central part of the state. Both irrigation projects. And I was doing design data originally on the Farwell Project, that's where I started. Eventually I finished up the design data on the Ainsworth Project as both–the Farwell Project was ahead on the construction schedule, so we completed Farwell and then we did the design data and finished it up on the Ainsworth Project. I was there five years. It was an excellent learning experience and when I came into planning in the sense of dealing with laying out projects and putting them together, not doing specific detail design work. And it was my first experience in that direction and, if you like, it was also my first experience in supervision and [I] decided that I liked that even better than anything else.

Storey: What did you enjoy about supervision?

Enjoyed Supervising

6. (...continued)
14 miles from north to south, beginning near Johnstown and continuing eastward to a point near Long Pine, all in Brown and Rock Counties. For more information, see Wm. Joe Simonds, "The Ainsworth Unit, Sandhill Division, Pick-Sloan Missouri Basin Program," Denver: Bureau of Reclamation History Program, 1999, www.usbr.gov/history/projhist.html.

7. The Farwell Unit lies between the North and Middle Loup Rivers in central Nebraska and provides irrigation water to over 52,000 acres, along with flood control, recreation, and fish and wildlife benefits. For mor information, see Wm. Joe Simonds, "The Farwell Unit, Middle Loup Division, Pick-Sloan Missouri Basin Program," Denver: Bureau of Reclamation History Program, 1996, www.usbr.gov/history/projhist.html.

Mach: Oh, I don't know. A couple of things, I guess. One, there was always something to deal with, different. I mean, you know, it was not repetitious. And as I indicated, one of the reasons I left the Chief Engineer's Office was because it was becoming repetitious. It was also the ability to make decisions. One of the things that really, I guess, turned me off of design was that everything in design was documented. You had manual after manual after manual, bookcases, and there really wasn't anything to decide. I mean, everything was laid out. If you had a wall "X" number of inches thick, you put in this kind of reinforcing steel; if you had load of this amount you did it this way. I mean there was nothing left to chance. There was no *new* design work being done. Most of the structures were standardized and already . . . And you just laid out, you just went to a catalog and went, "Oh, this one will fit," and put it in there. It was like putting a jigsaw puzzle together, you just picked out the pieces and put them in.

Whereas being a supervisor, you're always faced with making decisions. I also found that I . . . I guess I wanted to start to say I didn't *mind* dealing with people and people problems, but I also, to a certain extent, I guess I . . . enjoyed it to a certain extent, dealing *with* people, supervising in that general sense of the word. So it was different, challenging, not repetitious or boring, interesting, and I liked the power. I've always been very honest about that part, I *like* having a position of authority. I enjoy my current position because everybody likes me. (chuckles) I mean, not in the sense that they *like* me, but because I

write out the checks and I have a lot of influence and power that is not necessarily written down in the job description.

Storey: If I'd known this before, I would have interviewed you a long time ago. (laughter) No, more seriously, one of the things that I have found is pretty universal among Reclamation's managers is their attitudes about what a manager needs in terms of skills. Could you comment on what *you* think a manager in Reclamation should have in terms of skills, for me?

Required Management Skills

Mach: Well, I certainly have reached a point where I don't think that the education background, specifically, is that critical. In other words, when I came with the Bureau you had to be an engineer. There wasn't any other question about it. Economists were kind of second-class citizens. And of course we never heard of environmentalists, so that was not an issue at that time. But it was almost if you weren't an engineer you didn't go anywhere. And I don't think my engineering education per se has helped me that much from a manager's perspective. I think the ability to deal with people, the ability to listen, the willingness to make decisions, to make a choice–I mean, you can't duck an issue. I mean you've got to deal with it. And I don't mean it in the sense of confrontation, but just you've got to face up to it and deal with it. You've got to be willing to take some risk. There are times when you can't find the answers in a book or written down someplace, so you have to stick your neck

out a little bit. I think that . . . I'm not sure how to describe it, but able to sense what is happening outside in the rest of the world and to be able to live with the changes, not be stuck with one thing and refuse to listen to new ideas, new concepts, new directions, the kind of things we've talked about.

I think, you know, to me I've kind of come back to if I ever were to criticize the Bureau, was that I think sometimes it did not select managers that were willing to change. In some cases, some managers grew up with a certain taste, a certain approach, and they wanted to *stay* with that approach. They didn't want to go to something new, something different. They weren't able to *sense* that society was evolving and changing and modifying, and I think that's important. A good manager is able to keep up with it–and not trendy things, but just how the tides are shifting and that type of thing. I'm not sure it makes sense, but that's kind of in rough terms.

Storey: That's basically what everybody has said to me. The same sorts of issues: you've got to be able to manage people, you've got to be able to adapt to change and things like that. Connected to that is a very interesting issue of technical expertise. I was talking to Frank Knell this morning about this. How high up in the supervisory management "scheme," if you wish, is technical expertise important?

Technical Expertise in Management

Mach: I guess my first reaction–and I'm kind of relating to a field office, or regional office–let me put it that way, not necessarily a field office but a regional level. I would say really only the first level of supervision really requires any degree of technical skill, real skills. My first job as a supervisor, I went into it with a lot of uneasiness, because I was questioning my own ability to make sound engineering judgements. And even at that level, a GS-11, I found very quickly that I wasn't making engineering decisions, I was making *people* decisions. They weren't coming up and saying, you know, "Should this canal be located here?" Or, "Should this bridge be ten feet long or five feet long?" They were saying, "I need more help," or "Joe Blow is bothering my staff and they're not getting their work done because he's bothering them. Would you take care of that problem?" In other words, they were people problems, not technical issues.

So I'd say, at best, the first level of supervision is the highest you need to go with a great deal of technical skill or with any degree of technical skill. Beyond that, I think the other aspects, the people skills and those kinds of things, are so much more important, and those are the kind of decisions you're making. And if you're using your staff properly, *they're* the ones that are making the technical decisions. *They* should be able to provide you with *all* the technical input you need. You just need to make the people decisions and those kinds of issues and not technical decisions. Again, I go back to my first role as supervisor: that staff of engineering technicians, they knew what they

were doing. I didn't have to tell them how to lay out a canal or where to locate it or what kind of curves to put in or what drop structure to put in. They *knew* that. That was all taken care of, they had those skills.

Storey: One of the problems we face in the field of history is getting people to look beyond their technical expertise. (Mach: Uh-huh.) And I think that's true also to a large extent among engineers and so on. They want to be engineers, but they want the money that goes with being a supervisor and so on. How do you grow them (laughs) out of that, as it were?

Turning Engineers into Managers

Mach: I don't know. You know, I've looked at that, I've looked at myself. I still say today, you know, that I'm proud of being an engineer. Even after I became a supervisor, Bill Klostermeyer and I together took a correspondence course and got registered as professional engineers in the state of Nebraska. It took sixteen hours of examination to do it. I transferred after that out to Southern California and again went back and did some more study and got a license in the state of California, because I wanted to be known as an engineer.

I was proud of that designation. But by the same token, I have admitted to myself in my later years that I don't really enjoy doing engineering work. To sit down and do a design is boring to me. I don't want to do that kind of detail. I think that's how you've got to divide the groups. I think

that there are people who *want* to do the detail, who *don't* want to make the decisions. And somehow or another you've got to find those, because I don't think you can ever cure them of that direction. Now I appreciate, you know, the reward that goes along with management. I mean it is the place if you really want to get a reward, as far as grade and salary and everything else, obviously management is the way. There's got to be some kind of a dual career ladder, I think, within the organization, because I don't think you *can* take someone who really likes doing detail work and make a *good* supervisor out of them. In most cases you don't do a good job. They don't ever become *good* supervisors or good managers. I'd rather use the term "manager" than "supervisor." Beyond that, no, I don't have a good answer to the problem in the sense of how you can get people to change.

Storey: That's very interesting. Most people have also said they liked doing new things all the time.

Mach: Yeah, that's right.

Storey: I think that's interesting.

Mach: And there's a lot of technicians I've seen, you know, that they come apart when you put them in a brand new area, and to me that's the fun part of it.

Storey: Yeah, it is.

Mach: If I did it yesterday, I don't want to do it today.

Storey: You've already done that. (Mach: That's right.) Why do it again? (Mach: That's right.) Yeah, I know that feeling well.

Mach: You know, personal experience that really came home to me was that, all my life I've wanted to be a pilot and couldn't afford it. But in more recent years I *could*, and my wife said she wanted to do it too. So she started taking flying lessons and the agreement was when she soloed–because she was a white-knuckle flier before taking flying lessons–so I agreed with her that when she soloed, then I would start my lessons. And she *did* solo and I started my lessons and went all the way through the process and *loved* every minute of it. But you know, when I got my license and I could just go get in an airplane and take off and fly, flying wasn't that much fun. It was the *learning* that was the fun; the getting up there with the instructor and doing something new and different and acquiring that skill. And even now it's not that much fun just to go get in an airplane and fly from point "A" to point "B." If I get into an airplane I'd like to do something while I'm doing it. It was the *learning* that was fun, not the doing.

Storey: Going back to the supervisory/manager thing once again. Did you seek formal training of any kind in terms of supervising and managing?

Management Training

Mach: Early in my career I didn't. To be honest about it, I didn't know any better. My concern early in my career as a supervisor was my technical

ability, my engineering knowledge and skills. (Storey: Uh-huh.) And as I grew with experience and time, I began to realize that I needed *different* skills that I hadn't gotten at the school of engineering. And so then I did start to try to seek things, and in fact, the last fifteen years I think that I've probably bent more training officers' ears about training in the Bureau of Reclamation, simply because I think the Bureau has always done a very lousy job of training managers. I have tried to take every course I could find that dealt with interrelationship with people. I got into "I'm OK, You're OK" type of a thing, team building, Johari Window[8] exercises, and those kinds of things. You know, everything I could find. And I suggested several things that I thought the Bureau ought to do, and was outright rejected.

To me, for people like in my position, Regional Directors, I'm going to say the S-E-S [Senior Executive Service] Corps, I think the Bureau ought to have psychologists on board, or psychiatrists, that would, like for example, shadow me for a week or two weeks and then sit down with me and say, "Look here's what you're doing right and here's what you're doing wrong." To help me, because I don't *know*, and nobody is telling me. One of the things that I've found in my career as a manager is the higher up you get the less evaluations you get. I got good evaluations when I was a GS-9. The supervisor would sit down and say, "Yeah, here's what you're doing right and here's what you're doing wrong and you

8. The Johari Window is a technique to help people understand their relationship with themselves and others.

can do this to improve and I think you ought to look at this and think about that." But as an S-E-Ser, I have not had a supervisor, which is generally either an Assistant Commissioner or a Commissioner, sit down with me and say, you know, "Here's what you ought to do to improve and here's what you're doing well." Generally what you get is, "Well, you know, you did a"–now we've got level one through five–"Well, you know, I think this year you had a level four performance and I'm going to recommend that. And, you know, you did a good job." And that's about the extent of what you get. I mean, you don't get any good feedback. And I think that's really a lack in the Bureau of Reclamation. I think that the higher you get the less feedback you get as far as what you're doing right and wrong.

Storey: Were there any other categories of training that you sought out besides interpersonal relations?

Training Beyond Interpersonal Relations

Mach: Well, I've gotten some technical training. For example here, when I came into this job, I looked at, you know, budgeting process and I took a course on how Congress goes through it's process, where we actually went over and sat down and saw a committee function. And then we functioned ourselves as a committee, how to be a witness at a committee hearing and some things like that that I would consider to be a little more technical. But not a lot of it. It's been, you know, job-related, but still not that much.

I think the other field that I've probably

pursued is things like the Federal Executive Institutes where they talk about environmental policy and where the world is going from an environmental standpoint. In other words, *broad* issues that I think someone in my position or at this level ought to be aware of. You need to be looking at a bigger horizon than just the small little world that's within these four walls. (Storey: Uh-huh.) So I've pursued some of those things with that level of training.

Storey: Well, I'm afraid our time's about up for today. I appreciate you taking time. I'd like to ask you now if you are willing to let Reclamation researchers and outside researchers use the tapes and the transcripts from this interview?

Mach: Yeah. As far as I'm concerned I would be willing to let somebody else use the tapes. I don't think I've crucified anybody too badly.

Storey: Okay. Thank you very much.

Mach: Okay.

END SIDE 2, TAPE 1. OCTOBER 6, 1993.
BEGIN SIDE 1, TAPE 1. OCTOBER 25, 1993.

Storey: This is tape one of an interview by Brit Allan Storey, senior historian of the Bureau of Reclamation, with Darrell Mach, in the offices of the Bureau of Reclamation, in the Main Interior Building in Washington, D.C., on October 25, 1993, at about three o'clock in the afternoon.

Grand Island Projects Office

Storey: I believe we had gotten to Grand Island in 1960, and you had begun supervisory and manager training there, while you were there. If we could pick up there and move on, I'd appreciate it.

Mach: Okay. I got to get back in the swing of things here (laughs) and try and remember. Well, my first supervisory job was there. I went out to Grand Island, I was basically a person in the Planning Section that they had at that time. And then later was promoted to head up Design Data on Farwell Project, and eventually also then on the so-called Ainsworth Project up in northern Nebraska. [I] supervised, I think it was about fifteen technicians doing design data collection for those two projects that were under construction at the time. And that was pretty well where we ended up.

I spent five years in Grand Island, and the final job I had there was to–we had completed both of those projects, as far as construction is concerned. So naturally we had to surplus all these design data people and move *them* out, and got them all taken care of, and then it was *my* turn to go. So I had to make a choice as to where I would transfer to. [I] got offered a job in Amarillo, Texas, on the Canadian River Project,[9] and also a job in Southern California in San

9. The Canadian River Project is in the Texas panhandle, providing municipal and industrial water for 11 cities and towns throughout the High Plains area. Principal storage structure is Sanford Dam on the Canadian River about 37 miles northeast of Amarillo. For more information, see Eric A. Stene, "Canadian River Project," Denver: Bureau of Reclamation History Program, 1995, www.usbr.gov/history/projhist.html.

Bernardino, in what was then called the Southern California Area Development Office. And for whatever reason–and right now I can't even remember why I really did it–I chose to go to Southern California, rather than out to Texas. And so I transferred out to the so-called Southern California Development Office. [I] spent five years there in various roles. [I] went out there in 1965 and left in early 1971.

Southern California Development Office

[I] went out as part of what was called Office Engineering, became Head of Office Engineering. And through reorganization and downsizing of the office, [I] wound up being classified as office engineer and field engineer also, with field engineering being strictly implementation of the Small Project Reclamation Act Loan Program.[10] Those were interesting years; worked on some unusual projects. I was recently relating some history to some of my staff in talking about while I was there I worked on a program called Operation Plowshare. It was an effort by the federal government in general to find so-called peaceful uses for atomic explosions. And the idea was, how you would apply it.

So we actually set down and developed a

10. Mr. Mach is referring to the Small Reclamation Projects Act of 1956, 70 Stat. 1044, which was to "encourage State and local participation in the development of projects under Federal reclamation laws and to provide for Federal assistance in the development of similar projects in the seventeen western reclamation States by non-federal organizations."

project, a concept, and tried to rough-out some cost estimates of digging a ship channel from the Gulf of California in Mexico, all the way up to Yuma, Arizona. The idea was, we would dig this channel by planting small nuclear–or at that time, it was atomic–explosions at the right intervals, and setting them off, and this would create a natural ship channel, and we would make Yuma, Arizona, a seaport. Had a couple of possibilities.

At that time also, everybody was waiting on that one major breakthrough in desalting technology that would bring the price of desalting down to a reasonable level. And so the idea was, we dig this ship channel up to Yuma, Arizona, make it a seaport. This would provide the opportunity to ship a lot of products that were being produced down in that part of the country. The Imperial Irrigation District, Coachella Irrigation District–serve a lot of fresh fruit and vegetables coming out of there–cotton, other products *like* that, ship them out to foreign markets. But also at the same time, we could then, since this would be a direct connection to the Pacific Ocean, we could desalt this water and ship it over to Southern California in the San Diego area and take them off the San Diego Aqueduct.

So it would obviously offer an economic boon to the Yuma area, making it a major seaport, and provide fresh water to San Diego and other parts of Southern California. So we had some grandiose ideas of what we could do at that particular time. Today, obviously, the

concept of using atomic blasts to actually dig a channel just seems so ridiculous I don't know why we even dealt with it. But we did, anyway.

Importing Water to the Colorado River Basin

Also at that time–and this was in the early history of the Columbia [River] basin versus the Colorado [River] basin–did some work on looking at the possibility of importing water from the Columbia Basin. Two major concepts: one [was] to pick the water up at a higher level and bring it down into the Colorado basin, and then distribute it on to other areas within the basin. The second concept was to take it at the *mouth* of the Columbia, and in a pipeline that would float in the ocean, the difference in density between fresh water and salt water would allow this pipe to simple float. You wouldn't have to have a real *good* support, you could just kind of anchor it down so it wouldn't move around too much, but it would float, essentially carry it's own weight.

At that time, also, of course, there was a consulting firm [that] came out with a scheme called the North American Water and Power Alliance, I believe it was–NAWPA I think was the acronym they used for it. This concept was to go all the way up into Alaska, down through Canada, and basically throughout the western half or western two-thirds of the United States and distribute the water. There was, I can't remember now, but something like 2,000-3,000 feet of head that you could develop for hydroelectric production. Of course you're talking about bringing *millions* of acre feet of

water down from Alaska, which has plenty of water, and providing some economic development in Canada as well as the northern and western United States. So we worked on some fairly grandiose schemes. For a small office, we were thinking big at the time.

Commissioner's Office Planning Division

While I was there, that was the first time that anybody'd expressed an interest in my capabilities. We had a visit by a man by the name of James O'Brien, who at that time was the Assistant Chief of the Planning Division here in the Commissioner's Office.[11] Of course the Commissioner's Office then was over a hundred people strong–it was a fairly large office, had major divisions. [I] met Jim O'Brien, he came out on a fact-finding tour, and just before he left, he indicated that he was going to send me a vacancy notice and suggested that I apply for it. And he did so. He sent me a vacancy notice as soon as he got back and it was for a job here in the Commissioner's Office in the Planning Division. So I *did* apply for it, and they brought me back for a week to see what the country was like. I'd never been east of the Mississippi prior to that, so it was an interesting aspect. [I] did get selected, and became part of the so-called Planning Division here in the Commissioner's Office. That was in the spring of 1971. So we worked in there.

11. James J. O'Brien was Assistant Commissioner Resource Planning for the Bureau of Reclamation from 1974 to 1977.

At that particular time, geothermal was a real hot issue; pardon the pun a little bit. Reclamation was trying to get actively involved in geothermal energy. The group that I was with there in the Planning Division, that was part of our responsibility. And that lasted for about six months. During that time that I was here, first came back, the Department of Interior decided that it wanted to establish an office on water policy. And there was legislation introduced shortly after that in Congress that talked about "land use planning," and that kind of became the buzz word at that particular time. And so they established an Office of Land Use and Water Planning, is what they finally wound up labeling it.

Office of Land Use and Water Policy

And I'd been with Reclamation then about a year and I was called into the Commissioner's Office and [he] indicated that this office in the department needed someone to be their so-called water policy expert. And [he] wanted to know if I had any strong objections to being transferred to the Department of Interior to become the water policy part of Land Use and Water Planning. Of course the thing they dangled in front of me was, at that time I was a GS-13 and they dangled a GS-14 in front of me, and I decided that it was worth the effort. So I only stayed with the Bureau of Reclamation back here the first time for one year. Then I was transferred to the Secretary's Office into this Office of Land Use and Water Planning, and had a staff of two people working under me: one was on detail

from Reclamation and one was on detail from U.S. Fish and Wildlife Service.

And part of our primary effort or work or responsibility at that time was relationship at the department level with the Water Resources Council, which was composed of representatives of all of the major departments within the federal government that dealt with water in any way. At that time the Secretary of Interior was Chairman of the Water Resources Council, and so we had a fairly important role to play in that whole operation. I spent two years in the department, working with the Water Resources Council and other water policies *for* the department. Again, we were working strictly at the department level.[12]

We got to look at all the bureaus' budgets *within* Interior, to see that they *were* following the so-called department's policies on water and water resource development. And so it was a fun time, working with other departments and developing overall strategies. During that period

12. In 1965 Congress passed the Water Resources Planning Act, creating the Water Resources Council made up the Secretary of the Interior, the Secretary of Agriculture. The Secretary of the Army, the Secretary of Health, Education and Welfare, and the Chairman of the Federal Power Commission. The Council's duties were to maintain continuing studies of the nation's water resources "to meet the water requirements in each water resource region in the United States," and "make recommendations to the President with respect to Federal policies." See, "Water Resources Planning Act," in US Department of the Interior, Bureau of Reclamation, *Federal Reclamation and Related Laws Annotated*, Volume III, Richard K. Pelz, editor (Washington, D.C.: United States Government Printing Office, 1972), 1823-1839.

of time, of course, we had one meeting of the Council of Members–that was the only time that group had ever met–and the Council of Members was composed of the secretaries of all of the departments that were on the Water Resource Council. And this is the one level that the Secretary of Interior chaired. I bring this up, because at the time I was literally fresh off the farm. I'd been at most an office engineer in a field office stuck several hundred miles away from the Regional Office, so even a Regional Director was an important person. And I found myself getting ready to brief the Secretary of Interior as to what he should do and say as Chairman of the Council of Members, and actually attended the meeting.

Heady Stuff

So it was pretty heady stuff for a young engineer–I was in my early thirties, and kind of "feeling my oats," I guess is the best way to put it, to be associating with all of these people. I never really thought in my initial start of a career with Reclamation that I would ever be dealing [with] anything at that level. That was well beyond any goals or dreams that I'd set up. So it had a couple of major impacts on me. One, it obviously caused me to rethink all of my goals and where I wanted to go with my career, because I had already surpassed what I had originally laid out as my final objective. I had, when I went to work for Reclamation, really hoped to head up a small field office some day and be able to retire out of that kind of a job. And I'd already surpassed or gone beyond that,

and I was only in my thirties, so I had a long ways to go. So I took some deep thinking to figure out what I was going to do after that. The other thing, of course, obviously, is that it opened a whole world that I'd never seen before at that level.

I was able to go over to Congress and attend hearings and work on testimony, deal with assistant secretaries other than the one I worked for, and dealt quite often with what at that time was called the undersecretary. And this, of course, was during the Nixon administration, and [I] sat in on a couple of meetings, briefings, where both Erlichman and Halderman were there, and saw them literally sitting across the table from me. Obviously, later, I may not have necessarily bragged about that relationship (laughter) but at least at the time it was pretty heady things to be that close to what was considered to be the White House.

I also was able to wangle a couple of invitations over to the White House for formal receptions where visiting dignitaries were coming in, and they wanted a nice crowd to be there. So they would invite federal employees over to attend these. So I was able to see President Nixon and his wife on a couple of occasions, met a couple of other dignitaries as part of these receptions. So like I say, it was pretty heady stuff for a little country boy that came off of a farm in the wheat country of Oklahoma.

Planning Officer in Amarillo, Texas

I was back here for three years–came in '71, and at the end of '73 got a call back from the Commissioner and [he] indicated that they had a Planning Officer in Amarillo, Texas, who was getting ready to retire and wanted to know if I would like to go out there and replace him. I would go out to begin with as the Assistant Regional Planning Officer and get acquainted with the job and what was going on, and he was going to be there about another six months to a year, and I would replace him when he retired. So I decided that was a pretty good move. They promised to let me keep my GS-14, and so that was a profitable move, if nothing else, to move from this country out to Amarillo, Texas, at the same grade. And they did. I left literally the week before Christmas and arrived in Amarillo, Texas, on the first of January–went to work right after New Year's.

[I] stayed there for five years, and did become Regional Planning Officer. [I] had a close working relationship with the Commissioner in those early years. One of the reasons they wanted me out there was that the region had a study underway, called the Rio Grande Regional Environmental Project, basically was looking at the Rio Grande Project, El Paso, Texas/Las Cruces, New Mexico area. But it also had a relationship with Mexico, since Mexico's *deliveries* from the Rio Grande River were done *at* El Paso. And so there was an international relationship as well as two states.

Rio Grande Regional Environmental Project

And the study had not been going very well. The Commissioner had been getting calls regularly from the two irrigation districts and from the congressional delegation about getting the study straightened out. So I was sent out with two directives: one was to obviously learn what was going on and to prepare myself to eventually become the Regional Planning Officer; but my *primary* job was to get this so-called study straightened out. I was designated as the study leader before I even arrived; the Commissioner mandated that. And [I] was supposed to make that my first priority of business, to quote, "get this study straightened out. And I don't want these people calling me any more. I want them to get off my back," was kind of what the Commissioner said.

Gil Stamm was Commissioner at the time.[13] Gil was a close friend of the Regional Director, so they had worked all this out before I'd even left. So I went out there with that in mind, and did get the study pretty well straightened out, and did get the people at least settled down. [I] wound up dealing with Mexico as well as with the two states, and became Planning Officer before it was over with, and worked under two Regional Directors: Jim Bradley was Regional Director when I went out there, and he retired a couple of years later and Robert Weimer became Regional Director when Jim Bradley retired. So

13. Gilbert G. Stamm joined the Bureau of Reclamation in 1946. In 1959, Stamm became Chief of the Division of Irrigation and Land Use, and in 1964 appointed Assistant Commissioner. Stamm served as Commissioner of the Bureau of Reclamation under the Nixon and Ford administrations from 1973 to 1977.

I worked under two R-Ds [Regional Directors].

Storey: Where had that study gone astray? Or had it?

Problems with the Rio Grande Study

Mach: Well, yeah, it had gone astray. The main problem was communication; just what you identify in many cases. The study was being conducted in the Regional Office in Amarillo, Texas. The people in the local area, the two irrigation districts, the two states, and the local people in El Paso and Las Cruces really never knew what was going on. And maybe about once every six months somebody might come down and give them a *little* briefing, but virtually no communication between the Regional Office and the local office. And so they were very concerned, number one, about what was going on. Two, they were upset that decisions were being made in Amarillo without their involvement, and therefore without, in *their* opinion at least, knowledge of what the real local situation was.

And so it was just a matter of communication. Basically what we did was twofold. One, obviously, we went down there much more regularly. We put together a team to conduct the study and we would go down at least once a month and spend two or three days meeting with the local people, explaining what had been done and what was going to be done, what the status of the study was, the data we were collecting, and where it appeared the whole study was going. The other thing we did was to bring under

contract primarily the New Mexico State University at Las Cruces to do some of the work *for* us, rather than doing all of it out of our Amarillo Office. We *could* have done it in Amarillo, but it worked out so much better to have a local do it–the university had good qualities and good capabilities.

And so we hired a social analyst to do some social study work. We hired their Economics Department to do some economic studies for us. We also did a cooperative effort between University of Texas at El Paso and the New Mexico State University at Las Cruces. The two departments combined into one proposal, and had people from both sides. So by involving the locals, what they perceived to be the locals, in the study, and then also providing information . . . And we put together kind of a, maybe it was a sounding board or a consulting group or a coordinating council–there's a lot of words you can use for it–but these are people that we asked for someone to represent the state of Texas, state of New Mexico, someone to represent Las Cruces and El Paso, and then someone to represent the two districts–irrigation districts were there. And then we asked for someone from the International Boundary and Water Commission to be there also.

And we would meet with this kind of council and lay out some recommendations and some thoughts and ideas and directions, and try to get their consensus that, "Yeah, this is the way to do it." We would explain what we wanted to do, explain *why* we wanted to do it, and in the effort,

convince them that it was the right thing to do, and then they would kind of put their blessing onto it.

It was not a *formal* group, because we didn't have the authority to formulate a formal committee like that, so it was [on] an informal level, but it did involve these people and they did represent the groups that they were supposed to represent. And so we just improved the communication links. It took us about two years to complete the study, but I thought we came out with a pretty good study and one that the people could buy-into. And we did get them off the Commissioner's back. So I made some points with the Commissioner! (laughter) In fact, we had a meeting down there, and he flew in to meet, and he went out of his way to come over and talk to me first so that he could give his endorsement of whatever I was doing. I was quite pleased about it, thought it was a good effort on his part, to take the trouble to think about something like that. So it worked out quite well and we got a good study done, and kind of set a direction for the area.

Storey: What kind of international contacts did you have with Mexico?

International Contacts with Mexico

Mach: Well, they had representatives of the Mexican Government out of Mexico City who would come up and meet with us. Generally, we were meeting *in* Texas. We had one meeting in Juarez itself, which was the border town across from El

Paso. But these were official representatives of the Mexican Government and the state that Juarez and that area set in [the state of Chihuahua], that would meet with us.

Storey: And what issues were they interested in?

Mach: Well, obviously, they were very interested in the amount of water they were getting out of the Rio Grande River, and that's not the right way, it's the Rio Grande. But anyway, the treaty that divided the water between the United States and Mexico was not a fair treaty.[14] It gave the United States a certain amount of water, and Mexico got basically what was left over. And in years of shortage, there was not an equal sharing of the shortage. The United States still got it's entitlement first, and then Mexico literally got what was left, which was very little. So that was one major concern of the Mexican Government was to try to improve that treaty. And it was a treaty that was negotiated, I think, back in the

14. The Mexican Water Treaty and Protocol is a treaty relating to the utilization of the waters of the Colorado and Tijuana Rivers and of the Rio Grande. (Signed at Washington, February 3, 1944; Protocol signed at Washington, November 14, 1944; ratification advised by the Senate April 18, 1945, subject to certain understandings; ratification by the President November 1, 1945, subject to said understandings; ratified by Mexico October 16, 1945; ratifications exchanged at Washington, November 8, 1945; proclaimed by the President November 27, 1945, subject to said understandings; 59 Stat. 1219.). Article 4 of the treaty contains the requirements for the allotment of waters from the Rio Grande. See,"Mexican Water Treaty and Protocol," in US Department of the Interior, Bureau of Reclamation. *Federal Reclamation and Related Laws Annotated,* Volume II, Richard K. Pelz, editor (Washington, D.C.: U.S. Government Printing Office, 1972), 753-754.

1800s–it was a fairly old one.

The other aspect of it was that Mexico obviously was having a problem in Juarez, as they do in many cases, where people were moving into the city, and hoping to be able to get some kind of employment or some kind of an income. And they wanted to stop this migration from the country into the city, because there weren't jobs available for them, so it was a very poor city, a lot of poverty. So one of the things they were doing was trying to develop irrigation on the Mexican side of the border. And one source of water was to drill groundwater wells–except the Geological Survey had conclusively shown that there was a connection between the river and the groundwater basin that lay under the river.

And so basically what Mexico was doing was pumping water right out of the river, but doing it through wells, rather than direct diversion. And they were also then drawing groundwater out from under Texas, as well as taking it out of the Rio Grande, and this obviously upset the Texans. And it was to a point there were midnight excursions into Mexico to count wells. It was almost comical, the way they were trying to do it. So Mexico's interest was water, and interest in getting what they considered to be their fair share of the water, because they saw it as a means of solving some of their problems of poverty and growth in the city of Juarez. If they could keep the people on the farms–these were truly the small family-type farms that they were talking about–if they

could keep them on the farm, and provide them with irrigation water, then they could make a decent living and wouldn't be moving into the cities and causing the problems of poverty, and sanitation was a problem in Juarez, because they couldn't keep up with the growth with water and sewer facilities.

Storey: Well how did all this work? I presume that Reclamation could not say, "Oh yeah, we'll send you five million acre feet," or whatever it is. Was the State Department involved? Or how did all this work, actually?

International Boundary and Water Commission

Mach: Well, the State Department *was* involved, through the International Boundary and Water Commission, which is a subset of the State Department, and Joe Friedkin was the Commissioner. And in fact was quite often referred to as an ambassador, even though he technically didn't hold the status of ambassador. The State Department was interested in trying to negotiate something with Mexico much similar to what they did on the Colorado River under Minute 242. So there was an interest there to try to solve some of these issues.

It started with Lyndon B. Johnson when they deeded some of what was Texas back to Mexico, because the river had changed channels. If you went to the channel back in, I don't remember, 1700s, 1800s, part of this land was in Mexico, and then the river went *around* it, and so it became part of the United States and there was a

dedication, actually a ceding of this land back to Mexico again. In fact, Mexicans set up a park in it, as a symbol of the relationship between the United States and Mexico in that area. So there was an interest to try to improve the relations, to try to be fair, on the part of the State Department; they were interested in negotiating.

The problem was, the Texans obviously, and the New Mexicans both, neither one wanted to give up any of their water in the process. So to try to find some way of balancing those interests, primarily what came out of the project, is what we would call today water management/water conservation. The systems were old, they had already paid out their contracts–forty years of payment, they'd already made that at the time we were doing the study. And so the primary recommendations were to line some of the canals, put some of it in pipe, to better improve the water management, the deliveries to the irrigators, so that they wouldn't waste water. This in turn, then, would leave more water into the river and allow the United States to more closely meet Mexico's entitlement, what should have been their true entitlement. So it did improve the relationships in that direction.

The other thing that it did show was that the number of wells that Mexico was developing was not near the number that the Texans contended there were. According to them, there were hundreds of wells being drilled, when actually there were maybe ten or fifteen or something like that. So it kind of laid that off to rest, and allowed real data to be put on the table

so that people weren't speculating any more. They had good hard data to deal with and could make more rational decisions based on that data. Basically, what it came out to was that the city of Juarez and the irrigation in the area was *not* pulling that much water in from Texas and from the Rio Grande, even though there was a connection; that the pumping would be controlled. Mexico agreed to monitor the pumpings.

END SIDE 1, TAPE 1. OCTOBER 25, 1993.
BEGIN SIDE 2, TAPE 1. OCTOBER 25, 1993.

Mach: Basically, the two states agreed to not continue to try to deliver even less water to Mexico. So the net results, there wasn't any real big project come out of it, in the sense of a construction *program*, but there was significant improvement in the efficiencies of the two districts and the relationship with Mexico.

Storey: Okay, now, let's see if I can get this straight. Reclamation worked with the water districts in the two states in order to obtain a more efficient system (Mach: Uh-huh.) in terms of water use. And then the State Department was able to build upon those efficiencies in dealing with the Mexican Government? Is that the way it worked?

The Deal with Mexico

Mach: Yes. See, what was happening was that the United States, these two districts, were diverting such a large amount of water because they had an

entitlement to a certain number of acres–not necessarily to a certain number of acre *feet* of water. So they had a right to irrigate a certain number of acres of land, and their system was so inefficient that they had to divert tremendous quantities of water to get onto the land. And the losses were so great that the river was essentially dry, and Mexico wasn't getting its true entitlement. By maximizing the efficiency of the two districts, then more water stayed *in* the river and reached the diversion point where Mexico picked up its entitlement, and therefore they got more water–surface water–than what they had been getting before. (Storey: Okay.) And so it worked out quite well.

We labeled it an environmental project because we weren't going to build any *new* irrigation facilities, we were just going to try to deal with the social and economic and environmental aspects of the area and see what we could do. I sort of smile when people talk about water management and water conservation now, because that was what we were primarily focused on at that particular time. And the social impacts that would occur in the area, both in the United States and Mexico. So it was an interesting effort, and very enjoyable.

Storey: Did that take the entire five years you were there?

Planning Program in the Southwest Region

Mach: That study was finished before the five years were up. It took us about, I think, around three

years to complete the study and get it between covers. The last two years, I was just functioning primarily as Regional Planning Officer, head of the planning program and Planning Division there in the Regional Office, and spending my time running a planning program in the Southwest Region, which covered all of Texas and all of Oklahoma, about a third of Kansas and part of Colorado. We were involved with the Navajo Reservation and the Closed Basin [Project][15] in what would be southeastern Colorado, I guess it is, around the Alamosa area. (Storey: South central?) Yeah.

Storey: What were you planning for besides the Closed Basin Project?

Mach: Well, in Texas the big issue was municipal-industrial water, M&I water. The city of Houston, for example, was literally pumping itself into the ocean. The city of Houston's water supply at that point in time was almost exclusively groundwater. They were pumping so heavily that they were getting sinkage occurring, and parts of the city had actually sunk below sea

15. The San Luis Valley Project is in the south-central portion of Colorado. The authorized project includes the Conejos Division, which regulates the water supply for 80,600 acres of land irrigated in the Conejos Water Conservancy District, and the Closed Basin Division, which will salvage shallow ground water now being lost to evapotranspiration in the Closed Basin of San Luis Valley. The water will be delivered to the Rio Grande for beneficial use in accordance with the Rio Grande Compact among the states of Colorado, New Mexico, and Texas, and the Treaty of 1906 with the Republic of Mexico. For more information, see Wm. Joe Simonds, "San Luis Valley Project," Denver: Bureau of Reclamation History Program, 1994, www.usbr.gov/history/projhist.html.

level. And we had pictures of fairly new homes, homes that were no more than ten years old, sitting in three or four feet of sea water because they had subsided enough that they were now below sea level. So the city of Houston was interested in getting *off* of the groundwater and getting onto some sort of a surface water system. That part of Texas has quite a bit of rainfall, it's just not in the right place at the right time. So we were looking at potential for developing a water supply for the city of Houston. We were looking at Galveston. We did wind up building what's called the Choke Canyon Project, which was a water supply for the city of Corpus Christi.[16] We also built Palmetto Bend, which was a water supply for that area down there in the coastal area also. So most of our efforts were focused down in what to me was East Texas, in the Gulf area. And that's primarily oriented toward municipal-industrial water supply.

The exception to that was what was called the High Plains of Texas, which is where Amarillo was in. There was a lot of irrigation occurring in that area, primarily cotton, and it was all supplied by groundwater. It was part of the Ogalala Aquifer. That stretches all the way

16. "Choke Canyon Reservoir was completed in 1982 and filled for the first time in 1987. The reservoir was built by, and is owned by, the Bureau of Reclamation, but it is operated by the City of Corpus Christi. On July 11, 2002, Choke Canyon filled to 100% capacity based on inflows from the Frio River and San Miguel Creek." See City of Corpus Christi, "Lake Corpus Christi & Choke Creek Reservoir," http://www.cctexas.com/government/water/general-info-water-quality supply/supply-and-planning/water-supply-history/index. (Accessed 1-2017)

up into Nebraska. And the aquifer was being over drafted in all of the states that it covered. It really was under about five or six states. So we were looking at was there some way of potentially bringing surface water into that area to supplement the groundwater that was being utilized? We had built earlier, prior to my coming there, they'd built the so-called Canadian River Project, which was a dam and reservoir on the Canadian River, there in the Texas High Plains area, and that was a municipal water supply for about twelve cities there in the Panhandle area. So like I say, most of the work in Texas was oriented toward municipal-industrial water supply. We were even looking at the Edwards Aquifer then, which is now a major issue today.[17] So it was interesting from that aspect.

In Oklahoma, most of our efforts were really devoted toward just some kind of economic development. There are substantial portions of the state where their average income is well below the national average. And sort of, is there any potential for irrigation in some of the farming areas? or any other issues like that. We did wind up looking at municipal-industrial water supply for Oklahoma City, but not a lot of activity in Oklahoma.

In Kansas, there wasn't a lot going on at that time. The state was interested in taking over

17. The Edwards Aquifer is a major source of groundwater, serving agricultural, industrial, municipal, and recreation needs in southwestern Texas. For more information, see The Edwards Aquifer Website, http://www.edwardsaquifer.net. (Accessed 1-2017)

some of the Reclamation facilities that we had already built in the state, and basically operating them themselves. And so there was some analysis and some planning work in *that* kind of a direction. The state had allowed some groundwater development to occur that was depleting the upstream water supply from a couple of our reservoirs, and we were trying to work out something with the state so that either the irrigation would cease, or they would quit pumping or something, because there was just not enough water to go around to everybody. So that was more negotiations and discussions than it was planning in the normal sense of the word. So that was kind of what we were doing.

We covered part of New Mexico, but New Mexico's so dry that we helped them work up a state water plan, but that was about the extent of everything we could do in the state of New Mexico–just isn't much water to play with there–pretty well all allocated and already identified.

Storey: Joe Hall, I believe, at one point worked on the state water planning for Kansas. (Mach: Uh-huh.) And now you mention New Mexico. Is that a normal kind of activity for Reclamation to become involved in?

Reclamation's Assistance in State Water Plans

Mach: It was in *that* part of the country anyway. State water plans were very popular. It was kind of one of those things, everybody should do a state water plan, and New Mexico, Oklahoma,

Kansas–I'm not sure of other states around there–but those three states, at least, all developed state water plans. The state of Texas *tried*, but the state is so big, and it's interests are so diverse that what they really wound up with was more regional plans than they did a state water plan. They had a guy by the name of Harry Burley, and ex-Bureau of Reclamation employee who retired and went to work for the state of Texas. He was Executive Director of the Texas Water Development Board, and he came up with a scheme of transporting water from eastern Texas, basically from the Texas-Louisiana border, all the way across to the west and then north up into the High Plains area. The only problem was that it would require pumping the water up about 4,000 feet, because you were picking it up at sea level, and the High Plains is close to 4,000 feet high. When they just roughed out the power requirements to pump that much water that far up the hill, they figured they'd have to double the electrical output in the state of Texas to even be able to accomplish it, so it kind of lost a little bit of glamour. The cost and the magnitude and the impact was just too great for something like that. So Texas never really had *a* single state water plan. They really had some regional plans for different parts of the state because of the diverse sections of the state.

Storey: Did Reclamation put a lot of money into these plans?

Mach: Yes, we did. In the case of New Mexico, I think we in essence *did* the plan for them, at federal cost. We had a substantial role in the Oklahoma

state water plan. Kansas, I think we did. Our region only covered about the southern third of Kansas, and the rest of Kansas was in what was then the Lower Missouri Region out of Denver, Colorado. So I'm assuming they had an active role in it also. So I would suspect that we probably funded at least half, if not more, of the Kansas water plan.

Storey: What was the logic behind Reclamation doing state water plans?

Mach: We had a broader perspective. We had the expertise. We had the money. That's probably the three main reasons. Many of the states at that time just basically did not really have water resource management expertise within the state government. It was not a high priority prior to that time, and therefore they just didn't have the people on board to be able to do it. Texas was an exception because Texas had the so-called Texas Water Development Board, and they had a staff of a couple hundred people. They probably had better expertise than Reclamation did at that particular time.

But the other states, I think Oklahoma probably had maybe two people, for their water experts, in the entire state government. So obviously they just didn't have the physical capability of doing it, and most of them didn't want to put the money into it to change their priorities significantly and divert that much money into doing state water planning. And Reclamation was *willing* to do it, so therefore it became kind of a mutually-agreeable activity.

We needed work, we wanted to work, and we could get the money. And they didn't have the expertise and didn't have the money, so they were more than happy to let us do it.

Storey: You mentioned the two regional directors you worked with in Amarillo earlier. Could you characterize what they were like to work for?

Southwest Regional Directors

Mach: Well, Jim Bradley, as Regional Director, he was head of the Power Division here in the Commissioner's Office prior to being Regional Director in Amarillo, Texas. And his job as Regional Director was a reward. Gil Stam was a close friend, and Gil was an Assistant Commissioner at the time, and so they gave Jim the Regional Director's job in Amarillo as kind of a reward. And Jim saw it as something for him to do until he retired. So his approach was, "Let's not rock the boat, let's try to keep everything as quiet and smooth as possible. I don't really want to deal with any controversies, I don't want to get into any knock-down, drag-out matches with any of the states or anything like that."

So it was a very low-key administration. I know there were times when we thought we ought to go to certain meetings with states and stuff like that, and he really wasn't interested in going, because he didn't like to attend public kind of gatherings, didn't like to meet and greet people in those kinds of atmospheres. And obviously, being a Regional Director if he attended people

would seek him out to ask for things and want to discuss things with him. So again, his basic philosophy, "Let's keep it as quiet and smooth as possible. Do as little as possible . . ." The first time I met him, he told me how many years and months and days he had to go until he retired. He kept very close track of it, and he retired the day he was eligible.

Bob Weimer was head of what we called "The 400" or the O&M Division, Operations and Maintenance Division in the Regional Office, prior to becoming Regional Director. So he was a Division Chief under Jim Bradley, and he kind of liked Bradley's approach. And so he wasn't interested in doing too much differently. He kind of wanted to just float along. Bob had a lot of problems in the sense that he really wasn't that knowledgeable about the total regional activities. And I guess what I remember most is that in some cases–at that particular time. Let me put it this way, those particular years, Reclamation had two major program meetings every year: they had a Skull Session in February here in the Commissioner's Office in Washington, D.C., and then they had the so-called Program Conference which was usually in August, in the fall, and this is where major program decisions were being made. The Program Conference, you were to present a program, the Skull Session in February was to brief the Commissioner so he would be a learned person at the hearings that were going to be coming up. And in those two meetings, Bob was considered always to be the less knowledgeable of the seven Regional Directors at that particular time. And I think sometimes

some of the other R-Ds actually maybe made some fun of him and kind of joked about him running the Region. He was eventually reassigned from Amarillo to Billings, Montana, and chose to take a retirement rather than the reassignment, so that was part of the agreement. So neither one of them were very aggressive or forward-thinking or wanted to take on any exciting new issues or anything like that.

Storey: Was that characteristic of the Regional Directors in those days?

Southwest Region Considered an "Outlands"

Mach: Not of all of them, no. I think those two . . . The Southwest Region was kind of considered to be kind of an "outback country," or "outlands," or whatever you want to call it. We weren't exciting like California and Sacramento and the Mid-Pacific Region, or we weren't close to the Chief Engineer like the Lower Missouri Region. Southwest Region was kind of considered to be the bottom of the pile as far as the seven regions were concerned; probably had the smallest program, generally was at or near the bottom as far as number of employees–that kind of thing. And at that time we had probably maybe 450 employees in the region, and Sacramento might have 1,100 employees, and that would kind of give you a contrast and comparison. So it wasn't considered to be one of the exciting places to go. If you were a real hot-shot person and wanted real challenges with Reclamation, you would not have selected Southwest Region to go to. It was kind of the backwater of the seven regions.

Storey: What caused you to leave there?

Mach: (chuckles) Well, I'll qualify my answer in this sense: I indicated I didn't have any problems with these tapes being open to anybody. Primarily I got into a disagreement with the Regional Director, and just felt that I couldn't work under that kind of an atmosphere.

Storey: Which Regional Director?

Mach: This was with Weimer. Things that I wanted to do in the planning program, he just didn't want to do it. He made some changes in the office arrangement that I thought were wrong and told him so, and that didn't, obviously, go over very well. So we had some fairly diverse set of opinions, fairly major differences of opinion.

Storey: And so your next opportunity was?

Mid-Pacific Regional Planning Officer

Mach: Well, at that time, I have to kind of go back to ancient history. When I was in Grand Island, Nebraska, I became acquainted with and worked with, for a short period of time, a guy by the name of Billy Martin–and of course made contact with Billy off and on all through that period of time.[18] Billy was Regional Director in

18. Bill E. (Billy) Martin served multiple high-level positions during his career with Reclamation: Mid-Pacific Regional Director, 1974-1980; Lower Missouri Regional Director 1980-1985; Great Plains Regional Director, 1985-1988; Assistant Commissioner-Resource Management, 1988-1990. Mr. Martin also participated in (continued...)

Sacramento, California, and he had lost his Regional Planning Officer, so he called me up and wanted to know if I was interested in coming to Sacramento as Regional Planning Officer. And given the situation I was in in Amarillo, I said, "Yes, I would be more than happy to come out," and so I did. I left Amarillo and moved to Sacramento as the Regional Planning Officer. It was not a promotion, but it did get me out of an uncomfortable situation.

Storey: And what happened in Sacramento?

Planning Projects in Sacramento

Mach: Well, Sacramento was kind of interesting. I only spent two years there for a number of reasons. I left Amarillo in July of 1979, and then I left Sacramento in July of 1981, so I was there almost exactly two years. The Peripheral Canal was dying out as a major issue. People were kind of beginning to give up on the Peripheral Canal.[19] But the issues of the Delta were still a

18. (...continued)
Reclamation's oral history program, see Billy E. Martin, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, from1994 to 1996, in Sacramento, California, edited by Brit Allan Storey, 2010, www.usbr.gov/history/oralhist.html.

19. In the 1960s and 1970s, another canal was proposed, one that would divert the Sacramento River at Hood around the "periphery" of the Delta region. This canal would have been about 43 miles long and would have delivered canal water directly to the state and federal pumps near Tracy. The 1982 design for the canal would have enabled it to carry 15,000 cubic feet of water per second.

The "release points" designated on the plan would enable the (continued...)

major concern: the environmental issues, the fish losses, the decline in the anadromous fish, the migrations, the pumping of the water, the state's water plan was fully developed and operational, so those diversions were occurring, the water was being shipped to Southern California. The controversy between the Northern and Southern California interests was very strong at that period of time. Basically Northern California was saying, "Why should we strip our desirable environmental situation for the benefit of Southern California? They shouldn't have moved down there in the first place," and vice versa. Of course two-thirds of the votes in the State

19. (...continued)
Department of Water Resources to provide water from the canal into existing channels of the Delta to address flow needs for salmon migration and water quality and water level concerns. This required the public to trust DWR and its contractors to protect fish and water quality–a situation analogous to trusting the fox to protect the henhouse. Instead, the issue went to the voters for final disposition. Subsequently, a public referendum (Proposition 9) supporting the legislature's approval of bonds for the canal was defeated in June 1982 by a vote of 63 to 37 percent of the electorate.

By 1998, the CalFED Bay Delta Program developed three alternatives for moving water through or around the Delta, including a so-called"isolated conveyance facility." This plan called for a canal smaller in capacity than the original peripheral canal (around 5,000 cubic feet per second). The CalFED plan also included an ecosystem restoration plan, a multi-species habitat conservation plan, a levee repair strategy, reservoir planning studies, an ambitious science program to study Delta estuarine and river systems, a water transfer program, an "environmental water account" program to mitigate export pumping losses of fish and of water to contractors, and programs for water use efficiency and drinking water quality. This plan failed to receive sufficient funding, and (with the excepti on of the science program) essentially has been retired.
https://www.c-win.org/peripheral-canals-way-past-past-and present.html

Legislature were south of the Tehachipis, which only covered one-third of the state. So that was kind of the imbalance that was there, so northern people obviously resented the political power that Southern California had.

The issue of further development in Northern California was at it's major height at that period of time. And of course the Central Valley Project, everybody wanted to complete it. Auburn Dam was a major controversy. We were going to build the double-curvature thin arch, and then somebody had the audacity to question our engineering ability and whether it was a safe structure, given that we were crossing right across the fault line. We'd already poured several millions of dollars into a foundation and we hadn't even started the dam yet. That was being questioned. So it was kind of an exciting time, an interesting time.

I also found out after I got out there that part of the Planning Division responsibility was monitoring and managing the Weather Modification Program.[20] It seems I had a small crew of people that were spreading silver iodide all over the Sierra Mountains and trying to make it snow, and had an airplane and the whole bit. So I didn't find out about that until I got there. So I got involved in weather modification. I had to learn about that. It was an interesting time, an enjoyable time. I came there in July of '79 and in

20. For more information on Reclamation's Weather Modification Program, see Jedediah S. Rogers, "Project Skywater," Denver: Bureau of Reclamation History Program, 2009, www.usbr.gov/history/projhist.html.

April of the following year, April of '80, Billy Martin was moved out of Sacramento and moved back East, and so we had an Acting Regional Director, Mike Cantino[21], for *quite* a while. Eventually Mike got appointed to be Regional Director, but he was Acting Regional Director. You know, I went out to work for Bill–I'd known him for so many years. I didn't know Mike *at all*, so I wound up not really working for him [Billy Martin] all that long. I worked for Mike Cantino most of the time.

Heading the Planning Division in the Commissioner's Office

But in 1981, after I'd been there two years, the Head of the Planning Division here in Washington, D.C., retired, and the job became vacant and was advertised and Cliff Barrett[22] was the Assistant Commissioner for Planning and

21. Michael A. Catino served as Mid-PAcific Regional Director from 1981 to 1983 and participated in Reclamation's oral history program. See Mike Catino, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, and Donald B. Seney, both of the Bureau of Reclamation, from 1994 to 1995, in Sacramento, California, edited by Brit Allan Storey, 2010, www.usbr.gov/history/oralhist.html.

22. Clifford I. Barrett served multiple management positions within the Bureau of Reclamation during his career: Assistant Commissioner-Planning and Operations, 1977-1981; Upper Colorado Regional Director, 1981-1989; served briefly as Acting Commissioner in 1985. Mr. Barrett also participated in Reclamation's oral history program. See Clifford (Cliff) I. Barrett, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, in 1996, in Salt Lake City, Utah, edited by Brit Allan Storey., 2009, www.usbr.gov/history/oralhist.html.

Operations, I think was his official title. He was head of the two Divisions, O&M and planning. And Cliff discussed with me the position, and I indicated that I was interested in it. I had always enjoyed planning and that would have been a significant promotion, so I applied, and I did get the job. So I left Sacramento not because of Sacramento, but because of the opportunity to head up the Planning Division here in the Commissioner's Office. So I came back here in July of 1981 again, for the second time–didn't learn my lesson the first time (chuckles) and came back to head up the Planning Division.

What I had not anticipated in *that* move was the fact that Reclamation went through a fairly significant change. Up to that point in time, the commissioners had usually been some way related to Reclamation–either part of the staff: [Floyd] Dominy, [Ellis] Armstrong, Gil Stamm–or they had worked closely with Reclamation. But right after I came back here, about the same time I came back here, a guy by the name of Robert Broadbent was appointed Commissioner of Reclamation.[23] Reagan had been elected President, and he came back as part of the Republican administration.

Commissioner Robert Broadbent

23. Robert N. Broadbent worked as a pharmacist and politician in Clark County, Nevada from 1950 to 1975. Broadbent was elected the first Mayor of Boulder City, Nevada, and he also directed the Las Vegas Valley Water District. Broadbent served as Commissioner of the Bureau of Reclamation under the Reagan administration from 1981 to 1984.

What had everybody shocked was that Robert Broadbent was a pharmacist and mayor of Boulder City. Now, obviously, Boulder City gave him the vote connection with Reclamation. He had heard of us before, and he'd worked with us. But he was the mayor of Boulder City, he was a county commissioner for Clark County, Nevada, which encompasses Las Vegas, and he was a pharmacist. And that just didn't seem like that qualified him to be Commissioner, so there was a lot of rumbling in the troops about this pill-pusher becoming the head of Reclamation and how he was going to handle an engineering organization. So that was a bit of a surprise and unanticipated. Broadbent came *in* as Commissioner; he brought two people with him, Jack Christianson and Dave Houston[24] as special assistants to work with him and be part of his direct staff.

So I had to become acquainted with a brand new Commissioner, learn what he expected my role to be. All of this with someone who was not considered to be knowledgeable of Reclamation, although it turned out he knew more about us than what we *thought* he did, and turned out to be a very interesting person. [He] had some excellent political connections, which we probably hadn't had for some time. He was a personal friend of Senator Laxalt from Nevada, who also happened to be a personal friend of a movie actor called Ronald Reagan, and so he had direct access to the White House any time he wanted to get there.

24. David G. Houston also served as Mid-Pacific Regional Director from 1983 to 1989.

And was very comfortable going up on the Hill and talking with various congresspeople, both representatives and senators, and established a relationship with the Hill that we hadn't had for some time. So it was a good thing in the end.

Commissioner Becomes a Presidential Appointee

To me, it was a fairly significant change to Reclamation because prior to that, Commissioners had [been] considered to be technical leaders, whereas Broadbent was the first of what became purely political leadership in the Bureau of Reclamation. And so that was a fairly significant move in that sense. He didn't come in with the context of being a technical leader. He was not a technician, he was a political appointee. Also, he was the first of the presidential appointees for the Commissioner, and prior to that they hadn't required Senate confirmation. And Broadbent himself wasn't . . . He had to go before the Senate and was considered a presidential appointee. So that was another significant change.

Storey: Who selected them before that?

Mach: They were basically appointed by the Secretary. Obviously, the White House had some input into it, and Congress did too, but he was not considered a presidential appointee, he was just a Schedule C political appointee, and so did not require Senate confirmation. And starting with Broadbent, of course, they did require Senate confirmation, and had to go before the Senate, with a hearing, and submit themselves to

questioning and all the other things that go along with it.

Managing Reclamation's Planning Program

So that was a fairly big change. [I] came back here in 1981 as head of planning and served in that role for seven years, hopefully directing the Bureau of Reclamation's Planning Program. It was a fairly stable time, as far as Reclamation is concerned; no big changes were occurring. We developed a slightly different planning process, trying to speed up the process so that we didn't all of us die of old age before anything got from the planning stage to the construction stage, and moved through in that in general terms. Like I say, it was a fairly stable period of time, those seven years.

Chairman of the Souris-Red [Rivers] Engineering Board

I spent a lot of *my* time doing other things then, than doing planning itself. I was U.S. Chairman of the Souris-Red Engineering Board of the International Joint Commission for all seven of those years, which meant that I would meet at least twice a year with our Canadian counterpart, dealing with boundary issues between the U.S. and Canada on the Souris-Red rivers drainage basin, which covered about a good third to half of the western boundary, up in the Great Lakes West. The Red River is the one that's between Minnesota and the Dakotas, and the Souris is a branch of it to the west of that. Very enjoyable–I certainly enjoyed *that* activity. We'd meet over at the State Department, we'd

meet in Ottawa, Canada, their national capital. Got to go to the White House and personally meet and talk with President Reagan and Vice President Bush. Part of the international joint commission is a presidential appointee, so they were all very politically tied to the Reagan administration. So they were able to get us into the White House and actually sit down and talk with the President and the Vice President both. So it was a fun time, but like I say, fairly stable. There were no great happenings occurring. Probably more important . . .

END SIDE 2, TAPE 1. OCTOBER 25, 1993.
BEGIN SIDE 1, TAPE 2. OCTOBER 25, 1993.

Storey: Tape two of an interview by Brit Allan Storey with Darrell Mach on October 25, 1993.

Reclamation Losing Its Salability

Mach: To me, this was at a time when the Reclamation program started to lose it's salability. People were starting to talk about major environmental issues, and the environmental groups were gaining strength fairly rapidly, moving the forefront. Environmental issues were becoming important. Tellico Dam[25] came up during that

25. The Tennessee Valley Authority constructed Tellico Dam, on the Little Tennessee River, in 1979. The dam "was planned as an extension of Fort Loudoun Reservoir" and "serves to divert water through a short canal to Fort Loudoun, linking the two reservoirs in their functions of flood reduction and navigation." For more information, see Tennessee Valley Authority, "Tellico," https://www.tva.gov/Energy/Our-Power-System/Hydroelectric/Tellico-Reservoir. (Accessed 1-2017)

period of time with the snail darter, a little minnow that some people thought would make good fish bait, was able to stop a major dam construction for some period of time. And it was a period of time when Reclamation, I think, chose to close its eyes and not really recognize this movement and this change that was occurring. We weren't really testing the winds and seeing what was out there. We still wanted to sell this program that we'd been selling for the last seventy years.

We did take a look at where we ought to go and tried to develop a strategy, I guess, for the future. [It] resulted in the reorganization in 1988, but in *my* opinion, at least, I think that reorganization was not necessarily done to improve Reclamation but to achieve some goals for some particular individuals that were at fairly high levels in Reclamation. To me, my observation was that the reorganization was done for the wrong reasons. It wasn't to necessarily improve the organization, but rather to strengthen certain positions. And the primary result was an attempt to strengthen Denver's role in running the Bureau of Reclamation.

1988 Reorganization

And I think we've fought with that and struggled with that ever since 1988, in the reorganization. For me, it was a major change because part of that reorganization eliminated both the Planning Division and the O&M Division back here in the Washington Office, and since I was head of the Planning Division,

obviously it had a direct impact on me.

In that process, they offered me the position of heading up Program Coordination and Budget. And so I, not having a lot of other prospects in mind at that particular time, took the job with *some* trepidation. I wasn't really sure that that was the life I wanted to lead. Budgeting had never really been an interesting thing. It had been something that I knew about and worked with, because I knew the importance of it, but it was not necessarily what I want to do full-time. But [I] was pleasantly surprised to discover, I guess, two main aspects of the job. One was that I had a significant amount of power and influence. And had the ability to get to the Commissioner any time I wanted to get to him; had the ability to say yes or no about funding something, and having those recommendations followed *most* of the time. So the job took on a hidden power that wasn't obvious. There was nothing in the job description or anything else that said it had the authority to run the program, but in reality that's where you really were. So that was a pleasant surprise, and one that obviously caught my attention.

The other thing was that I found that I really did enjoy it, that it was a challenge. I had to look at the entire Bureau of Reclamation, try to balance out things we wanted to do, where we wanted to go, directions, priorities, and always at a total Bureau viewpoint, rather than being oriented toward one region or one office or one particular part of the program. [I] was involved in construction and O&M, and planning in all

aspects of the Bureau program. So I found it to be a very enjoyable job, very enjoyable process. One that I still find enjoyable. And I've been in it, obviously, now about five years. It was in October of '88 that I made the switch, and so October of this year is my fifth year as head of Program Coordination and Budget.

We've obviously been involved in this major shift or change in Reclamation's program. I've seen it go from a construction program of almost $800 million to a *total* program of $800 million and a construction program of only about $450 million, so a major change in the kinds of things we're doing, major *change* in the important part of the program: Operations and Maintenance has gone up from less than $150 million to $280 million today, in those five years. So [I've] been involved in part of the major changes, major shifts, and it's been very enjoyable, and one that I find very rewarding, and one that I hope to keep going for a while longer.

Commissioner Dennis Underwood

I'm not sure what to say. We've had several Commissioners. Dennis Underwood[26] came in as

26. Dennis B. Underwood worked for California Department of Water Resources in 1960 and helped to update the State Water Plan. From 1966 1969, he served as a commissioned officer with the U.S. Army Corps of Engineers in Thailand, achieving the rank of Captain. From 1978 to 1989, Underwood served as the Executive Director of the Colorado River Board of California. He worked extensively with the seven Basin States, the International Boundary and Water Commission, and various Federal agencies on developing and managing Colorado River water resources. Mr. Underwood served as (continued...)

Commissioner, and [I] was able to work with him in preparing him for his [Senate confirmation] hearing, and then also in helping to answer some of the questions that came out of the hearing that were to be answered in writing. [I] Remember clearly a Saturday up here with the Commissioner-designate, I believe is the title they used, with the Deputy Assistant Secretary for Water and Science, with the head of Congressional Liaison, with the Special Assistant to the Secretary, and trying to negotiate some agreement between this group of people as to what the answer to a question ought to be. Underwood had *his* thoughts of how to answer things, and each one of the others also had *their* thoughts, and they weren't always the same, so it was an interesting Saturday.

We were up hear almost all the day, writing answers, and myself and my secretary were here to do the clerical work, and to get it put together so it could be sent over to the Hill. So too often I was forced into the situation of going back to Underwood or one of these other people saying, "You know, the others don't agree with what you said and they want to change it," and trying to get *that* person to agree to the changes or find a

26. (...continued)
Commissioner of the Bureau of Reclamation under the administration of President George H. W Bush from 1989 to 1993 and participated in Reclamation's oral history Program. See Dennis B. Underwood, *Oral History Interview*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, from1995 to 1998, in Los Angeles and Ontario, California, edited by Brit Allan Storey, www.usbr.gov/history/oralhist.html.

change that they would *all* agree to. It was kind of a mediator type of a role, and a lot of fun. I thoroughly enjoyed the day. It was a long day, but enjoyable. Dennis was an interesting person to work with. [I] felt like that he was going to be a good Commissioner even then, and enjoyed that relationship with him during that particular period of time.

Storey: How would you characterize him as Commissioner?

Mach: Well, I guess my overall impression was that he was a very forward-thinking person, had some very good and broad ideas–broad in the sense that they encompassed a lot of things. In fact, I think sometimes his thoughts were generating so fast and covered such a big area, that it was difficult for him to convey those thoughts to others; the staff as well as other people outside the organization. If I fault him, it would be in the sense that he liked to go through details, and sometimes he got bogged down, and then he just spent too much time on some of the details. But he had a lot of good ideas and a lot of directions that he wanted to go, and just couldn't contain them. They were just spilling out of him constantly. In fact, there were probably too many of them, because the agency just couldn't react that fast to those kind of changes.

It's sort of like a train. You just don't stop it in five feet. It takes a long time to stop a freight train. And I think that was part of the problem, was it just takes time to turn the agency, and he just . . . I'm sure to him it was frustrating

sometimes that we just couldn't change that quickly, couldn't get everybody to agree with him. And to that degree, I think he had some problems in convincing some of his top management that what he wanted to do was right. So he didn't sometimes get the degree of cooperation that maybe he should have.

We were kind of into a management concept where everybody would have input into it–everybody at the top management level. We had at that time what's now the Executive Management Committee. They kind of felt like that they could discuss things, and almost take a vote. And Dennis looked at it and perceived it very differently. He perceived it as an advice group. They could provide him advice, they could provide him input, but *he* was the Commissioner and he was to make the decisions. And consequently, I don't think some of the top management necessarily saw it that way either. They thought they should have had a stronger role, maybe, than what he did. And so there wasn't a hundred percent cooperation, which I've found somewhat disturbing. I guess I felt very distinctly in my own mind that the Commissioner is the Commissioner. He's the boss, what he says goes. And if I had an opportunity to at least provide input, then I'm satisfied. He may not agree with me, but at least I've had an opportunity to voice my opinions, and that's all I want to ask for.

Storey: On short acquaintance, how would you

characterize Dan Beard as Commissioner?[27]

Commissioner Dan Beard

Mach: Well, I think Dan's going to be an interesting asset to the Bureau, and I appreciate that "interesting" and "asset" may not necessarily go together. I knew Dan when I was here in '71. Dan was Deputy Assistant Secretary for–I think it was called Water and Land then. And so I've known him off and on ever since then. Of course even as he was staff over on the Hill on the Interior Committee, attended briefings or made briefings *to* him, provided material off and on. So there was always *some* contact with him over those years. So I've known him a little bit in that sense, and he knows me also. I think he has some clear thoughts in his mind as to where he wants the agency to go, and I think that's going to be good. I think that's going to provide some good guidance in that sense. I think also that he very definitely is going to take us into the next era, whatever that may be. He's *not* going to continue the old programs as we've known them for the

27. Daniel P. Beard worked for Congressman Sidney Yates (D-Ill.) on the House Interior and Related Agencies Appropriations Subcommittee from 1975 to 1976. He served as Deputy Assistant Secretary of the Interior for Land and Water Resources from 1977 to 1980. Beard acted as Staff Director of House Interior Subcommittee on Water and Power from 1985 to 1990. Mr. Beard served as Commissioner of the Bureau of Reclamation under the Clinton administration from 1993 to 1995 and participated in Reclamation's oral history program. See Daniel P. Beard, *Oral History Interview*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, from 1993 to 1995, in Washington, D. C., edited by Brit Allan Storey, 2009, www.usbr.gov/history/oralhist.html.

last seventy years. There's no question in his mind that that's done, we've completed our job, and it's time now to move on to a new role. So he's going to move very aggressively in that direction.

I think Dan has a distinct advantage in that he's coming on at the same time that to me we're turning over from one generation to another. The old-timers that we talked about, the Joe Halls, the Bill Martins, Darrell Webbers, those people either have retired, will retire. There are several others within the organization that probably will retire within the next twelve months. You're having basically a new generation coming into the organization at that top leadership level. And the newer people are going to be much more receptive to the thoughts and concepts and directions that Dan is going to be promoting. And so I think in that sense he's got an advantage over Dennis, because Dennis had to deal with the older generation. So I think Dan is going to be more successful in that same sense. Unfortunately, a lot of the success is going to depend on whether he's here four years or eight years. Four years is really not a lot of time to turn the agency around. If he gets to be here six or eight years, whatever he wants to stay, then I think he'll be very successful in that direction.

I think some personal characteristics of him, he's very accessible. He's a low-key person, not real strong on real protocol and bowing and scraping and those kinds of things. So I think he's an interesting and easy person to work with. He listens, at least I have to go from *my* personal

experience. He'll listen to the arguments, he'll take into account your input. Again, he may not necessarily agree or disagree with it, but he'll at least listen. And in many cases he will accept the advise, the counseling, or the input that you provide to him. So he doesn't go into things with strictly a closed mind, and "This is the way it's going to be come hell or high water," type of an attitude. I think he's open to any discussion. But I *do* also think that in a kind of conclusive way, that he's got some goals and objectives in his mind and he's not going to be diverted from those goals and objectives. *How* he gets there may be some variation, but he's going to get there one way or another. And so in that sense I think he's got some fairly strong opinions, but it's really goals that he's set, where he wants to go, directions that he wants to go, and there may be some variation on how we get there.

Storey: How about Dale Duvall as Commissioner?

Commissioner C. Dale Duvall

Mach: Well Dale was an interesting person.[28] I've never

28. C. Dale Duvall attended Eastern Washington College Education, Gonzaga University, and Kinman Business University. He entered the business world as a C.P.A. and partner in a Spokane accounting firm, 1965-1980. Duvall acted as Vice President and Treasurer of Overseas Private Investment Corp. (OPIC) from 1981 to 1986. Mr. Duvall served as Commissioner of the Bureau of Reclamation under the Reagan administration, from 1985 to 1989, and participated in Reclamation's oral history program. See C. Dale Duvall, *Oral History Interview*, Transcript of tape-recorded Bureau of Reclamation Oral History Interview conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, January 26, 1993, in (continued...)

known him before he became Commissioner. I worked with him as Head of Program and Budget, but also worked with him during that period of time when Bill Klostermeyer was Assistant Commissioner and was my boss. So a lot of stuff that I did was through Bill or *with* Bill. The other thing, Bill had been in *my* position before he *became* Assistant Commissioner, so he knew as much about the budget as anybody did. So in *that* sense, most of the dealings with Dale, he pretty much did what we recommended. He didn't have, in my mind at least, didn't have any strong opinions or definitive goals that he wanted to reach, or direction that he wanted to go. I think he just wanted to be Commissioner. He would make decisions, but most of the time those decisions were based on recommendations from someone within the organization. So I don't want to say he was not a decisive person, because he would make decisions, but by the same token they weren't necessarily always his personal decisions. So he was open to be influenced, and deliberate, and I don't think he would have even denied that. He depended heavily on staff for input and for opinions and recommendations.

He did not, in one sense, have any real impact on the agency as far as changing directions, because the people that were his closest advisors at that top level of management were the same people that'd been there for the

28. (...continued)
Washington, D.C., edited by Brit Allan Storey, www.usbr.gov/history/oralhist.html.

last ten years, and *they* weren't ready to change. So therefore the input to him was not to support change in that sense either.

Storey: How would you characterize the Assistant Commissioners for Engineering and Research with whom you've worked?

Assistant Commissioners for Engineering and Research

Mach: Well, let's see, I worked with Rob Vissia on a couple of occasions.[29] I worked with Darrell Webber. In fact, I met Darrell Webber when I first came with the Bureau of Reclamation back in the fifties.[30] Darrell was an E-D-P [Electronic Data Processing] person at that time, and I was on my training program and ran into him. I think that both of those wanted the Bureau to continue doing what it had been doing for the last fifty years or seventy years–didn't want to see it

29. Rodney (Rod) J. Vissia served as Pacific Northwest Regional Director from 1974 to 1980, before becoming Assistant Commissioner Engineering and Research (ACER) from 1980 to 1982. Mr. Vissia also participated in Reclamation's oral history program. See, Rodney (Rod) J. Vissia, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation oral history interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, in Ocean Shores, Washington, edited by Brit Allan Storey, 2011, www.usbr.gov/history/oralhist.html.

30. Darrell W. Webber served briefly as Southwest Regional Director in 1982 before becoming Assistant Commissioner Engineering and Research from 1982 to 1993. Mr. Webber also participated in Reclamation's oral history program. See Darrell Webber, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation Oral History Interviews conducted by Brit Allan Storey, senior historian, Bureau of Reclamation, Denver, Colorado in 1993, edited and desk-top published by Andrew H. Gahan, 2012, www.usbr.gov/history/oralhist.html.

change. And that's probably the most prominent thing in my mind in evaluating the two of them.

In both cases, both individuals tried to build up the Engineering and Research capability. They tried to build up the program of Design and Construction. And in Rob's case, he tried to get projects going *within* Reclamation; in Darrell Webber's case, he saw that we weren't going to get any Bureau projects, so he went out looking for work for others, to use that capability and expertise and to actually build it. He would have built the organization larger if he would have been allowed to hire the additional people. I think in both cases what I remember most clearly was that in the preparation of each budget each year, both of them would be asking for more F-T-Es [full-time equivalents], more people than what they had in the previous year. And so they always wanted to expand and grow bigger.

I'm not sure what else to really say about them. (Storey: Okay.) That was probably my most contact with them.

Storey: Did you work with any of the other Assistant Commissioners for Engineering and Research?

Mach: No, in fact, I wouldn't even really know now who they were.

Storey: Okay. One of the characteristics of change is that when we're in the middle of it, we often don't see it. So my next question is, if you tried to step back from the organization and look at it, what would you see as changes in Reclamation that

have taken place over the years?

Changes in the Reclamation Program

Mach: Well, obviously one of the changes that has been occurring, and is occurring, and will continue to occur is that we, in my opinion at least, have done our job–i.e., we were set up to develop the West, provide an economic base that would allow western areas to function and to grow, and we did a good job of that. And in essence we've done that, and the West is now self-sustaining. It doesn't need any impetus to keep it growing. It'll grow on it's own. In fact, some people think it's growing too fast and too big and too much. They might like to turn it around and go the other way. So I think to me, somebody, and I don't remember now who exactly it was, kind of characterized this like infantile paralysis where March of Dimes originally was set up to cure this childhood disease; then when they got the cure and there was the ability to stop the disease, then what do you do next? I think that's what I see Reclamation. We finished our job, we did what we were told to do, and we did a really good job of it. In fact, we did such a good job of it that we worked ourselves *out* of a job. I don't think we recognized it when we did. I mean, really, we worked ourselves out of this job ten years ago. It's taken us this long to get someone to really recognize that we don't have that job any more.

I think the type of people in the organization is changing also, where we had engineers; engineers whose role in life was to develop, build, construct, "We should make the maximum

utilization of our natural resources"–to people who are more balanced and to different disciplines. I mean, when I went to work for Reclamation, if you weren't an engineer you couldn't probably get a job with the Bureau. We hired a *few* economists, we had a few soil scientists and some people like that, but you had to be engineers. Today, we talk about environmentalists, ecologists; we've got psychologists; we've got sociologists; we've got environmentalists; disciplines what would never have been *considered* in the early years. And some disciplines we didn't even *know* about in those early years. We hadn't heard of some of these people. So I think that's a change that's occurred.

The downsizing of the organization I think is a natural phenomenon, as the program changes, we just don't really need the people. So I don't see that as a major, significant change. But I think there's also been an attitude change in that when I came to work for Reclamation. The basic attitude was we knew what was best, and all you had to do was ask us! Today, I think we're trying to *be* more responsive to those publics out there that we should be serving today. I'm not sure we really served the publics in those early years. We didn't care what the public *said*, because we knew what was best. Today maybe we aren't quite as sure we know what's best. We're more apt to go out and test the publics, find out where they're at, what they're coming from, what their attitudes, and what's important to them and what isn't important to them, because that's really where we kind of missed the boat. Ten years ago

we didn't bother finding out what was important to these people. If we had, we would have found out that building new structures wasn't important. What was important, what was *becoming* important was interest in the environment, interest in the social conditions and social attitudes and welfare. And we just missed that boat because we wouldn't ask anybody. We knew what was best. So I think that attitude has changed. I see that as major change in the Bureau.

Storey: You mentioned that the reorganization in '87-'88 may have been really to strengthen some people's positions rather than for the good of organization. Are you willing to discuss that further and name names? or would you prefer to avoid that?

Mach: Well, in all honesty, I'd probably prefer to avoid it (chuckles) because it's a lot of personal speculation on my part.

Storey: Okay. I'd like to explore further your involvement in the international relations with Canada on the Souris-Red Engineering Board of the International Joint Commission. Was that similar to your involvement with the international commission down in Mexico? Or was it different?

Red-Souris Engineering Board/International Joint Commission

Mach: No, it had a lot of similarities, although the relationship between Canada and the U.S. is obviously very different than the relationship

between the U.S. and Mexico. Canada is probably much more like us in the sense of organizations and expertise and that type of thing than Mexico was. But putting that aside, no, the same issues were there. The Red River flows north from the United States to Canada. Canadians were concerned about two major issues. One, they didn't want the water contaminated so that it was useless to them and would contaminate their part of the world. And the United States was doing things which were causing increased flooding in Canada and they didn't think that was correct or right or justified.

The Souris [River] was much the same type of issue. This is all a part of the Missouri [River] basin. The Souris and the Red lie north of the Missouri Basin. So the Garrison Project was a very critical issue as part of *my* responsibilities, because the Canadians were very worried that you would take the biota from the Missouri Basin, introduce it into the Souris-Red basin and it would then get into the Hudson Bay. That's part of the Hudson Bay drainage and could wreck all kinds of havoc. And the thing they always brought up was the so-called sea lamprey that was introduced into the Great Lakes when they built the St. Lawrence Seaway. Before they built the St. Lawrence Seaway, the lakes were free of any parasites like the sea lamprey. But they built the seaway, and that allowed access of the biota from the ocean to move into the Great Lakes and we're still fighting them today. There's clams, and there's the sea lamprey, and there's any number of different animals like that. So that was of *great* concern

to them, and of great importance to them, because the Hudson Bay fisheries is a fairly large economic interest to the Canadians.

From the U.S. side it was much the same type of thing: make sure that the waters were equally divided. There's several small streams that head up into Canada and then come into the United States. And Canada was developing power facilities, for example, and then diverting the water for various uses. They were doing some mining in some of these upper basins that were contaminating the water coming into the United States. So water quality, water quantity, flooding, diversions, equitable divisions of the water. Those were the issues that we were dealing with.

Storey: And this Commission was, once again, an adjunct of the State Department?

Commission an Adjunct of the State Department

Mach: Well, the International Joint Commission was set up under–I'm going to say under a treaty between the two countries. And this commission was to negotiate and come up with solutions to border issues between the United States and Canada. Under the commission, then, they appointed various boards who reported *to* the commission. I was the U.S. Chairman of the Souris-Red Engineering Board, and so myself and my Canadian counterpart, it was our responsibility to report to the commission on issues and solutions to those issues dealing in that particular geographic basin, the Souris-Red drainage basin.

And in both cases, you communicated through the State Departments, and the State Departments of *both* countries were always involved in this, obviously, because any time you had an agreement between two countries, it's the State Departments that do the agreements.

The Joint Commission could not in itself do the agreements. So we were always intimately involved with the State Department. I talked fairly regularly with what they called the Canadian Desk, and in fact I still have security clearance because communiques between governments are classified. And the only way I could read them was to get a security clearance, and then I had to get my secretary one because it would come in a plain brown envelope, and only she and I were supposed to see them. And she would open the envelope, see what it was, and give it to me, and therefore she had to have a security clearance also. Never did understand it, because these were very innocuous communiques . . .

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Mach: . . . that would come from the Canadian State Department to the U.S. State Department, to me; and then my answer would go from me to the U.S. State Department, to the Canadian State Department, to my Canadian counterpart. So it was kind of an elaborate process, but one necessary for diplomatic relationships, as I understand it, between countries.

Storey: In your activity on the Souris-Red Engineering Board, did you actually work out anything that was of benefit to both countries?

Agreements on the Red-Souris Issue

Mach: Yes, we were able to develop an agreement between the states of North Dakota and Minnesota and the Canadian provinces–I can't remember which ones they are–right across the border, on the Red River. This was an interesting issue. On the Red River is a very flat area, and a song about the Red River Valley is written about that particular area. It's *beautiful* country, flat, nice and deep, dark, rich soil. Picturesque farm places with the red barns and the white houses, you know, just the way you'd find it in storybooks. Anyway, what happens is that the river is very flat and the country is very flat, so when the snows melt in the spring, there's almost always flooding that occurs, and it floods in wide areas in both sides of the river, because it's so flat.

Well, North Dakota and Minnesota, one state built some low dikes on their side of the river. That forced all the water on other state's side. And I'm not sure which one started it, Minnesota or North Dakota–it's irrelevant. One state built a set of low dikes. The other state said, "Okay, I'm going to build dikes too, because I don't want to be flooded," but they built their dikes two foot higher than the ones on the other side of the river, which then again forced the water over onto the other state. And these two states, literally, were just building dikes up like that.

Storey: One would add a little height, and then the other would add a little height (Mach: That's right.) and so on, back and forth.

Mach: And so on, to keep the water from their own side and force it to the other side. Well, they did a good job of protecting themselves, Minnesota and North Dakota did, but what they were doing was raising the level of the river and forcing all this water to go directly into Canada, instead of spreading out all over North Dakota and Minnesota. It was causing tremendous flooding in Canada. And so the Canadians were faced with two choices: either they started building dikes ten miles high, or something else happened. And so what we did as an engineering board, we went in and did some hydraulic computations on what would happen with certain levels of dikes and certain flows and conditions and that type of thing, and eventually wound up negotiating an agreement between North Dakota and Minnesota and the two Canadian provinces across the border.

And the results of that negotiating was that the two states, North Dakota and Minnesota, would lower their dikes to a certain level. There was an agreed-to level; so that there would be still some flooding in the two states–not all the water would be funneled right straight into Canada. And the two provinces on the Canadian side then accepted this and did some bit of diking on their side as well.

One of the things I hadn't mentioned was, that if Canada built their dikes higher than the U.S.

side, it would back the water back into the U.S., because the water has to have a certain amount of head to flow, and if you narrow it down into a channel, it required more head, which would raise the water on the U.S. side, and so there was . . . I mean, it was like four kids standing around and saying, "My dad's stronger than your dad," and "No, my dad's bigger." It was funny in one sense, but very serious in another. We were able to negotiate and to develop an agreement among the provinces which the two *countries* then endorsed. And North Dakota and Minnesota actually lowered their dikes and the Canadians did not build their dikes, except to a certain elevation that was agreed to. And so it became an agreement that was endorsed . . . First, our board put it together, the two states and two provinces agreed to it, and then we took it to the Joint Commission and they accepted it, and in turn recommended it for some kind of an agreement between the two countries, which the two State Departments then formalized in an agreement of that type. And the two states, North Dakota and Minnesota, actually lowered the dikes.

That was one. Of course Garrison [Diversion],[31] we were actively involved in

31. The Garrison Diversion was to divert water from Lake Sakakawea, formed by Garrison Dam on the Missouri River in eastern North Dakota. The diversion was to provide irrigation water to about one million acres in east-central North Dakota, municipal and industrial purposes, flood control, recreation, and fish and wildlife benefits. For more information, see "Pick-Sloan Missouri Basin Program, Garrison Diversion," in US Department of the Interior, Water and Power Resources Service, *Project Data* (Denver: United (continued...)

Garrison all during that negotiations. And one of the main points of contention was the Lone Tree Reservoir, which was a proposed reservoir as part of the Garrison Project that sat right on the drainage divide. Water could flow to either drainage–the Missouri drainage or to the Hudson Bay drainage. And the first efforts were to provide safeguards so that no water would go into the Hudson Bay drainage. But the concern was if a dike broke or flooding occurred and it spilled over the dam–a flood that wasn't computed, bigger than anything they'd computed–any kind of situation like that that would get water into that thing.

The other concern was that fishermen would come in with live bait, minnows, et cetera, fish in the lake, go into the other drainage, and dump their bait bucket out into a creek. They may have gotten the bait from Missouri [River] water and then carried it over into the Hudson Bay and dump it into some small creek or something like that, which is not an uncommon thing among fishermen. Quite often they do things like that. But there was a lot of concern about that, and we were working with that and dealing with that in a more of an overview role, because the Bureau of Reclamation was negotiating directly with basically the Canadian counterparts. So we had more of an overview role as representatives of the International Joint Commission. And the net result was that due to a lot of factors, the Lone Tree Reservoir was eliminated from the

31. (...continued)
States Government Printing Office, 1981), 869-876.

Garrison plan–there will be no reservoir.

And in fact, they're still arguing about whether we should build the Sykeston Canal, which would take the water to an irrigated area, but it would stay in the Missouri drainage. And there's some concern about it. I mean, that country is so flat, when we talk about a drainage divide, it may be only a foot or two difference in elevation on one side or the other. So it's not really like the Continental Divide running down through the Rockies. I mean, obviously, you know where the divide is, because of that peak up there on the top. There, it's just as flat as this table. You can't see it. You have to survey it to find where the drainage divide actually is.

Storey: Was the concern about Lone Tree water spilling toward Hudson's Bay the ecological one?

Mach: Yeah, introducing strange biota into this other watershed. One of the proposals that the Canadians finally agreed to was that there was an area where they wanted to take rural water supply into and also irrigation. And the final agreement was that that water would be fully treated to drinking water standards before it was put into that area, whether it was used for irrigation or drinking, either one, didn't make any difference, it *had* to be treated to drinking water standards, which meant chlorination and you'd kill all the bioda and everything that was in it. And it was filtration and the whole thing to go with it. And that was finally agreed to by the Canadians to allow that to happen. The water treatment plant would be in the Missouri

drainage, the water would be fully treated, and then it would go *by pipe* into the Hudson's Bay drainage, because you didn't even want it in an open ditch in case something would get into the open ditch. So it would go by closed pipe, and then could be brought into the Hudson's Bay drainage.

Storey: Going back another step, to your days in Sacramento. You mentioned the Weather Modification Program. Could you tell me about that, and how effective *you* felt it was?

Weather Modification Program

Mach: Well, at that time, the Bureau was *strongly* involved in weather modification in general. And this program in the Sierras was a small subset, or a small part of that total program. Most of the effort was really oriented toward the Colorado [River], the Rockies, and those areas *like* that. The Sierras have a little different concept in the fact that, well, the storms are different. You have a definitive flow of water to and from the ocean–a flow of moisture, I should say, in the air. And it's dependent upon a combination of the high and the low that sits off the western coast in the Pacific Ocean. As the two, the high and low, move, it changes the flow of moisture as to where it comes across.

And in Southern California and in Northern California both, there's a definitive rain season, or moisture season. It's generally in early spring: February, March, April and that general time period–May–depending on where you're at. So

the idea was that in *that* case, we knew the moisture was going to be there, we knew the *clouds* were going to be there, we just wanted to increase the efficiency with which they dropped snow. So where they may drop a *foot* of snow, by modifying the physics of the cloud, you get them to drop *two* foot of snow. Because some years the clouds would just simply go on by, and then the conditions wouldn't be just right and you'd only get a foot of snow, whereas a normal snow might be five foot deep, you'd only get a foot. Well, if you could modify the physics of the cloud, you'd always get five foot of snow, you'd have a constant water supply.

So I would characterize the program as a bit more of a certainty as far as having an impact. What we were really measuring was how much of an impact we could have, and which storms we should seed and which ones we shouldn't seed. Obviously, we didn't want to inundate the area with *twenty* feet of snow–we just wanted *five* feet of snow, type of a concept. So what they were doing was running random tests and then measuring what happened in each of those tests. They would say, "Okay, these conditions, based on history said we'd only get this much snow, they'd got seed the clouds, measure how much snow would occur." And the eventual analysis of it was that number one, there was no question we could change the snowfall, we could increase it.

By the time I left, they felt they had enough data that they could pretty well increase it *when* they wanted to, and by the *amount* they wanted

to. So if they wanted a thirty percent increase, they would seed it to a certain level. If they wanted a fifty percent increase, they'd seed it to another level. So it was a fairly firm program by the time I left. They wanted to run one more. This is probably one of the areas where I disagreed with the staff that was running the program. They wanted to run one more year of experiments, and I thought they'd run enough experiments. They had verified their data well enough and didn't need to do it again. They wanted to do another year. The program did not get funded, and so it got dismantled after I left anyway. So I guess in the end I wound up being correct by default. I don't know whether I was absolutely correct, but . . . The Sierras were different than some of the other weather modifications they were doing. No question it was effective, no doubt about it.

Storey: And why was the program discontinued?

Mach: It was a research program and I think other people shared my opinion that the research was over, it ought to go operational, and the Bureau should not pay for the operational aspects of the program.

Storey: Who *should* pay for the operational aspects?

Mach: In this particular case, it would be either California or Nevada, depending on which side of the drainage divide you were working on.

Storey: The people receiving the benefit.

Mach: That's right. It was not like the Colorado [River] where a number of states would receive the benefit. In this case, only the two states would benefit–either Nevada or California, depending on which side of the Sierras you were working on.

Storey: We're right at time, I think. I do have several more questions I'd like to ask you. I'm particularly interested, for instance, in the Alaskan and Columbia River diversion concepts; the geothermal stuff while you were in the Planning Office here in Washington; the Water Resources Council, I think; and I'd like to go further into projects in California while you were there, even though it was only that two-year period. So maybe I'll be able to come back and schedule maybe another hour or so with you, if that's alright.

Mach: Sure, be glad to.

Storey: I'd appreciate it. In the meantime, I'll ask you the standard question for the end of interviews: Is it alright with you for the tapes and transcripts from this interview to be used by researchers from Reclamation and from outside of Reclamation?

Mach: Yes, I'd be willing to let them use it.

Storey: Thank you very much.

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END OF INTERVIEWS.