ORAL HISTORY INTERVIEWS

JOHN MOODY

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STATUS OF INTERVIEWS:
OPEN FOR RESEARCH

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STATEMENT OF DONATION
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JOHN MOODY

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INTERVIEWER: _____
Bret Allen Blumy

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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 struck out 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 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.

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

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For additional information about Reclamation's history program see:

www.usbr.gov/history

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Oral History Interview
John Moody

Storey: This is Brit Allan Storey, senior historian of the Bureau of Reclamation, interviewing John Moody, the supervisory hydraulic engineer in the Ephrata Field Office of the Bureau of Reclamation, in his office on April 6, 2004, at about eight-thirty in the morning. This is tape one.

Mr. Moody, let me ask you where you were born, and raised, and educated, and how you ended up at the Bureau of Reclamation?

Early Life

Moody: Alright. I was born in Tucson, Arizona, in the Ship-of-the-Desert-St. Mary's Hospital, out on the west end of Speedway. When I was about four years old my parents moved from Tucson to Yuma, Arizona. That's because my dad became the County Extension Agent for Yuma. And, we lived there in the Yuma Valley first while he was County Extension Agent, and then later, and we farmed in the Yuma Valley starting in about 1949. And of course, he was shortly afterwards a board member on the Yuma County Water User's Association. So, and yes we were very aware of Bureau of

Reclamation because that was a Bureau of Reclamation project.

Through my high school career, I mean through my high school, I really didn't have any thoughts of joining with Reclamation. I was looking at farming. I was looking at agricultural engineering in the way of machinery. And, I liked electronics, so I was very active with the Radio Club in high school, and with Civil Air Patrol, and was able to get . . . do my initial flying when my, in my senior year of high school, and soloed, and put in lots of hours while Vincent Air Force Base was still at Yuma, because I could fly with their Aero Club. And, had lots of fun. And then in college I found how much it was . . . how expensive it was to fly per hour, which wasn't that expensive in those days but it was still a lot of money for a college student. And, went to college at the University of Arizona. It was just like going home, simply because I was there nearly every summer for 4-H, and 4-H Roundup. Both my parents had graduated from the University of Arizona.

Beginning with the Bureau of Reclamation

Let's see, I started working with the Bureau of Reclamation. I was, actually in '61, October,

and that was simply to join in as a student aide. To earn money for college, I had been working for L.A.-Yuma Freightlines, and I was on a short haul, and they were able to get someone who could be permanent, so I went and saw Mr. Steenburgen [spelling?] who was the Project Manager at the Yuma Project's Office. He said, "Well, you go see personnel. We do have a student aide position." I applied for it, and that was in the middle of the week, and the next Monday I started work. So, since October '61, except for a break of about five years to farm, I've been with the Bureau of Reclamation.

Storey: Alright. Well, let's go back. What did you study at Arizona?

Moody: Well, actually, in Arizona, or at the University of Arizona I studied, my intent was to study electrical, electronic engineering. Started out in that course, then in the summer between my freshman year and sophomore year I was working with equipment. I had a defoliation business that summer, defoliating cotton, starting at about the first of August through the first part of September. So, I was very intense. And actually we did other spraying as well. But, it was a very intense period. I enjoyed working with the machinery so I decided to go into agricultural

engineering. And, so with that I really decided to go that way.

It was after that year that I went back and found that I needed to save a little more money. So, I planned to work a year and then go to school a year, and do it on that basis to finish college. So, I started with Wash-Yuma [spelling?]. Well, I started actually with, I had been working in the melons the first of each summer, as a mechanic and tractor boss, working tractors and trailers into the fields and taking care of equipment for Consol Company, and we were shipping, or harvesting and taking cantaloupes from the fields into the sheds at that time. They weren't field packing in those days. They were still taking them to the sheds. So, it was after that summer and working for a short time with Wash-Yuma Freightlines that I ended up getting the job with Bureau of Reclamation.

Then, I went back and spent another year in Ag engineering, and about that time – let's see, so that was in '61. So, in '62, '61-'62 I went back, continued another year in Ag engineering, and then stayed out and worked. But, in the year that I was staying out and working, between that year and my, and what would have been my fourth year of college, I had the opportunity to meet my wife on a

visit to Tucson. And, found out that her parents and my parents were old friends. It was a prearranged wedding, I'm sure. (Laugh) And, anyway we've had the pleasure of being married almost forty years now. In fact, this August will be our fortieth year. She then worked at the Science Library there at the University of Arizona. I did work for the Science Library also, trying to set up an alpha-numeric computer program to track books. It was in the early stages of programming. So, I found I enjoyed that.

I also had the opportunity . . . I decided I wanted to do a joint degree in hydrology because I enjoyed water resources. So, I just tried a little bit of everything in there. And then Sharon became sick, so it was necessary to settle back another year at Yuma; continue to work for the Bureau of Reclamation. By that time I was an engineering technician. I went from student aide to engineering aide, after ninety days in '61-'62. And then from an engineering aide I became an engineering technician. We saved enough money and did enough things that we decided that we'd better work over, move to . . . switch schools. And, I went to Arizona State University then to complete my degree in engineering. So, I worked full time, went to school part time. And, finally graduated.

(Laugh)

Storey: You were living in Yuma and going to ASU?

Moody: No. We moved, we moved over to Tempe. I was able to get a transfer to the, at that time the Phoenix Development Office.

Storey: That would have been when Cliff Pugh was head of that office?

In the Phoenix Development Office

Moody: And Cliff Pugh, and we had more fun. And really, Cliff Pugh, of course he was married again by that time, so, and his wife. We did. We had a lot of fun. It was a good time. It was in the initial stages of developing the Central Arizona Project. I had to work, I worked with a fellow by the name of Ron Ball at that time, and we hand cranked out what the water supplies would be. We did lots of, lots of things that you do today on a calculator in a matter of a few days, and of course there, then it took several months. I was also on detail up to Boulder City, and worked on water supply up for the Virgin River and water rights. And so I got, had a chance to work in the Hydrology Group. So it was, found out I really enjoyed water resources. So, that

continued. I received a degree in civil engineering from Arizona State University.

Storey: When was that?

Moody: That was in, actually in '71. (Storey: Uh huh.) And, with a background in water resources. So, the focus was, by that time I had a minor in math, and had a lot of water resources courses under my bill. So, the degree came with all of that. And I went from being a technician to an engineer, and I could spell the word. (Laugh) (Storey: Uh huh.) Then Cliff Pugh came in one day and he says, "Well, you've been wanting to go on rotation and see a few other projects," he says, "Pack your bag." (Laugh) So I started a rotation in late August of '71. Went to Duchesne, Utah to work on the Central Utah Project, and the diversion from that side of the mountain over to the Provo area.

Storey: Not much more water, but a little colder?

Moody: Well, and 7-8,000 feet. By that time Sharon and I had been married about seven years, and so we found out that cooler weather and the altitude was very constructive in that by Christmas Sharon was pregnant and we were expecting our first son. So, that spring, when I was then on rotation into

Denver to work there in the . . . at that time it was with the group that oversaw the ERTS [Earth Resources Technology Satellite] satellite, which was an answer to a lot of questions. You just had to answer the . . . you had to ask the questions for them to give you the answers that were there. But, the Earth Resource – E-R-T-S. And, I can't remember what it all stood for at this point. But ERTS, anyway it was a fun group to work with. In there, in there, let's see I guess, I think it was after I came back from Denver, the next rotation took me to Davis Dam for a short term. And I came back and started working right into the Central Arizona Project. Had a lot of good times. Got to actually walk and ride essentially all of the route of the Central Arizona Project before, in other words, I set the stakes and went out and flagged the routes for the cultural resource surveys that had to be done at that time. I helped write the first EIS [Environmental Impact Statement], which was about, I mean first Environmental Assessment, which was being foisted on Reclamation about that time. We . . . I think it was all of two pages. (Laugh)

Storey: Uh-hmm. I've heard about this one.

Central Arizona Project

Moody: Very concise and straight forward. So, anyway it, it I think had a lot of good things in it, and we said what we were going to do, and it was done. (Laugh)

Storey: Uh-hmm. Who was heading that effort?

Moody: That's what I was trying to remember. He became the project manager. Afterwards, he was over at . . .

Storey: Oh, I want to say Schuemson [spelling?]. That's not quite right.

Moody: No. It was – give me a moment here and we'll just look it up. Let's see here.

Storey: He had been transferred from Washington, I believe.

Moody: Well, no that was, that was later. Earlier before him, following Cliff Pugh, the construction engineer was Andy Dolynuik.[1] (Storey: Yeah.) So, that's who I worked with, was with Andy Dolynuik.

1. Andrew K Dolynuik, *Oral History Interviews*, Transcript of tape-recorded Bureau of Reclamation oral history interviews conducted by Brit Allan Storey, Senior Historian, Bureau of Reclamation, in Phoenix, Arizona, Edited by Brit Allan Storey.

Storey: Oh, okay.

Moody: And, during that time. And, they just turned us loose and said, "Hey, you need to do this, this, and this." I had the pleasure of working with an engineer by the name of Charles W. Windsor [spelling?], and he did a lot of the work in the office. And, another fellow, who was a technician, and I headed for the field, and we, like I said, flagged all of the route starting from about where the outlet of the pumping plant out of Lake Havasu was going to be.

Storey: That's up in the Buckskin Mountains?

Moody: Mountains. Uh huh. So, the outlet of that Buckskin Mountain Tunnel, from there on into Phoenix. We flagged that route. In doing that route, took a look at the topography and some of the area, came back in and looked at the maps, did a little bit of cost analysis, and I made a recommendation to Andy Dolynuik that the Jack Rabbit Pumping Plant should be eliminated, that it could all be combined at Havasu, and showed where the Havasu Pumping Plant would be. And, that's where it was built.

They eliminated the Jack Rabbit Pumping

Plant, put a higher lift at Havasu. I mean at the, not Havasu, at the Hassayampa Pumping Plant. And so the Hassayampa Pumping Plant is there today. One of the concerns at the time was, at that location, was where to put the spoil and how to protect the canal from flooding of the Hassayampa. That actually got to be tested, just prior to the first filling of the canal, with a flood that came down and washed all of the, pretty much all the spoil away, and washed it downstream. And, they did a little bit of revampment and it's held ever since. (Storey: Uh-hmm.) So, that . . . we had a chance.

Designing Storm Models

I also worked in Hydrology as part of the Central Arizona Project. I came up with some of the design storms that, along different reaches of the canal, and helped plan some of the diking that was built as part of the Central Arizona Project, both on the reach, Reach Eleven, and then the Salt/Gila Reach, the first reach there south of the Salt River. Interestingly enough one of the storms that hit just west of Mesa, in the one area, actually tested our hypothesis as far as storms go. And, we had sized the spillway correctly, and it carried the water down to where it was supposed to and back into the Salt River, protecting the area out in that

Apache Junction, East Mesa area. So, (Storey: Hmm.) that was, it was fun to see that. They gave me an award for . . .

Storey: You said west of Mesa. That's east of Mesa, right?

Moody: Excuse me, east of Mesa. Yes. Don't mind me.

Storey: (Laugh) Well I was just wondering what we were testing with.

Moody: Yeah. No, east of Mesa. No, east of Mesa. Yeah, west, of course we worked down in the area west of Phoenix, on some reaches there. I sat in on with a group from the county and the state on flood control. So, it was a good, a good team effort and designs came about quite well. I got chastised for having such high storms, but they . . . the one definitely proved out. (Laugh)

Storey: You mean they didn't like the fact that they were having to build bigger than they thought they wanted to?

Moody: Yeah.

Storey: Is that what I'm hearing?

Moody: Right. And, it was a good thing because that area has since become heavily populated.

Storey: Uh huh. Let's go back to the Buckskin Mountains, and the tunnel. (Moody: Uh-hmm.) Let's see, I talked to, I believe the name is Vernon Powell?

Moody: Yes, Vern Powell, in fact, Vern was my . . .

Storey: He was the surveyor?

Moody: Right. Yeah, he was supervisor of the survey crews. Cory, Vern, I worked under Vern Powell for a while, so I was on survey crews out on Powder Ridge.

Storey: But you were an engineer?

Worked as an Surveyor on CAP

Moody: I was an engineer, but that was part of the, part of my rotation was to go out on (Storey: Okay.) out with the survey crew. So I had the (Storey: How was . . .?) I had the opportunity to do that, both. And we actually cross sectioned all of the Havasu Pumping Plant (Storey: Were there. . .?) with the crew I was on.

Storey: Yeah. Were there any other engineers on that crew?

Moody: At the time I was on it there weren't, but there had been. I mean there were other engineers. Engineers, I think fairly typically in Reclamation, and it used to be early on in Reclamation you came on board as an engineer but you worked survey crews for up to two years before you qualified as a, for your career status as an engineer. And, at the time I graduated that was still considered a part of rotation.

Storey: Uh-hmm. Talk to me about the relationship between what the survey crews do and what the engineers do. How did they interact?

Moody: Well, it's sort of a . . . it's really a multifaceted process, because the engineers will take a look at topog [topography] maps and of course the surveyor, if it wasn't for surveyors we wouldn't have topog maps. (Storey: Uh-hmm.) But then that sets alignments and locations for various facilities. The idea is once that's set out there then you have to go back out and do specific cross sections to fine tune those alignments, and give that back to the engineers. The engineers do, do a final design, and it's up to the surveyors to make sure

that then all the quantities, or at least the information in order to develop quantities for excavation and fill are there. So, it's really a . . . at that time with the surveyors, it was a weekly back and forth communication between the engineers and the surveyors. I didn't see any "us-them" at all in that group. It was, it was really a hand-in-hand relationship with the surveyors and the engineers that were doing the design work and preparing for the construction of the project.

Storey: But, this process would not necessarily require engineers to be in the field supervising?

Moody: No. In fact, Vern Powell was not an engineer. And it was, at least I don't think he was. But he was . . .

Storey: No. He wasn't.

Moody: But he was very . . . he had done surveying all the time and he knew just how to put his thumb on engineers, really, for those guys with, that were still wet behind the ears like I was, to make sure that when we went into the field we didn't go in knowing every . . . go in like we knew everything, because we didn't. (Laugh) (Storey: Uh-hmm.) So, he was a good, he was a good friend.

Storey: Now, if I'm hearing this process correctly, the engineers are going to sit down with topo maps?

Moody: Prepared originally, in other words – of course, Geological Survey, at that time, came out with the topo maps, but again all the points had to be set in the field originally. And then they did aerial map. . . aerial photographs, and then of course came up with topography maps of large areas. (Storey: Uh-hmm.) And then the engineers said, "Okay, in order to hold a certain grade on the canal, where will that take us?" And then, "Will it take us to a point where we can build a pumping plant if we have to lift it?" Since we had to gain elevation from Lake Havasu to Phoenix. That was one. Of course, in a lot of cases, you're hoping for a gravity system and then are able to just gravity it all the way.

Storey: Uh-hmm. But, they do this from maps mostly?

Moody: The engineers would look at the maps, do some field . . . some site visits just to confirm what was on the maps. Then, at that time we had some very good aerial photographs they had taken, pretty much along the route of the Central Arizona Project, and it was form those, then, we transferred – we could use those photographs with the maps

then and actually flag the, flag the route, and we did. So, we drove stakes all along it to give an indication of where the route actually would be for seeing in the desert.

Storey: Were, that flagging of the route, was there any variation in it from what the engineers had thought it would be?

Moody: Well, in doing that, that's when I recommended we eliminate the one pumping plant and go to Hassayampa as the higher lift station at a different location. (Storey: Uh-hmm.) It changed the crossing point on the Hassayampa by several, or by over a mile anyway, from where it was to where it is today.

Storey: I'm trying to get a sense of whether the engineers were just out there flagging the route? Whether the surveyors were out there flagging the route the engineers had marked on a map, or whether they were looking at some alternatives, and there might be some variation in what was going on, at the surveyor level?

Moody: I'd say, if the surveyors picked up something it was brought to the engineers' attention. (Storey: Uh huh.) And, it was up to the, it was up the engineers

then to make a recommendation to a decision maker to (Storey: Okay.) say that. So, there was reasonably good interaction with that. In fact, about that, well it was a little later than that, but Vern did receive a very outstanding, one of the outstanding awards for, for that. I remember that the engineer that was his supervisor wrote him up for that. (Storey: Uh huh.) And it was well deserved.

Storey: What time of the year were you out in the field?

Field Work on CAP

Moody: All times. It didn't matter. Winter or summer. In fact, I worked, down in Yuma I worked on Senator Wash and that was doing all the preconstruction surveys, and that was 130 degrees in the shade.

Storey: Now, this was when you were a student aide or when you were working out of Phoenix?

Moody: Actually at Senator . . . at Senator Wash I was still an engineering technician. It was before I graduated. Yeah.

Storey: Uh huh. What kinds of precautions did

Reclamation employees have to take out in that kind of heat?

Moody: Drink lots of water. And, of course, salt tablets. You were, you know, you were expected to take care of yourself and not get overheated. I was raised in the desert, but that didn't mean that I couldn't become dehydrated to the point of a heat stroke. So, it would just thinking about what I was doing and taking precautions. The survey crews, actually with the hats we had, we'd wear a thin muslin, white muslin sort of an apron that hung from the hat that would protect our ears and our, the back of our neck, and hung down our back a little bit. Loose clothing, and comfortable, comfortable boots. But, no I don't, I mean we really, just, it was just we were used to doing it and did it.

And, what precautions did Reclamation take? About 1962, Reclamation took the attitude of zero fatalities. And they had a symbol that looked like, it was sort of an oval and that was the "zero," and that was to impress onto the employees – and they actually had safety, a regional safety officer at that time was a former pastor, and he literally preached. That was his sermon, as safety officer, was "Be careful. Don't have an accident. We don't want you to have an accident. And, take the precautions

necessary to avoid them." So it, that was sort of a turn around point, I think, in Reclamation, as far as starting the safety programs that we have now for being aware of where we're working, and who we're working with. And, being conscious of safety for our fellow employee as well as for ourselves.

Storey: Do you ever remember any situations where somebody was, needed to learn this stuff?

Moody: Well . . .

Storey: And how was it done?

Moody: But later, yeah later on when I was actually a construction inspector was, was where – getting the contractor to take the time, to sit down, even though he'd have a safety plan, getting him to say sit down and have the safety meetings with the crews once a week, and for the crews to do an almost just a short daily tool box before they'd go out. Because sure enough somebody would get in the wrong position with a piece of equipment. When I got to Flathead Irrigation Project, actually the safety program that we had there we'd put people on the machinery so they could see where the blind spots were. Then they would know

where to stay away from around that piece of machinery, because the operator most likely wouldn't see them. (Storey: Uh-hmm.) And that was a good program.

But, just out there in Arizona in the situation, how do you teach somebody safety and keep them from having an accident? You holler a lot, (Laugh) if you're out in the field. And, you preach it in the office. And, probably in the office you have fingers that get pinched in file drawers, and of course the key there is making sure file drawers, you don't have more than one open at a time. Because files do tip. (Storey: Uh-hmm.) And, I think some of the newer equipment has, accommodates that by, if you open a drawer then the others can't be opened. (Laugh)

Storey: How big would a survey party be?

Moody: We'd have from, at that time, a minimum of four, because you would have a person who would be carrying and setting pins. You had the chief . . . the survey chief, and he might be the instrument man, or just the note keeper with an instrument man. And, then the person dragging chain and running rod. So, you would have those . . .

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BEGIN SIDE 2, TAPE 1. APRIL 6, 2004.

Storey: Four, but generally five?

Moody: A minimum of four, but generally five on the survey crews when they headed out. And, we were busy, especially if we were running line. Once the alignment was set and turning angles, then everything that was done out in the field was taken back for the final drawing.

Storey: Could there be more than one crew at a time in the field?

Moody: Oh yes. Oh yeah. Crews . . .

Storey: Leapfrogging or something?

Moody: Well, or for a . . . you would be set a . . . you would set . . . be set a reach of from station to station, which might take, might take that week. (Storey: Uh huh.) Or, such as when we were out cross-sectioning the Havasu Pumping Plant, that was a four-day job. A long four-day job, and that meant traveling at the beginning and end of it, from Phoenix out to Parker.

Storey: Uh huh. So, say you had one crew going from Station A to B, (Moody: Uh-hmm.) and one going from B to C, and one going from C to D, is that the right idea?

Moody: That could happen. Under Vern, I think he had enough crews to do that. I know one of the fellows I supervised is Cory Stolsig [spelling?] and he was down there as a lead surveyor for a crew there, before he came here.

Storey: Uh huh. Well, where I'm going is, how do you make sure the, everybody arrives at Station B? (Laugh)

Moody: Oh. Well.

Storey: So it connects properly.

Moody: When that crew . . . when that . . . if you were going to a point that point was . . . you knew which point you were going to because the other crew would let you know. The crews would exchange information so that wasn't too big an issue.

Storey: Oh, okay.

Moody: I mean, we got the information and knew where we

were going to. You started a . . . you generally started at a known point or had a monument nearby that you could reference to. So.

Storey: Uh-hmm. Did you ever see Cliff Pugh out in the field?

Moody: (Laugh) Not in the locations where I was, and I don't remember that he did go out in the field.

Storey: Well, it isn't absolutely necessary. I was just curious.

Moody: (Laugh) Cliff Pugh, Cliff Pugh was out to promote the Central Arizona Project. And, it was Clifford A. Pugh, C-A-P. (Storey: Uh huh.) The same initials as the Central Arizona Project.

Storey: Uh huh. And he made sure everybody knew that, huh?

Moody: Well, I don't know that he did, but it was just obvious. And, because he was, he was out there to promote the Central Arizona Project. And he did. He, as much, with as much energy and vigor as he could muster towards that end.

Storey: Uh-hmm. Let's see. I'm trying to think. There

was a guy who went there about that same time. Larry Morton.

Moody: Yup. Larry Morton took Ron Ball's place. Well, and, let's see. No, let's see. What did Larry, Larry Morton . . .

Storey: He went about '62 or three as I recall.

Moody: Okay. No . . . And I was . . . No . . . Ron Ball , right. Larry, Larry was there. Ron Ball was there, and I worked under Ron when I first went to Phoenix. And, Larry, I can remember him. I just can't place his exact location at the moment, (Laugh) (Storey: Uh-hmm.) in things. I just . . .

Storey: What did you do after you were done surveying?

Moody: Oh.

Storey: Where did they move you to next?

Flood Control Studies

Moody: They moved me to – what did we do? Let's see, I did, you know, surveys, the field investigations, pre-construction activities. Oh, let's see. At that time Lowell Heaton [spelling?] went – Lowell

Heaton [spelling?] was the engin . . . was my supervisor after I graduated, and Andy Dolynuik was, of course, for him.

Storey: He was the construction engineer?

Moody: Right. Let's go back to your question.

Storey: What did you, they put you on rotation doing surveying. What was the next thing you did after that?

Moody: Well, that pretty much, that came, after the pre-construction activities I came back in the office and worked on the flood control.

Storey: The Hydro . . .

Moody: The Hydrology.

Storey: Hydrology.

Moody: Yeah. The Hydrology. So, yeah. And, I was on a joint flood control committee with the federal, state, and county, and city agencies, combining flood control activities that, where it fit with the Central Arizona Project.

Storey: Well, let's talk about what kinds of issues come up, came up in Hydrology for C-A-P?

Moody: You were in a desert environment, and I had done, I had worked under, while at Yuma as a technician, worked under a fella by the name of Louie Ehrlich [spelling?], and I consider Louie [spelling?] probably one of the top Hydrologists within Reclamation. He was able to transfer, or he transferred from Yuma to the Phoenix Development Office, which became the Arizona Project's Office. And so, when I was on that committee I actually was working – I think I was still under Lowell [spelling?], but because of my background behind Louie [spelling?], they had me go over and be participant on those committees. (Storey: Uh-hmm.) The . . . it wasn't part of the rotation. The was just part of getting things ready for construction and deciding what had to be constructed where. And then that went to the design engineers and they prepared the actual designs for the work. And some of that design work was done at the Denver level, too, not at Phoenix.

Storey: Well, for instance, you talked about separating flood flows from the canal, I believe?

Moody: Uh-hmm. And or passing them under the canal: (Storey: Yeah.) undershots. Really, in other words, storing them above the canal. Reach Eleven was designed that way, where the actual, the excavation done for Reach Eleven, also they excavated upstream of the canal and prepared the dikes that are there. Then, there was some concern about the aesthetics of just a straight long dam. So the dikes were, a slight wave was put into the dikes to give it the appearance of rather than being a level top it had some undulation to it. And just, that was just simply because the dike was snaked a little bit on the up-slope side of the canal to give it that appearance. Then the collection points behind those dikes, the low points, were then passed through piping that was placed under the canal when it was constructed.

And those dikes have served reasonably well for the flooding. In fact, during some of the time we were doing, before I received my degree, earned it, there was a storm up in that area of Reach Eleven that provided a tremendous amount of sheet runoff and so we were able to actually to do a bucket survey to find out what the storm was up in there, and come up with the amounts of water that would have to be retained behind those dikes with a regulated release through them. So, that's how the

dikes were sized.

Storey: Well, you know, this is water in the desert, why are we bypassing it?

Moody: Well, it's not that frequent, and the volume at any one time – the canal is not a . . . was not intended to be for flood relief, or conveyance of flood. You had natural channels where that flood was to go, and the canal crossed those channels. That isn't to say that that water wouldn't recharge the groundwater in the area (Storey: Uh-hmm.) through retention downstream. In fact, the Corp of Engineers did build additional retention downstream, and flood control for the areas that became populated there in the north Phoenix, and on across Reach Eleven towards the Salt River.

Storey: Hmm. You also sized dam outlet works, and spillways? Is that what I heard?

Moody: No. We didn't. We, that was just to, basically if you had a volume of flood and you did a flood routing, what size of outlet would you have to have to keep it from overtopping the dike?

Storey: Oh, okay.

Moody: Or build, or how high would you have to build the dike given a size release. So that was, that was just, that was a calculation and then it was up to the design engineers to build the dike such that it was strong enough to retain the water at a given elevation, and the outlet to be satisfactory for passing the maximum release that was needed.

Storey: Now, if I heard you correctly, these were – well, let's see. How should I translate this? The flood that you anticipated was somewhat larger than the managers had anticipated?

Moody: Well, no, I'd say we came up – the . . . it was known what flooding could take place in the desert. It was not known what volumes would be there. So, we had to project the type of storm that could come in to give that higher volume. And, so it was, we had to project size of storm, then given the antecedent conditions prior to the storm, "How much of that storm would run off from a basin and have to be collected, or retained, for a slower release downstream?" (Storey: Uh-hmm.) What size, if you did that, then in addition to that – now on Reach Eleven there are no "spillways," but on the Salt-Gila Reach, the one dike that was built did have to, I mean was planned not only with an outlet but with a spillway, so that there, it was the spillway

to take care of the size storm that was greater than what could be retained behind the dike. And, that actually happened about the second or third year after that basin was completed. (Storey: Uh-hmm.) And, it ran over that spillway. So it was, it was a matter of still making a recommendation and being able to have the figures to back it up, because you still had to tell the . . . still had to make that for the decision maker to say, "Okay. I believe you. That's the way we'll go."

Storey: And, what kind of a, of a maximum probable flood were you planning for?

Moody: Well, it wasn't a maximum probable flood at that time.

Storey: Or runoff?

Planning for Storm Events

Moody: We planned storm events. At that time it was probably more like the, a back to back, in other words, a hundred-year storm followed by a hundred-year storm immediately. That, because we had enough information we could develop volumes that way. And then, you would look at, "Well, what is the maximum, what is the. . ." at that

time we didn't call it "probable maximum storm," we looked at, "What was the up . . . what was the probable upper end of a precipitation event?" And so we would look at the weather records, look at the curves that the weather service had prepared through the years based on storm events for a given area.

We took some of those and modified them, because we found in the desert Southwest we could take the storms based on the direction they were coming from and the slope of the land could actually drop fifty to sixty percent of their precipitation in the very first portion of the storm. In other words, if you had a half-hour storm the first ten minutes would be the intensest portion. If you had a previous wet condition, then the bulk of that would be running off. And then once it's running off the rest of the water that's in that storm tends to run off also. (Storey: Okay.)

So, that's how we did that. We figured based on the storm event, "What was the likelihood of the runoff from that basin?" And, to do that meant some site visits to the basin to get an idea of what were the conditions, how fast infiltration would take place. If it was a general storm with slow precipitation, most of it would go in the

ground with little runoff. But your thunderstorm types, which are high-intensity with a short duration, can produce quite a bit of runoff in an extremely just, really a very large runoff for the time of the event because the storm is so intense. (Storey: Uh-hmm.) You can have, you know, if you have that inch of runoff, or inch of rainfall in that first fifteen minutes, and you get three-quarters of an inch running off of a basin, that can become a large volume given the size of the basin. If the basin is five or, five or six square miles, that 'll be one size of so many acres. If it's a twenty-mile basin it's going to even be more. (Storey: Uh-hmm.) So you figure for the size of the basin.

And, can we stop a minute?

Storey: Sure. [tape paused]

Let's talk about the storm planning some more.

Moody: Okay, storm planning.

Storey: And, you said that we, Reclamation, planned for two one-hundred-year storms in a row?

Moody: Well, that was the approach that our team took to

come up with some of the precipitations. We would also look at, given the curves from the weather service of the storm pattern, and they would, they would rate the storm as, of course, a ten, twenty-five, fifty, one-hundred-year occurrence and then you could build the curve off of that and see where it would go to what was a probable maximum storm. And then you would say, "Well, this basin and its angle probably isn't conducive to that probable maximum storm." Or, in the one case we said, "It's definitely conducive to having this type of storm, because the slope, the general direction of air movement, the type of storms that have occurred in that area, in the area east of Mesa and north of Apache Junction. That storm probably should be this amount." And, I came up with the higher number, and argued it, and it was accepted. (Storey: Uh-hmm.) (Laugh) And received an award for it. (Laugh) Not in jest, because at that time the storm hadn't occurred and the dike was just getting to be built about the time that Louie Ehrlich [spelling?] was retiring from Reclamation.

And, of course, Louie [spelling?] got all kinds of accolades. And, you had to be around to know Louie Ehrlich [spelling?]. Louie [spelling?] was a very colorful character, as well as one very good

hydrologist. He spent a number of years overseas, first working in Ethiopia on river surveys, (Storey: Uh-hmm.) and water supply on the upper Nile. And then from there, of course, he went to work for the Department of Saline Water in Washington D.C. Just got tired of that and got himself out to Boulder City, where he was hydrologist at Boulder City before going to Yuma. Went to Yuma, and that's where I, as a technician, [I] got to be assigned to him under Bonnie Bonbrick [spelling?]. And, Bonnie Bonbrick [spelling?] was a former construction engineer on the All-American Canal.

Storey: This would be a man, right?

Moody: Yes. Oh yes. The . . . and don't ask me what his first name was. See, Art Greenlee [spelling?] I had as a supervisor. Art was a geologist. And, I learned a lot of good geology from him. That's when we were doing the work on Senator Wash, all the pre-construction work. I got to know Bill Plummer. Bill Plummer was later regional director for the Lower Colorado Region, (Storey: Uh-hmm.) and he was an assistant to the under secretary in the Department of Interior during part of his career also, before going back out to Boulder City as regional director. In fact, Bill and I double dated several times while he was at Yuma as an

engineer. And he, we just had – Reclamation is family.

But anyway, going back to storms, the, that's, you really had to look at a lot of things. That meant going out and looking in the field. If you did have a storm you did bucket surveys. You just couldn't sit in the office and make, what I would call "good decisions." I mean, if you had all the data in front of you, you probably could, but you needed to really see it in the field to have a feel for what could take place, just looking at it. I'd say I learned a lot in Yuma because we had Unnamed Wash and Picacho Wash, which would periodically, by their lay and their drainage, would come into and across the All-American Canal. So, we had a chance to see storms there. Knowing that was in an area where the average precipitation was around three inches per year, going into an area where precipitation was around nine inches per year. But a similar lay of land you could begin to project storms. And so, it was a good experience through the years working with Louie Ehrlich [spelling?] and others that had had some backgrounds and could see errors that were made in early years of Reclamation. (Storey: Uh-hmm.) When we had some monuments down at Yuma that, syphons that didn't syphon, and overshots that

didn't carry the flow that was expected. And we didn't want that to occur again.

Storey: I tend to be really conservative about some things. One of them would be designing for floods, I suspect, (Moody: Uh-hmm.) or storms. Did we build in safety factors in addition to what we thought the maximum probable storm might be?

Designing Structures for Flood Control

Moody: I think we decided, it depended on the . . . given the storm and the volume that had to be contained, and then having the topography of the basin, that would set the height of the dike. Really, the safety factor was more in the, what the design engineers decided on the dike. And, that was based on, "How long would it have to retain that water?" You know, "How fast can it be released?" So, that's the size of the outlet. "How much freeboard do we want?" So, that's where the safety factors were added. And, that came more at the design stage rather than – at the flood stage we determined, "Okay, here's the size storm. Here's the volume of water. Here's the amount that's got to be retained, and here's the period for which it'll be retained while it's being released."

Storey: Uh-hmm. Okay.

Moody: Then from there the design people come up with, okay. Well, and we might even go so far as, in the one case we said, "Well, the outflow has to be at this location." And that was, if you had, say, side-by-side drainage and it didn't merge until somewhere downstream, and you made a decision that because you're containing it upstream that you're going to then use one channel instead of the other. In other words, that'll be your main conveyance channel out. (Storey: Yeah.) And then, and you can do that, of course, if you have control of the release going into that channel, so that you don't overburden the channel from, with the amount of water that two channels would have originally carried.

Storey: Are you aware of whether we had problems with people building in the flood plains down there? (Moody: Oh.) Channels that we thought we needed to use or wanted to use?

Moody: Well, in, that was historically a problem in Arizona, where people would develop into what became – the old timers knew it would flood, but if somebody hadn't seen a flood in that area for ten years they'd say, "Oh, we can build a house here," and then of

course ten years later that house might be underwater, or at least damaged by flooding. And yes, that was a problem. That's one reason why that committee, the Flood Control Committee there that I was able to participate on, I thought was very good because everyone on that committee recognized the problem in the develop, in the rural areas that were developing, that included some of these flood plains.

Storey: Let's talk more about that committee. Who all was on there? What kind of powers did they have? Why did they still keep building on the flood plains? (Laugh)

Flood Control Committee

Moody: Well, why did they, yeah, why do they keep building? And that's why the Corp of Engineers came in. That's interesting because we did have, let's see. The Corp of Engineers was represented on that flood plain, or that committee. They had an individual that came to our meetings. Let's see: Bureau of Land Management; from the state. The state actually was developing their Water Office about that time and they had at least one representative. Maricopa County had several people on that committee. Maricopa County had,

really, I think the biggest interest in flood control, and protection of these areas. And they were looking at it was, "If you can contain a storm upstream and put it into a known location and then say, okay, this is then the inundation area downstream," for that location they'd say, "Okay. This is the flood plain." And they then could, then their flood plain on an adjacent drainage that might not be passing the same amount of water would be decreased, and development could take place in those locations.

What we saw on Reach Eleven was that Reach Eleven was going to have a tremendous amount of development downstream. It already was working that way. And so Maricopa County, basically that's why there was essentially full containment. In other words, the floods were retained above the canal, the Central Arizona Project Canal, and released in a known amount downstream. You asked the question earlier, "Well, why in the desert area does that not go into the canal?" The reason why is because the canal wasn't intended to convey flood waters, and it wasn't designed for that.

Storey: But, it seems like an opportunity. I mean, we want water, right? (Laugh)

Moody: Yeah. Well, except that at the moment that the flood occurs, and then you have it settle out, and you can release it, but if you look at following a flood the turbidity of the flow downstream you really don't want that in the canal. (Storey: Uh-hmm.) There's just a lot of desert sediment.

Storey: Water quality issues?

Moody: Water quality is a definite issue. In fact, we didn't want anybody, and that came under Tom Burbey, to have to be putting any kind of return flow into the canal. It had . . . it had to be of a like-quality or better than what was in the canal. So, that meant that we didn't want sediments. We didn't want to have cross drainage coming into that canal.

Storey: Uh-hmm. Interesting. So, did Maricopa County actually use what you all worked on to effect the zoning?

Moody: Maricopa County and the Bureau of Reclamation – well, yes Maricopa County did a lot of that, and setting up for the development of what was out there. I wasn't as in tune to that at that time simply because I didn't worry about the development once the boundary for that development was pretty much in place, and it was up to the county to

enforce that, (Storey: Uh-hmm.) knowing that there would always be those few exceptions that would get past the county. (Laugh)

Storey: Or where the developer would just run over them politically, or whatever?

Moody: Whatever. So, and that could happen.

Storey: What else were you doing at that period?

Sub-basin Studies

Moody: I was also doing a, actually, and this occurred just prior to my graduation, where I was, came up with – the State of Arizona, in developing their water plan, came up with what they called sub-basins, and those basins were based on geologic conditions, not necessarily hydrologic. But, they ended up with these little sub-basins scattered around on the Central Arizona Project, and they wanted to have an idea then of what water flowed from sub-basin to sub-basin. And I was, so I did that in that same office with (Storey: Uh-hmm.) Tom Burbey and Louie Ehrlich [spelling?]. But, my job was . . .

Storey: Yeah, go ahead.

Moody: My job was to . . .

END SIDE 2, TAPE 1. APRIL 6, 2004.
BEGIN SIDE 1, TAPE 2. APRIL 6, 2004.

Storey: This is tape two of an interview by Brit Storey with John Moody.

Moody: Okay. Anyway, I was working on these sub-basins. I went out and did a lot of field reconnaissance work, figured out where water would be flowing, and we came up with a report that actually documented the amounts of water that would be flowing from sub-basin to sub-basin within the Central Arizona Project service area. And, then when we got all done, and my work was being checked, they found that it didn't match with what was going out below Phoenix, and that's because I had failed to take into account all the pavement that was in the Central Arizona Project, I mean in the Salt River Project service area. So, the Salt River Project service area, with the amount of pavement, concrete buildings that had taken place, actually increased a certain amount of runoff into the Salt River. And when I did some research on that, found some work done in other locations, used those formulas, came up with an amount that came in off of the metropolitan area into the Salt

River, and put that into it, it balanced. So, that was, that was just prior to my getting a degree and going onto rotation. (Storey: Uh-hmm.) So that was, that was a nice plus.

I also did a lot of work on the Gila River. In fact, I did a lot of historical work on the Gila River. I had an interest there because my grandfather had been the superintendent for the San Carlos Project, and the dam tender for the Coolidge Dam. So, I had an interest on the Gila River, and of course we were looking at, as part of the Central Arizona Project, what could be done upstream on the Gila River with certain dams. There was the Buttes Dam, and so I did a lot of work there and a lot of background. And one of the fellows that also worked in our group later became, later went to work for the state and he became the Mr. Gila River for the state, but he took a lot of the information that I had collected and put together. That gave him a lot of background for his job then. (Storey: Uh-hmm.) He and I had actually graduated from high school together, so it was sort of, sort of fun.

Storey: Were you involved with the Butte Dam proposal? Buttes Dam?

Moody: With, from the standpoint of water supply, we did some work on that, but I wasn't – that work was pretty well done by the time I did the rest of the research to take, go up and look at all of the drainage from up around Silver City, New Mexico on down through Yuma, and then of course taking a look at what could be generated off of the Salt and Verde system, given the dams that were there at that time.

Storey: And I, was Orme at this period, or was this later?

Moody: No. Orme was still an active proposal at that time, because we're talking at the time that the Colorado River Basin Project Act[2] was passed, which was in 1968. And that, once that was passed, Orme and Buttes were still a very active part of Central Arizona Project.

Storey: And, you were talking about Orme when we were off tape, (Moody: Uh-hmm.) and going out with the project manager, was it?

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2. For a detailed description of the Colorado River Basin Project Act see "Colorado River Basin Project Act," in United States Department of the Interior, Bureau of Reclamation, *Federal Reclamation and Related Laws Annotated*, Volume IV of Four Volumes 1967-1982, Louis D. Mauro and Richard K. Pelz, editors (Denver: United States Government Printing Office, 1989), 2395-2424.

Moody: Right. At that, the project manger – after, this was after I had farmed and I came back.

Storey: Shunick [spelling?]?

Moody: That's right.

Storey: That's the name. Not Schulamson [spelling?].

Moody: Shunick [spelling?]. Yeah. Mr. Shunick [spelling?] was the project manager, and he had me doing a lot of things. Well, when I came . . . when I went back to work for the Bureau of Reclamation in 1980 I went back as the team leader for the Indian Distribution Division of the Central Arizona Project. And, that had about a $220 million authorization for works taking Central Arizona Project waters, or some way exchanging them in a manner that an Indian reservation, and I can't remember I think there were twelve Indian reservations, that could share in that portion of the Central Arizona Project water supply that would be designated to them.

One of them was Gila River Indian Community. And, that was sort of a second home to me. It was fun to work with those people because they had, my grandfather had worked for them after he had retired from Bureau of Indian

Affairs. He worked for them for fifteen years. So, they took me under wing and made sure that I left my own shoe prints, not depending on my grandfather's shoes. (Laugh) (Storey: Uh-hmm.) So, they put me to the test many times just because they wanted to make sure I had the muster to do what was needed to be done. (Laugh) And they were, it was. It was a good time.

Storey: Well, let's talk more about before you went off to go farming. (Moody: Uh-hmm.) What else were you doing in there, in that period?

Other Experiences within Reclamation

Moody: That's quite a bit, really. That was, we're talking basically a period from 1967 through 1972, in the Arizona Project's Office. That started out, when I got there, as the Phoenix Development Office. That, that really was a lot. That was water supply for the Central Arizona Project, with Ron Ball. That was doing some engineering and coming up with cost estimates for some facets of the project. I think that was primarily distribution systems. And Tom Schlichting [spelling?], I'd go to him and I'd say, "Okay Tom, is this about right?" And, what would take me a week to two weeks to work on, he could crank out an answer in just a matter of a

short time to check me and tell me if he thought I was on base or not. (Laugh) He was quite an experienced engineer. And so, he knew all the shortcuts to coming up with a reasonable cost estimate to get in the ballpark and find out if my detail had been adequate or not. (Storey: Uh-hmm.) Working with Louie Ehrlich [spelling?], Tom Burbey, we did the hydrology. Looked at flood control. Looked at – then, of course, I completed [that] and looked at the sub-basins. Once I had my degree, then they moved me more onto the pre-construction side of things. And, that's when I was in there with Lowell Heaton [spelling?] and Andy Dolynuik, Vern Powell. And, they did those things. I got . . . I was able to go on rotation to Duchesne, to Boulder City, Denver, Davis Dam, and Yuma.

Storey: Oh! What did you do in Boulder City?

Moody: In Boulder City I did additional work in hydrology, and then also sat in the WAPA office [Western Area Power Authority] for a while, under John, and I can't think of his last name right now, but he was the director for WAPA, for the Western Area Power Authority.

And then, let's see. From, went, I worked

out of the Yuma Office on rotation for awhile.

Storey: And, what were you doing there?

Responsibilities at the Yuma Area Office

Moody: There it was still tied with the, all of the Parker-Davis substations, and the work there. And, it really wasn't out of the Yuma Office it was out of the Parker-Davis Office, because that was Davis Dam and then down at Yuma. And there was construction ongoing, and so it was monitoring the concrete, and the batch plant, and the quality of the gravels. They were having some problems. Sand was a, as a part of the aggregate, was a big issue because some of the sand had a tendency to be very, it was a carbonate sand and would dissolve. So, you didn't have a true aggregate within the matrix of the concrete. So, we trying to isolate some of those issues and pass that information on. (Storey: Uh-hmm.) It was a learning experience for me, because it actually put me out in the field and getting practiced on things that I would do later.

Storey: And it was back home?

Moody: Well, it was back home with family. That's correct. At Yuma. Uh-hmm. So, but it, it was just

– that, really rotation, I think the best thing about rotation isn't that you get to accomplish a lot, but you learn so much because you're working around people that are experienced. So you learn from their experience. And, the bad part about it is, they'll give you a task and let you make your own mistakes. (Laugh) And then, of course, the good parts of that is they show you your mistakes and you get to correct them and not let them happen again. But there, a good rotation actually puts you out there where you're forced to make some decisions, and those decisions include mistakes.

Storey: And, part of rotation is to, I think, let the engineer figure out where he wishes to be in the organization?

Moody: That's part of it too. Find out if I wanted to be more in construction. I would have liked to have been more in construction. It didn't seem to work that way. I was in a lot of pre-construction, and then of course later, and I shouldn't say that, because later when I went back to work with Reclamation after 1980, one of the tasks was coming up with an irrigation delivery system that would take water to the Ak-Chin Reservation, and plus we had what was called the Ak-Chin Water

Settlement Act that Congress had passed[3]. And, in that, it was, "The Secretary of [the] Interior shall, through Reclamation," and then it set out what they were to do. A piece of legislation that the Ak-Chin actually put together, and Congress got one of the Representatives to pass it. And, I don't remember which one it was at that time. And, it actually went through both the House and the Senate, and came to fruition. So, I got thrown into that.

But, as a result I was able to be sort of a facilitator, working with various people as the team leader for the Indian Distribution Division, to go out and work with the communities in the Central Arizona area down around Marana, or down around Eloi, and Casa Grande with the Tohono O'odham Tribe community, Nation actually at that time. It was formerly the Papago. They, and with the Ak-Chin, in fact working very intimately with the Ak-Chin, but we came through a planning process that actually identified where the canals would come through. I made, again, a recommendation that we would go to, rather than the southeast corner of the reservation of Ak-Chin, we would go to the southwest, that being the higher

3. For more information on the Ak-Chin water settlement see "Settlement of Ak-Chin Indian Water Rights Claims," in USDOI, BR, *Federal Reclamation and Related Laws*, Volume IV, 3084-87.

corner. And, what I looked at was a system that could serve the maximum number of irrigators in an area where it was all wells previously. And, that was the Maricopa-Stanfield. Well, it became the Maricopa-Stanfield Irrigation District. (Storey: Uh-hmm.)

So, by trying to serve them, as well as the Ak-Chin, we came up with a system that then went to design, and then as it was built, by that time, I had been able to get through the planning portion and was assigned over to the construction offices as far as the construction oversight, inspection of the system. And so I only was just marginally in the design portion of it, because the . . . well at that time, what they decided to do is that once we did the system then the water users that were interested it was their consultants that did the bulk of the design and then we did the approval of them. (Storey: Uh-hmm.) And so it was very . . . it was a team, it was a different kind of effort from anything I'd done in Reclamation before in that – go ahead, stop. [tape paused]

Storey: Now, this was after you came back to Reclamation?

Moody: After I came back to Reclamation from farming.

Storey: Why did you go away from Reclamation?

Returns to Farming

Moody: Well, like I said water resources was a real interest to me and farming has always been a part of me, since I spent a lot of time farming with my dad. It was an opportunity, going from Central Arizona Project I actually went down, back down to the Yuma Project's Office to help set up an Irrigation Management Services Program, which was just starting within Reclamation at the time. They had started the program up here on the Minidoka, and then we, the Lower Colorado Region, decided they would take it on. So, I took the position at the Wellton-Mohawk Irrigation District to set up the program for them. And, that one's about to run out too. So stop that.

Storey: Be careful of your microphone.

Moody: Yeah.

Storey: (Laugh)

Moody: Alright. Anyway, I was talking about the irrigation services program, when we were interrupted. But, the Irrigation Management Services Program was

being picked up and started within the Lower Colorado Region since it had some success on the Minidoka. Before going over I had also done some work just because friends of mine were at the Water Resource Lab, the Department of Agriculture Water Resource Lab, which was right on the boundary between Phoenix and Tempe, near where I lived.

So, I had started, in working with those people, I had learned a lot about crop curves, what they were intended to be. And then once I had the opportunity to apply for the position at the Wellton-Mohawk I did some intense research with them, and got to see their water measurement devices and various things to look at what could be applied as, after I went to Wellton-Mohawk. And I just had a sense when I went there that it would be in the not-too-distant future that there would be a position, because I had an individual that I knew that was managing, or actually was farming what was called the Schneider Ranch, that we'd known through the years. Also that Cliff Tabor [spelling?] who I had known, who I knew from the time I was about four years old when he was at Blythe . . . in Blythe, California, to his position as the manager for the Wellton-Mohawk Irrigation and Drainage District that, there would be an engineer's position

opening up at the district, and that the farm manager's position would be opening up at Schneider Ranch.

Well, I didn't go there with the intent of leaving Reclamation, but of setting up a program on Irrigation Management Services. And, Bill Wooten [spelling?] was a cooperator on that, at Schneider Ranch, and I was able to get a lot of other farmers also to participate in it. And, after about a year and a half I was offered both positions. At the district, an engineer position at the district. And Bill offered me the manager position at Schneider, what was then known as Wooten, Inc., which was Schneider Ranch. And so I interviewed both places, and asked questions, then made a decision that I would leave Reclamation, not to work at the district but to work at the farm.

And part of that was because in the Irrigation Management Services Program we were [in] helped develop, with Campbell Nuclear Pacific, the nuclear probe that became useable within Reclamation. And that started because we took our radiation test, and Mr. Campbell came over and actually taught the test; the person who was developing these probes. And, they had a probe that was used for measuring density for highways,

and for road construction. And, we said, "Why can't you make a nuclear probe for measuring water in the soil profile, that's no larger than this one?" And he says, "I think I can." And he came back a month later with a prototype. And so we said, "Yes, let's go with it." And then after using it for a little bit we just said, "Well, you need this, this, and this with it." And he came back. And so in that six month period he came up with the probe that – and it was refined more and more. But, that's, since we were licensed to use it, I maintained that license, and we actually used that probe at Schneider Ranch, and we became the first farm. And actually that's quite the statement, because Schneider Ranch was 2,800 irrigated acres within the Wellton-Mohawk Irrigation and Drainage District. In order to meet the Reclamation Act, each 160 acres or less, in fact there were twenties and forties, were all owned by different individuals but they were held together in a trust. So, we farmed that whole, farmed for the trust.

Storey: This was beginning when?

Moody: This was starting in 1972 through 1980. (Storey: Uh-hmm.) 1974. Excuse me, 1974 through 1980. The '72 through '74 was the setting up the I-M-S

[Irrigation Management Services] Program.

Storey: Were large operations like that typical on Wellton-Mohawk?

Moody: There were other operations that probably approached that. But, you're talking a handful. Most of the farms were probably in the, around 600 acres where a husband and wife, and maybe a father or father-in-law all owned 160 and it was kept as a family (Storey: Uh-hmm.) corporation to farm. So, and maybe a son or a daughter would be involved. Wellton-Mohawk was authorized for 75,000 acres, and then during the, as part of the Brownell Agreement, which came about soon after, it was reduced by 10,000 acres.

Storey: So, what were you farming there?

Moody: We, as . . .

Storey: Raising, as it were?

Farming at Schneider Ranch

Moody: Yeah. Well, the three primary crops, and that was alfalfa, cotton, and wheat. Then we subleased to a produce company. At that time it was called Sun

Harvest. And, they grew lettuce. And then on a piece of ground that they might have subleased for a whole year, then they would grow other cropping too. And, we actually worked with that company and used the neutron probe to show soil moisture under their crops as well as the crops that we grew. And we grew, in addition we had sudan grass, as a hay crop, but that was an interim crop.

In that country we farm thirteen months a year (Laugh) simply because you never stop. (Storey: Uh-hmm.) There's always a crop that you're growing or harvesting year round. And, we would rotate our crops to fit with what the produce company's needs were. So, it was good. We had, we generally had, as a basis, we had at least 600 acres of alfalfa, 600 acres of wheat, and 600 acres of cotton. And, that being in rotation. Of course, alfalfa you're growing for at least a three-year period if you have land to, when you rotate that in. Wheat was a crop that you could plant following a fall produce crop, and plant it around Thanksgiving and before Christmas. And then that would be harvested by July 4th, and getting ready for whatever was going to go in next. Cotton was planted right about the first part of spring, and of course that would be harvested by Thanksgiving. We would have completed our cotton harvest by

that time. So, wheat could fall on the back end of a cotton, too. The reality was we probably had closer to, at any time, closer to a 1,000 acres in alfalfa, and when we had wheat it was closer to 1,000 acres. But, we had a base rotation then we would fit in accordingly.

Storey: Can you talk about the kind of money that flowed through?

Moody: Yes, we had a cash flow of, when I was there, of about a million and a half dollars.

Storey: Annually?

Moody: Annual. Annual cash flow of about a million and a half.

Storey: And you have a . . .?

Moody: That was in ‘74, ‘75.

Storey: You have a sense of profit?

Moody: Oh yes. You had to show a profit or the banks didn’t loan you money. (Storey: Uh huh.) But interestingly enough, with the families, and we had fixed it up so that we actually had the families

owning their own housing right around the perimeter of the farm. We, each person that worked for us, it was roughly about every 140 acres, supported a family out of that 2,800. So, and that included me, as well as Bill Wooten, who was the operator of Wooten Farms. So it, it did show . . . I mean given it in a management scale you can at least show properly managed at that time. Now, to do so, because of the cost of equipment, you would have to join together with other farmers, if you only had a 160 acres. You could support a family with that, but you had to do it where you shared equipment. Well, on a 2,800 acre investment then you could buy the equipment and you could keep it busy and pay for the equipment.

Storey: Yeah. Am I doing my math correctly? That's about twenty families?

Moody: That's correct. We had twenty, actually we had twenty-two individuals that worked, counting myself.

Storey: Oh, these weren't owners?

Moody: No. These were twenty-two individuals that worked. It's just that's what it took to support that

many families. Yeah.

Storey: I see.

Moody: Yeah. They didn't . . . they didn't own any of the land. They actually worked there. And, they were paid a reasonable, what I considered a very good salary. (Storey: Uh-hmm.) And, in fact, it was good enough that they really didn't want to see the trust dissolved there at the end of 1979. Because it was, it was a, very loyal individuals working there.

Storey: So, I'm hearing a staff of maybe around twenty-two or three maybe?

Moody: Yeah. Staff was . . .

Storey: Or twenty-five?

Moody: Yeah, a staff of twenty-two, full-time. And then seasonal we would pick up three or four during wheat harvest. (Storey: Uh huh.) Yeah.

Storey: And this was irrigated wheat?

Moody: This was all irrigated. Yeah, we grew, in other words on our wheat ground, and we grew hard reds and durham wheats, we actually had the

equivalent of about 110 bushels per acre, as the average yield. (Storey: Yeah.) On alfalfa, our average yield was just right at twelve tons per acre, with the better fields going as high as thirteen tons per acre.

Storey: Okay, I need some comparison. What kind, what would you have expected non-irrigated to yield.

Moody: Oh, you couldn't down there. Up here a non-irrigated field, the dry land around the Columbia Basin Project is about, a good year, sixty to sixty-five bushels.

Storey: So, you more than doubled?

Moody: About doubled what's produced here. Yeah. (Storey: Uh huh.) And we did that, basically we . . . after doing it a couple of years and using the techniques that we were teaching in Irrigation Management Services, on that farm we could say that for wheat you could grow that yield with about twenty-two inches of water. And, where we came in behind a crop that left good soil moisture we could get by with less than seventeen inches of applied water, during the time the crop was growing. And so we were basically saw how far we could go with as little water application as

possible.

And this was important for all of Wellton-Mohawk because later on, under the Brownell Agreement, they took a look at seeing, the Wellton-Mohawk district as a whole could no longer look at consumptive use as their formula. They would be limited to what could flow out by what could be treated by the desalting plant at Yuma. So, with that, with an outflow now limited they could see what consumptive use was within the project, and that was all they could divert from the Colorado River. Previous years it had been, "We can divert everything that was available from the Colorado River as long as we . . ."

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BEGIN SIDE 2, TAPE 2. APRIL 6, 2004.

Storey: Less than what you did?

Moody: Yeah. Yeah. Everything . . . in other words, they could take everything from the Colorado River that was reasonable, and then if they, then they had to return, from the project, an amount less than, on a large amount with only the difference being what they called "consumptive use" on the project. And then the consumptive use on the project was

roughly figured at, I think, about three, three and a quarter acre feet per acre times the acreage that the project was. Well, at that time it was 75,000 and then reduced to 65,000.

Storey: But, you were getting around an acre and a half? Acre foot, one and one half acre feet on your wheat, roughly?

Moody: Well, yes. And on alfalfa we were able to – alfalfa's a higher water using crop. Well, a lot of people were saying you've got to put on about eight acre feet per year per acre on an alfalfa field. And what we showed was, "No, if you're monitoring the moisture that's in it, and planning your harvest schedule such that you, during the hotter period of the year, hotter dryer period of the year, you could get that, have the crop ready for harvest, the alfalfa ready for the cutting, get it cubed or baled, anyway get it off the field in a given time then you could come back with that first water, after about a ten-day period, and that would fit." But, you only did that as needed.

In August we found that because of the higher temperature of the soil, even though if you put on too much water in August then the soil bacteria in the root zone of the alfalfa would go anaerobic and

that would attack the plant. So we found we could use less water than normal in August, and a lot less in the winter time. We actually saved a couple of acre feet using the Irrigation Management Services techniques with the neutron probe monitoring in alfalfa. So we were down, and what I feel – so my rule of thumb was you should be able to produce two tons per acre foot for alfalfa. You should be able to produce at least one and half tons of wheat per acre foot of applied water. And this is applied. And, for cotton we were looking at a minimum of one bale of cotton per acre foot. So, these were just sort of general rules to look at when you started planting your water use for a given crop.

Storey: Let's talk about the wheat first.

Irrigating Wheat on Wellton-Mohawk

Moody: Okay.

Storey: The fact that you irrigated that, did that mean that you could grow speciality wheats?

Moody: Yes. And a very high quality wheat. The hard red wheats that we grew were a very good hard red, and bought by the California mills for processing for flour and that type of thing. The durham wheats,

when we got in, when we started that process with durhams we did some research and found out that durham wheats really we had to maintain the nitrogen levels in them. And, I did that through a technique of first where we put a, at a portion of the nitrogen need into the ground, as well as along with phosphate. And then we applied nitrogen with each irrigation. And, I found that as long as I could keep the irrigation at about one part per million nitrogen, active nitrogen for the plant, they, the plant, did well and we would come up into the area of about 180 pounds of nitrogen per acre for that wheat, which is about what it takes to grow a good wheat in irrigated ground producing 100, 100 bushels or three tons of wheat per acre. (Storey: Uh-hmm.) So, I did that. And, of course again we monitored irrigation, and we did it on a field by field basis.

So, on a field-by-field basis I knew what we had applied both in fertilizer and water, when it would need its next irrigation. And, in the Wellton-Mohawk that's critical because you end up ordering your water a minimum of four days in advance of delivery. So, on each Thursday I would turn in my water order for all of the next week. And, I could do that. And then as the week, as that next week progressed, of course, I

could fine tune that water order. But, I already had it coming in the system for our need. We didn't have to worry about storms or weather, you know, that was really an infrequent event. (Storey: Uh-hmm.) And, if it was a general storm coming in off the coast we could see that coming and plan accordingly. But, that was a winter time event, so your irrigation was less anyway.

Storey: Now, these probes that you were using. . .

Moody: The neutron. . .

Storey: Did you go out and . . . ?

Neutron Probes to Measure Soil Moisture

Moody: The neutron probe – I actually hired a technician to work with me to assure that we went to every field, and then that same technician did the, did some of the work for the produce company that was leasing ground. And, we worked together with the office, Bureau of Reclamation office, and then their people, instead of taking all their time for our needs, were then freed up to go do other farms, because we . . . and then we would use this . . . we would share the probe. So it was a good relationship. I also worked with the University of

Arizona so that we could apply minimum pesticides. That was another part of the field-by-field records that we kept. So, we looked at techniques to reduce our costs of chemicals, both fertilizer and herbicide, and insecticide.

Storey: So, this wouldn't be something you could, would install permanently?

Moody: No. No. What you did, you installed a conduit into the ground. That meant augering a hole into the ground, and you went and measured the water, measured the soil moisture at that spot. And you wanted to pick a spot that represented the bulk of the field. And then of course we would take a look at the field, because you might have streaks in there where it was sandier. (Storey: Uh-hmm.) And, so you would look and see, "Well, what's the stress on those plants in that area? How serious is that? Do I need to irrigate a little sooner than what it's saying over here where the probe's measuring water?" But they, the lettuce people actually appreciated it because they found out that they could use less water, maintain bed temperature for the lettuce more uniformly. Yeah, so there was that side benefit from using the neutron probe that we hadn't even anticipated. Along with that the Department of Saline Water – I don't mean the

Department of Saline Water. Anyway, the research station out of California came over. They wanted to take a look at what it would take for leech, leeching factor for the waters that we had on the, that were going into the Wellton-Mohawk off the Colorado River.

Storey: Meaning taking salt out of the soil?

The Replogle Flume

Moody: At least keeping salt out of the root zone. What was that minimum? So, we set up a check field and, but just prior to that John Replogle had come over and said, "Why don't you try this portable flume that I've built?" So, we did and everybody liked it. So, we built several of them and we would move them around to different locations within the farm to measure water being turned out. And then he says, "Well, let's . . . let's put one in." And so about that time we needed the measurement of water through specific ditch onto a field that was being used as a check against what the research laboratory was doing for finding out through a replication of applications that gave water into the soil at, I think they had it set up for ten percent, twenty percent, and thirty percent leeching factor, to find out how the salts progressed with that. And

our check field, we actually ended up being able to measure the water down to the hundredth of an acre foot.

It was the first permanent installation in the world of a, of the "Replogle Flume."[4] The . . . and that field ended up, I think our leeching factor on that field was around five to six percent. And so that gave the Salinity Research Station out of California the opportunity to check that . . . check that also, and came up with a, and that was Dr. Von Skilthgard [spelling?] that was overseeing that project. And he came up with the fact that, "As long as you could apply adequate water that the salts would not build up within the root zone, that you would push them just past the root zone so that the transpiration would use it up, that the three to five percent was adequate leeching." So, what it did say was we could be a lot more tighter in our application to meet the crop needs and have less. And that changed our perspective of crop curves, too, because our crop curves, when we set them up, actually took in account leeching factor. And so we could actually tighten that up too.

4. For more information on Replogle Flumes see Irrigation Training and Research Center "Basic Design of Replogle Flumes," www.itcr.org/reports/reploglefluem/reploglefluem.pdf (accessed May 2013).

Storey: Uh-hmm. On an operation of 2,800 acres, how large were the fields you were dealing with?

Moody: We had . . . well, at the same time we were doing laser leveling, so we had – I'm trying to think what our largest single turnout went into, and that was on a deep loam soil. But it was about seventeen acres where a single turnout. And we used what we called high-head irrigation. So, when we turned the water into the field we turned it on at about fifteen cubic feet per second. And that way it could push the water across at about six acres per hour. So, when we irrigated, on the sandier fields we actually irrigated a little faster than six acres per hour with a fifteen to sixteen cubic foot per second head, in other words the flow of water in our farm ditch. That went to a single turnout that then went into what we called an "arco," and what that did, that amount of water was then spread over a sill to where the velocity onto the field was at about one foot per second. So, as long as it was not greater than one foot per second there would be no erosion. And so it was just a flat spread of water, and that would push out.

Because we had water, because we had the ditches configured the way we were with the broad-crested weir that Replogle developed, we

could then put a gauge at the ditch and you could measure water to a tenth of a cubic foot per second just at that gauge. The ditchrider no longer used a Sparling meter. He would just go to our fields; go down and look at the gauge and know what was in there. It was more accurate than the Sparling's. The . . . and I had told the irrigator, I said, "Go up and look at the gauge, and whatever it's saying, you know, in other words if it's saying that you've got sixteen cubic feet per second, or fifteen and a half use sixteen, and then walk from the end of the field three times that." When the water gets to that point, move it to the next border." And that way we never overwatered, and the water would push to the end of the field, and what it did for the irrigator then was if there was a gopher problem it gave him the opportunity to take care of the gophers while the next border was, had the water and he didn't have to worry about it for the twenty or so minutes he might be monitoring the end of the field. And then he'd go over to the next border, walk up it. So, on the sandier borders, they were around three acres per border. (Storey: Hmm.) So, that only gave him about half an hour between, between water changes on the sandier fields. But then on the good, the better soils that were, had some clay and good loam, of course, there the borders being larger he could do what . . .

Storey: Sounds to me like you'd be irrigating almost all the time?

Moody: Yes, but we did it, we could do it with one and two irrigators, because we would only be running one or two heads at a time. Very seldom did we have to have, be irrigating at three locations at the same time.

Storey: Uh-hmm. You were going to say something and I interrupted you.

Moody: What?

Storey: You were talking about the gophers and the . . .

Moody: Well. Yeah. We'd, of course, on the gophers the, they're always the worst on the sandier fields, (Storey: Uh-hmm.) (Laugh) over the heavier soils. Just easier for them to get through. And, it always a problem too, even the district canals. The district canals in those areas were all lined. But, you'd get a gopher and it'd come in behind just right under the top of the lining. And if the water was being pushed at the top of the lining then it would find an exit. And so, and of course that system was actually, the first water on that system was in 1952, and I think it was in March of '52 when we went

out and the secretary of interior came out there in the Wellton-Mohawk, and Governor Pyle from Arizona. And we . . .

Storey: You – excuse me.

Moody: And we dedicated the water there at Harold Woodhouse's [spelling?].

Storey: Uh-hmm. You mentioned going in and working with Reclamation. How were they involved in their operation?

Working with Reclamation at Schneider Ranch

Moody: Well, we were a cooperator, because first of all the Irrigation Management Services Program for it to work, had to be applied, and you had to have farmers that would apply it. And, I can show its application on a field and sort of set the standard for the rest of the project. And, we had really a good demand. In fact, one of the technicians that worked for me, Susan Dodd [spelling?], is responsible for that program today in the Wellton-Mohawk. So, she works for the district. The district actually took over that program after about four years.

Storey: So now who owns, who owned the probe?

Moody: The probe actually was owned by Reclamation. And I say that, yes because we ended up purchasing those probes, but you had to be a licensed, you had to have . . . you had to be licensed to handle radioactive material in order to use it. So, of course that meant annual training, and then proper precautions in its use. (Storey: Uh-hmm.) Even though it was using americium to provide the neutrons, and that was a pretty small, pretty small source of radioactivity.

Storey: And this is what you did basically for about seven to eight years?

Moody: Well, the I-M-S Program for almost two years, and then the, a little over five years with the farming. Uh huh.

Storey: And, did the farming change?

Moody: The farming . . .

Storey: While you were there?

Moody: Well, the farming . . . I think we put that farm probably – the only thing that we hadn't

incorporated on that farm was automated irrigation, and that was being incorporated at some other farms within the Wellton-Mohawk. But, we set up the system where it could be automated but it . . . we never applied it. Because there, given a known head, through a farm ditch, it would actually, on other locations, actually had it so the irrigator didn't have to go up and change the . . . open and close the gates. (Storey: Yeah.) The gates opened and closed automatically. And the farmer himself or his, I remember in one case it was the father, he says, "Boy you're spoiled." He went around, I mean he was irrigating for a period. He says, "You're really spoiled." He says, "I can sit here and read my book and check the end of the fields," but he says, "there's really nothing to this irrigation." (Laugh) (Storey: Uh huh.) But it is; it was just for our situation we kept one person with the water all the time, wherever it was running. And so did the company that had, had rented the ground also, that was growing produce and whatever.

Storey: How much did they rent from you all?

Subletting Land at Schneider Ranch

Moody: Generally that would stay probably in the range of 4 to 500 acres a year, out of the 2,800.

Storey: And all lettuce?

Moody: No. They grew, they grew lettuce. They grew garlic. Now the company that's there, on that same piece of ground, they've incorporated with the lettuce. They're growing broccoli, cauliflower lettuce, because they all hit certain windows of the market. They grew sorghum, as a crop, that was a summer crop. The problem is with sorghum, if you have a high temperature at the time it's flowering your yield is reduced. So instead of getting six or seven ton per acre yield you may only end up with four and a half or five tons per acre. And then it's marginal. You don't, you don't really make a profit on it. (Storey: Uh-hmm.) So, sometimes, and if that's the case, then they'll choose to leave the ground fallow between their spring crop and their early fall crop.

Storey: But then you decided to come back to Reclamation, I guess?

Left Farming to Return to Reclamation

Moody: Well, that's because the trust under which I was operating was dissolving. And, one of the heirs to Mr. Schneider was coming back and he wanted to run it himself. And, if I had stayed on farming it

would have cost me about $2 million in the first year, because I would have had to buy new equipment. I would have had to put down the . . . put down the first and last year's lease. And, I was competing against two produce companies at that time who also wanted the ground. So, and the produce company that got it, two years later they were bankrupt, and the other company that was bidding got it. (Laugh) So, took it over. And, is still there today.

Storey: And why was the trust dissolving? Do you know?

Moody: That's, that was because the heirs had chosen to dissolve it.

Storey: There were a bunch of folks involved I gather?

Moody: Well, there were; I would say there were probably three key individuals that were (Storey: Oh.) involved. And the one was outspoken.

Storey: Pushy, huh?

Moody: Well, at least wield enough leverage that that's who they followed. So, and that's great. I mean they took it over. They managed it then as more of a corporation, different from the way it had been

operated prior to that. Had the trust been there I would have liked to have been able to take it over and farm. But then I wouldn't have been back to Reclamation and doing all the things I've done too. So. (Storey: Uh-hmm.) And, as much as my wife enjoyed my time farming, she didn't like the idea of having that much debt. (Laugh) Mainly because when you looked at cash flow, that was at a time when in 1980 gas prices were being forecast to go up to $2.00 a gallon, even though at that point in time I think we were still at eighty cents a gallon. So there, it's just . . . it was a time of flux as it always is. I had been, I was, interviewed to go up and manage a large farm up in the Agila area, and that was owned by an Italian conglomerate. So, I took a look at that, and I still enjoyed, I still – that was in '79. So, or actually in '78, because they knew that the trust still had a year to go, and so timing wasn't good just to leave right then. Although that was, that's still a nice area to live. (Laugh) The Agila area up near Wickenburg.

Storey: Oh.

Moody: Yeah.

Storey: Up there? What size farm was that?

Moody: That would have been about 4,000 acres.

Storey: But not on a Reclamation project?

Moody: No. That was all by wells. So, I went, I applied for – I had applied for a number of positions both with the Department of Agriculture and with Reclamation. And, I got a call from Phoenix, from Steve Magnussen and he said, "Would you like to come to work here again?" And I said, "Sure." And so Steve became my supervisor in, at the end of February of 1980.

Storey: And, what did you go there to do?

Indian Irrigation Division

Moody: To be the team leader for the Indian Irrigation Division of the Central Arizona Project.

Storey: Okay. [tape paused]

You went to the Indian Irrigation Distribution Systems?

Moody: Well . . .

Storey: Is that right?

Moody: Uh-hmm. Yeah.

Storey: Yeah. As I recall Larry Morton was involved with that a lot?

Moody: That's correct. He was.

Storey: Tell me about it.

Moody: Okay. Well, of course Larry was looking at the bigger scope of all of, all of the, all of the Central Arizona Project, as assistant manager for the Arizona Project's Office. And then Steve Magnussen was actually the manager for Advanced Planning. And then when he left that left Carol Erwin and I on a rotational basis in that position, (Storey: Uh-hmm.) while Steve was up in Boulder City, before he went on to Washington D.C.

Storey: But then you were assigned to working on the Tucson?

Moody: Well, that was part of – yeah, well in Advanced Planning one of the first things that we were doing, not only for the Indian communities, but we were looking at what it would, in other words, "Where was the Tucson Aqueduct going to be located. As it went past Marana, was it going to go up the

Santa Cruz drainage? Or, was it going to job over into the drainage west Tucson?" (Storey: Uh-hmm.) And, of course going up the Santa Cruz drainage meant that you'd have this canal which the populace thought would be a scar to the desert, as seen from Tucson. So, of course the recommendation was from them, from the general public was that, "If it's going to be routed around Tucson then it's going to be routed on the west side of the Tucson mountains." And that's where it is. (Storey: Uh-hmm.) And then it comes back in south of Tucson, and continues on across towards –.the idea was to, if necessary, have it available to take water all the way to Nogales.

Storey: Now, what kinds of things were you involved with that?

Moody: Well it was primarily looking at, "What was feasible locations? What were the geologic conditions of those locations?" Comparison of costs, cost estimates was a big (Storey: Uh-hmm.) item. The interfacing with the public. And then once that was done, I focused more on what we had to do with getting the distribution system built out to the Ak-Chin, and working on that. Let's see, I also facilitated getting the system in for the Harquahala Irrigation District. So there, there was a lot of

different work going on about that time. (Storey: Uh-hmm.) And Queen Creek . . .

Storey: And we were involved in several things?

Moody. Right. And Queen Creek was probably where I became most involved. First, in just the design and planning stage done by the engineer that the district had hired. And then . . . as I . . . when I transferred into Construction Management, then overseeing that construction. So it was, that was very interesting because that was a lot of cast-in-place pipe, which was one of the, one of the, I think that's the only area on the Central Arizona Project that, where they actually used cast-in-place construction techniques. (Storey: Uh-hmm.) They did a lot on the Salt River Project, but for a distribution system off of the Central Arizona Project, I think that was the only one, was the Queen Creek area.

Storey: Now, where is that?

Moody: That is southwest of, southeast of Phoenix, east and south of Chandler (Storey: Okay.) going towards Florence and Coolidge.

Storey: Uh-hmm. The . . . why did you . . . how did you

go about shifting over to construction?

Moody: I requested it, and Larry Morton approved it and put me over there. (Laugh) (Storey: Uh-hmm.) Which was nice. It was a good, it was like I said that was a fun year and a half with that crew. And, it's amazing how much construction was actually done in that time. It just, when I look back, it's hard to believe the miles of ditch that went in, canal system, where it went to, doing the transfer inspections for all of that facility, once it was constructed, to the districts for operations and maintenance. It was, it was quite an event.

Storey: So, what were you working on?

Moody: Well, we worked on primarily, the focus for me was of course Queen Creek, as far as construction goes, and working with those people. [ringing telephone] And inspecting the system. The working on the portion that went over to, well, what they called the Santa Rosa Canal, and then let's see, some of the other distribution system that was also in the vicinity of Eloi.

Storey: So, what did this involve?

Moody: That involved actually going out, looking at the

system as it was being constructed, and assuring the quality was maintained in concrete, finding out the times – well, as simple as looking at the departure time of a truck from a batch plant to when the concrete was being placed, and . . .

END SIDE 2, TAPE 2. APRIL 6, 2004.
BEGIN SIDE 1, TAPE 3. APRIL 6, 2004.

Storey: This is tape three of an interview by Brit Storey with John Moody.

It had been over ninety minutes we would refuse the (Moody: That's correct) concrete?

Moody: That's correct.

Storey: Why?

Moody: Because it would have done a preset, especially in some of the temperatures that we were doing. They actually had to cool the concrete. In fact a lot of the concrete was batched with ice in the summertime in order to keep the temperature of the concrete as it was being placed somewhere in the seventy degree range, and keep it from being too hot at placement.

Storey: Did this mean that the contractor was setting up batch plants?

Moody: As close to the sites as he could, reasonably close. A lot of trucking, of course, (Storey: Uh-hmm.) for getting the concrete from the batch plant to the site where it would be placed. Slip-form lining was used. Of course making sure that the bedding for the ditch was proper, or for pipelines. In some cases where they placed pipelines they used low-strength concrete for, they would place the pipe and then pour up to spring line with low-strength concrete for the bedding, where it was reasonably good desert soils without a lot of rock. (Storey: Uh-hmm.) And then in some cases they even placed over the top of the pipe with that. It was diggable concrete.

Storey: Now were you just on the crew or were you supervising the crew?

Moody: I was not, I did not consider myself a supervisor. I actually was out on the inspections doing the work.

Storey: So, what kind of records did you have to keep?

Project Inspection

Moody: Well, as far as inspection goes you had to keep the record of what equipment was being used, and you had to identify each piece of equipment, the hours that it was worked. You had to identify who was at the site, and how many hours they all worked. So, you were keeping complete records, actually in duplicate, to what the contractor was. You would meet with the contractor. You had to make sure the contractor had done his safety talks. You would review progress weekly with the contractor. And then you'd do progress reports back because that's when the contractor submitted a payment. And, they had started me on that when I was on rotation in Duchesne. That's one of the first things that they had me doing was going through and checking the contractor's statements with what the inspector had written to ensure that they were the same. Making sure that the contractor had held out proper deductions, that the wage that the contractor was paying was in accordance with Davis-Bacon. So there's a whole lot of things that way. That all goes back in, and then if there's any question there were people in the office that would do the follow up on that. So, you had labor specialists that took care of that. I just had to make sure that the reports got in (Storey: Uh-hmm.) so that they had the information to go on.

Storey: So, who were you working for?

Moody: In that construction office – that's a good question. We were actually under – better click that off for a moment. [tape paused]

At the moment [I] don't remember.

Storey: What was the organization then? You have a . . .

Distribution Systems Construction Officer

Moody: It was called Distribution Systems Construction Office, because it was, instead of being a part of the main stem of the Central Arizona Project it was responsible for overseeing and inspecting all of the construction going out, being put in out in the field. And . . .

Storey: And so there was a director, and you were the deputy?

Moody: Right.

Storey: And then how many other staff?

Moody: Well actually he was the chief, and I was deputy chief.

Storey: Deputy chief.

Moody: Right.

Storey: How many other staff would there have been doing construction inspection?

Moody: Six.

Storey: And is this a situation where you have a field staff and an office staff?

Moody: We had, we had essentially, well the chief, the fellow that served as chief was probably in the office sixty percent of the time. (Storey: Uh huh.) And then we had, of course you'd come back in and be writing your reports, so all of us were in the office almost daily. (Storey: Uh huh.) Yeah, in fact, from that office a lot of the folks went on to – well, let's see Doug Griffie [spelling?] went on to do pumping plants once the distribution systems were in. Distribution systems really went in in a relatively short time off of the Central Arizona Project, the key ones that we had oversight on. (Storey: Uh-hmm.) And, I can't remember Jerry's last name. A big guy that was also at Waddell Pumping Plant. But, and they were all helpful because they were old pros at inspection and I was

the new kid on the block, (Storey: Uh-hmm.) and getting out there and getting trained. And, about a year into that I saw an advertisement for the Flathead Irrigation Project, because, and it was out of this region, for a . . .

Storey: This region, Boise?

Flathead Irrigation Project

Moody: For the Pacific Northwest Region. So, I was in the Lower Colorado Region at that time and then saw this opportunity to apply up here out of Boise, to be on the Management Team for the Flathead Irrigation Project. And, because my dad had grown up on the reservation, and my grandfather had been the project engineer for the Flathead Project for a lot of years, I thought, "Well, I'll at least apply for it." And Bill Brooks was already up here. He had been the construction engineer at Lower Colorado Region, and he was working his way back north. So he applied for and had gotten a job in '86. So, there late '88 I applied and he called me up and says, "Well," after interviewing me he says, "Well, if you want the job it's yours." And I said, "Well, I'll come up and take a look." (Laugh) So, Thanksgiving of '88 I moved up here. (Storey: Uh-hmm.) Moved up to St. Ignatius,

Montana.

Storey: Let me ask you a question I've neglected so far. What grade did you start working at Reclamation?

Moody: GS-2.

Storey: That's was when you were a student?

Moody: Student aide. And then. . .

Storey: Just take me through your career (Moody: Okay.) in terms of grade levels.

Advancing in Reclamation

Moody: Okay. Started out in October '61 as a GS-2, student aide. Ninety days later they came to me and said, "Well, do you want to apply as this, or do you want, in other words if you want to stay on you need to fill out this application." So, I filled out the application because the employment that I had was a ninety-day employment. And, so I filled it out. They accepted it. I became a engineering – is that right? Let's see. No, I became, let's see it was a student aide. Yeah, and then an engineering aide, a GS-3 engineering aide, at the end of ninety days because I had, I did the paperwork and they said

the personnel person said, "Yup. That's fine." So, they then assigned me, well in fact I think I was already assigned. I was assigned to Larry Nelson . And, I think you knew Larry there in Denver, back years ago?

Storey: I don't think I knew him.

Moody: Okay. Yeah, anyway, Larry Nelson. And, so I worked, I worked and then somewhere in that process from a GS-3, I don't remember specifically when I went to a GS-4 but I think it was about the time I went to, that Louie Ehrlich [spelling?] got there. I know when I went to Phoenix, I went to Phoenix as a GS-5 engineering technician. So, a GS-4 engineering technician at Yuma, and then an engineering, a GS, a GS-5 engineering technician when I moved to Phoenix in '67. Then, when I graduated that's when I, from Arizona State University, that's when I became a GS-7 engineer. (Storey: Uh-hmm.)

And, a year later I was a GS-9 engineer. And, that was with rotation in that year. (Storey: Uh-hmm.) And, went over to – and then took the position at the . . . for heading up Irrigation Management Services Program at the Wellton-Mohawk, and that's when I became a GS-11. At

least that's what I'm remembering. It may have been before that when I was working under Lowell Heaton [spelling?]. In fact, it must have been when I went to work over for Lowell Heaton. [spelling?]. Well, no, I think I went over as a nine, and then became and eleven. Then I farmed for the five years, and then went back to work as a GS-12. And then when I went up to Flathead I became a GS, or actually a GM-13, (Storey: Uh-hmm.) under that program. (Storey: Okay.) And still am. (Laugh)

Storey: Okay. Now, where is, St. Ignatius you said?

Moving to Montana

Moody: St. Ignatius is in western Montana, about forty miles north of Missoula.

Storey: This is one of the missions that was founded by, what was his name? He also did Cataldo, I believe? Is that right?

Moody: I think so. He, well there was Rivallii.

Storey: Yeah. And that was the name, right? (Laugh)

Moody: Uh-hmm. That's right. And, interestingly enough

the mission at St. Ignatius was at the request of the tribal fathers back in about 1850-60, somewhere in there. They actually traveled to St. Louis to request that the mission be started at St. Ignatius for the purpose of educating their people. (Storey: Uh-hmm.) And it was. It was, and it became – the mission that's there today, of course, is a historic national monument built in 18 – roughly around 1890. But, the mission was older than that. The . . . one of the original mission buildings is still there. It's more of a log cabin style building. (Storey: Uh-hmm.) And then they had, at one time, quite a school associated with that also, because a lot of the people that I knew in St. Ignatius had gone to school in the mission school at St. Ignatius. (Storey: Uh-hmm.) It was apparently pretty well known.

Storey: So, you went up there working with Reclamation?

Working with the Bureau of Indian Affairs

Moody: On a Bureau of Indian Affairs Project. That, in 19 – I want to say December of 1985 or the first part of 1986 the assistant secretaries for Reclamation and Bureau of Indian Affairs signed an agreement whereby Reclamation would provide a Management Team at the Flathead Irrigation

Project, and this was at the behest of the irrigators. The Flathead Irrigation, or the Flathead Indian Reservation approximately half the land is non-Indian, because it was opened for homesteading after the allotments were given out. And then as things took place through the years a lot of the allotments that were owned by individual Indians were sold off, and of course were bough by non-Indians. So, you have a mix there of roughly eighty-five percent of the farmland served by the Flathead Irrigation Project is non-Indian. And that serves 139, or 130,000 acres. So.

Part of the mission of the Management Team was rehabilitation of the project. And so part of the agreement was that the Bureau of Indian Affairs would seek appropriations for rehabilitation, and then the Management Team would oversee that rehabilitation. Bill Brooks was a construction engineer. I'd had both irrigation background and working with people in setting up portions of the Central Arizona Project, as well as recent or construction experience right then. (Storey: Uh-hmm.) So, I was able to take that, take that with me, and together we utilized that. We had, when I arrived there, there were three of us that formed the team, an administrative officer, Bill Brooks as the manager, and myself with the title of irrigation

manager. So it was fun to get there and move in, live in houses that had some historical significance. The first house we lived in in St. Ignatius was also built at the time of the mission, in 1890. And so we lived in that for almost a year before we bought the Van Veen [spelling?] house, which was a house that was built by Dr., or actually enlarged by Dr. Van Veen [spelling?] because he had twelve children. (Storey: Uh-hmm.) One of, a couple of whom were born after the house had been enlarged. (Laugh) (Storey: Hmm.) So.

Storey: So, what was the program that you had to run?

Moody: Okay. The program when we arrived there was that – we really, of course, and I had, fortunately on the, being working in Phoenix I had gotten to know quite a few people in Bureau of Indian Affairs at the Washington level, Washington D.C. level, and then had some of those same people to communicate with after I'd gotten to Flathead. However, from Washington it went to the Portland Area Office and I did not know people in the Portland Area Office. And then from there it went through the Flathead Agency, which was Bureau of Indian Affairs on the reservation.

There we, the, the agency superintendent

actually was, knew the reason for the Management Team being there and had gone through all of the politics of that happening. And so, he accepted Bill on a fairly equal plain. However, within about a year, within the year after I arrived there, he moved over into the eastern part of Montana and another person came who was not accepting of the Management Team. So it was quite an interesting battle. But we had the agreement. Basically B-I-A [Bureau of Indian Affairs] would not provide funding for doing the repairs on the system. So, some things had already been in place before I got there, as far as getting some, getting turnouts preconstructed for installation by the crews that actually ran the water in the summertime. Then during non-irrigation season did maintenance. And, so that was started. Gordon Wind had preceded me. He was there for about a year before he went back down to Grand . . . Grand Junction to serve as the construction engineer there, and then later went back up to Flathead to oversee the Safety of Dams work.

Storey: Now, when was it you went to Flathead?

Moody: I went there Thanksgiving of 1988.

Storey: Eighty-eight?

Moody: Uh-hmm.

Storey: Okay. This new person that came in was a Reclamation person?

Moody: No. No. That was Bureau of Indian Affairs.

Storey: It was the B-I-A person?

Moody: Bureau of Indian Affairs. Right. And so it made it very difficult. In order to accomplish the work, and of course we worked closely with what was called the Flathead Joint Board of Control, which represented the irrigation districts. There were three irrigation districts. You had what we call the Mission Valley side. So you had, Jocko Irrigation District, you had the Mission Irrigation District, and then the Flathead Irrigation District. And, the Flathead Irrigation District also encompassed a little smaller area that was know as the Kamus-Hot Springs area. (Storey: Uh-hmm.) So, with that . . . that made up all the service areas that we oversaw. And there were, in every one of those areas were pieces of the project that had not been maintained for a period of time, where trees were growing through canal banks, where trees were growing on the dams. And so we were very heavily involved in trying to correct that situation, but you could only

do so much at a time. So we had . . .

Storey: Tell me why trees on canal banks and dams are an issue.

Safety of Dam Issues

Moody: Well, the root systems of those trees, while they're growing, hold soil in place, but if a portion of that root system dies then that becomes a path for water to flow out, and we don't want that.

Storey: Uh-hmm. Oh, okay.

Moody: So, it's the root system at a time, after the tree is gone, or if the tree dies, that becomes the issue. And, if it penetrates into an area where water can go into it then that's – plus you can't see rodent damage, you can't see other problems that are possibly taking place with that bank or that dam. (Storey: Uh-hmm.)

There were seventeen dams and reservoirs to be . . . that were part of the Flathead Irrigation Project. And so we were responsible for that, and for all of the Safety of Dams work, or at least all of the Safety of Dams inspections up to that point. The tribe then contracted under the 638 Program

to take over the Safety of Dams part of that. And, that was good because then they hired Mike Brown [spelling?] who, who worked for the tribe and oversaw all of that. And he was . . . he was pretty sharp and instrumental in getting the tribe to seek dollars through B-I-A, and get the money out there for the Safety of Dams work. Then the tribe contracted with Reclamation, and that's how Gordon Wind got there. Being that Reclamation, out of Denver, then provided the team to oversee the Safety of Dams work.

So, the first project was Black Lake Dam. And then, of course, a lot of investigation work was done on Tabor, and McDowell, some on Mission, let's see, Crow; let's see, Little Bitterroot, Hubbert. Hubbert was one that was accomplished while I was there. Let's see, oh, Hell Roaring; that was a small structure that Reclamation had actually purchased, Reclamation Service had purchased. Interestingly enough the Flathead Irrigation Project was initiated in about 1907.[5] Authorization came in either, I think it wasn't until 1908 that they actually had authorization to go forward with construction, but they actually had the first delivery of water off

5. For more information on the Flathead Irrigation Project see Garrit Voggesser, "The Flathead Project: The Indian Projects," Denver: Bureau of Reclamation History Program, 2001.

of Mission Creek, to some land, in 1908. My grandfather at that time was working over on the east side. They had him and a number of the engineers that ended up at Flathead were traveling all over eastern Montana to different projects and building those. But, 19– roughly about 1912 was a big big time in the Flathead Irrigation Project for getting a lot of construction done. They had the main feeder canal that conveyed water from Tabor to in front of Mission Dam and on around to pick up water from McDonald Dam and take it all the way to Pablo Reservoir. So, it was quite a long route around the perimeter of the Mission Valley.

Storey: And this was Reclamation construction?

Moody: And that was all Reclamation Service. And then in 19– I think it was 1924 the, was the transition then from Reclamation Service, United States Reclamation Service, to Indian Irrigation Service. So, it was US-I-I-S [United States Indian Irrigation Service] from that. So the people didn't move they just had the umbrella changed over them at that time, and my grandfather being one of them. He was the project engineer on the Flathead Project at that time, (Storey: Uh-hmm.) and through 1933 when he moved down, he was transferred down to the San Carlos Project to build that one. (Laugh)

Storey: Yeah. So, we were not involved after '24 or so?

Moody: Reclamation Service was no longer involved on the Flathead Project after 1924. The same people were there but Reclamation Service was phased out at a number of locations in that time frame, '23, '24. (Storey: Uh-hmm.) And the transition made into Indian Irrigation Service. But, we picked up all of those pieces, and, when I got there and we did a lot of good. When Gordon Wind was there, they took on their first repair project on a diversion that was off of the Jocko River, that took water then over into Tabor Reservoir. And, let's see, so that was the first one done. That was done before I arrived. After I arrived we did the syphon crossing under the Mission B Canal to the Post F Canal, under Post Creek. So that took place. We did a lot of major construction in the winter time, (Laugh) (Storey: Uh-hmm.) because that's when the water was at a low and when we could do it without – the Flathead Irrigation Project, as it was built, was built with canals that interfaced streams. And, the Mission Mountains was the range along the east side of the valley, and out of that range came streams. And then the canal actually, as it were, traveled perpendicular to the streams, intercepting them, conveying the waters. The dams were built above the canals, except for Ninepipe and Kicking

Horse reservoirs. They were . . . those dams and reservoirs were built to take care of the, what we called, the Post Division, and that was around Moiese. That was the big flat area of the project. But, Reclamation engineers that were on Flathead, the Flathead Project for Reclamation Service included Frank Crowe, who went on to Tieton [Dam] on the Yakima Project. He actually went, stayed with Reclamation, and of course later built Hoover Dam, (Storey: Uh-hmm.) as the construction engineer for the Big Six.

Storey: Yeah, I'm a little confused. The tribe took over dam safety?

Moody: After, after we had a Management Team there. Reclamation – now they only took over that portion of dam safety that – and I can't remember. Reclamation for the Bureau of Indian Affairs was doing the SEED [Safety Evaluation and Existing Dams] examinations. And that's the Safety Evaluation of Existing (Storey: Dams.) Dams. So Reclamation was already doing that. So, we had all of the SEED reports, and we participated in those with those that were coming out of the Denver Office for that purpose. And, Region was getting involved a little bit about that time also, because of us being there as the Management

Team.

But, Denver was already doing the SEED Reports, and on every one of the dams, and identifying where the problems were, and beginning the process that under Safety of Dams could be done. But, for the actual Safety of Dams work, Bureau of Indian Affairs had to appropriate the dollars. The first Safety of Dams work was actually done at Crow Dam, and it was actually using the funds because the outlet works, the cylinder gates had failed, and, that controls the outflow. So, that was under Bill Brooks. So, they actually accomplished that in 1988.

Storey: Uh-hmm. In '88?

Moody: Yeah.

Storey: Yeah, okay.

Moody: '87 and '88 was when that was an apparent problem and they had to take care of it.

Storey: Uh-hmm. But, so what was the Reclamation team doing after Safety of Dams stuff went away?

Moody: Okay, all of the irrigation infrastructure (Storey: Uh

huh.) that conveyed the water from the dams to the fields, and all of the feeder canals, the larger conveyance systems, the diversion structures were in a state of failing. So, we actually set up a . . .

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BEGIN SIDE 2, TAPE 3. APRIL 6, 2004.

Storey: A program?

Flathead Project Rehabilitation

Moody: Yeah, we set up the program for going through that. Prior to Reclamation Service, or actually right about the time Reclamation Service and the Management Team, I mean excuse me, Bureau of Reclamation's Management Team arrived on the project, a study was done by a team that identified all of the weak points of that project and made recommendations as to what should be fixed and what the costs would be.

And so we had that as a blueprint for starting. Took that; the first thing that had to be done was go to the district, the Flathead Joint Board of Control, and let them know that in order to accomplish this work that meant they had to raise their assessments, because the money wasn't coming

through B-I-A, it was going to have to come from the farmer, to get this work done, or they weren't going to have a project. So, the rate raised at the rate of, let's see I was there for eight years, the rate raised at the rate of almost $2.00 a year. (Laugh) So, it was about $22 an acre-foot from $11 an acre-foot. In fact, I think, no I take that back. I think it was less than $10 an acre-foot when Bill Brooks arrived. And, so anyway, that provided the funding, and then we did it with force account. We did it with the staff that was already working on the project. The reorganization of the staff was done before I arrived, so it was pretty much in place when I arrived. It made it very easy to serve as irrigation manager and work with the watermasters, and through the watermasters to the maintenance crews. We didn't have one single maintenance crew. We had a maintenance crew at each watermaster camp. That way you had the staff and the skill for the area that they were serving. And then we would pool that staff in the winter time for specific projects. (Storey: Uh-hmm.) And the idea was to make sure that that canal system didn't fail.

Storey: And, what were they irrigating? What was the water used for, maybe I should ask?

Crops on the Flathead Project

Moody: Okay. Water . . . water at the Flathead Irrigation Project was unique in that it did not provide a full supply, except in two small areas. It was a supplemental supply. Most of the Flathead Irrigation Project was around, oh probably the average less than eleven inches per year rainfall. So, not even good dryland. Well, dryland country if you rotated your crop every other year. But, the irrigation project gave you a supplemental water source of about an acre-foot or a little more a year to add to precipitation. And they grew . . . wheat was a major crop. Hay crops, and that was a combination of grass and legumes, and alfalfa in areas where they had better water supply. They did have alfalfa crop; potato, seed potato. There's about 4,000 acres on that project that produce probably forty percent of the gross project farm income. And that's, those seed potatoes, a lot of that seed potato is actually delivered right here to the Columbia Basin Project for the potato crops that are grown here. (Storey: Uh-hmm.) So you had, you had that. Speciality crops you had rape, which is . . . I mean canola, a lot of canola. Wheat being the predominate. Right in there with wheat was a lot of pasture ground. So cattle, cattle was probably the major livestock crop. A lot of cattle are on that (Storey: Uh-hmm.) project. So they turned to pasture, the pasture ground into, into

calves, cow-calf, that services the cow-calf operations. So, wheat, cow-calf operations, and pasture. Then came your haze, and that's just a lot of multiple types of hay. Then of course the highest value crop was seed potatoes.

Let's see, other crops grown. They did grow some other crops, but they were on smaller scales. So, that pretty much covered the basic crops. It meant, for the potatoes, that we had to make sure we had a water supply to those fields into September because that's, that way they could have it before we ran out of water they had enough. The Moiese area had a full-service supply of water. That was one of the areas. The Dixon area had another full supply of water. And they did, they grew cropping. The alfalfa and potatoes were key crops in the Moiese area; Dixon area alfalfa.

Storey: Uh huh. Now, if I understood you, the whole project is on the reservation?

Moody: Except for a few facilities, the whole project's on the reservation.

Storey: But, maybe fifty percent were Indian, and . . .

Moody: No. Yeah, well, no only of the reservation land.

(Storey: Yeah.) The reservation itself, about half of it was non-Indian owned. And most of that non-Indian owned was serviced by the Flathead Irrigation Project, and that was because it was all homesteaded. (Storey: Uh-hmm.) Or, purchased, or allotments purchased by non-Indian.

Storey: So, how much were the Indians involved, and how much, as opposed to other groups, and what kind of issues came up because of that?

Indian Issues for the Management Team

Moody: Well, with the Flathead, with the Confederated Salish and Kootenai Tribes of the Flathead Reservation, they had marked say in what was going on. It's just that at the time, in '88 you still had an agency that was, the employer took care of all the roads. The irrigation district, the irrigation project was actually under the agency before the Management Team arrived there, and was still under the agency. But, it's just the Management Team, under that agreement, was given the authority to do the work without having to go through B-I-A for everything.

The Management Team was given the authority to reorganize the employees that were on

across the project, and do the advertising and hiring through B-I-A; we worked through the Portland Personnel Office (Storey: Uh-hmm.) for all of that. So, much of the Management Team . . . the Management Team was sort of equivalent to the agency. We worked with the agency, but we also worked directly with the Portland Area Office to do administration for the, what was needed for the employees. At that time the Portland Area Office had a . . . had an irrigation staff also that oversaw the Wapato, Fort Hall, and Flathead operations to the extent that they provided support service.

Storey: But the water users had to increase their rates in order to pay for this?

Moody: The water users had to increase the rates in order to pay for the work actually done on the project. They also had to pay for our salaries; the Management Team's salaries. Initially, Bureau of Indian Affairs was to at least fund the Management Team's salary. And, that quickly changed, after I arrived, because the Bureau of Indian Affairs, the money, they diverted the money in one year, and the next, even though the money was in the pipeline the next year it never made it out of the Portland Area Office even to the agency. So, so the irrigators had to pay our salaries.

Storey: And, what kind of issues came up with the irrigators when they found out they were paying this; facing these rate increases?

Rate Increases to Finance Project Rehabilitation

Moody: It was a hard thing for them to face, and the argument was that they shouldn't have to be increasing their rates. And of course, they would look at other projects already serviced by Reclamation, and rates, and look for comparisons. As it turned out – and then too, remember this was just a supplemental water source. It wasn't a full water supply, except in a couple of locations. (Storey: Uh-hmm.) So, they were looking at for a supplemental water source. But then we could justify back to them that, here's what the money's going for, and we could account for them. And we actually had, fortunately had a young lady working for the agency that worked there in irrigation who, when Bill explained what we needed, could set up for him, using the Federal Finance System, to gather the data. And then we actually did, we set our budget for each year and she tracked all the costs. And so we could sit down with the district management and say, "Here's where the money's going," and show them specifically for that. And, costs, you know, as far as manpower costs go that

had, some of that had been reduced a little bit so that that could offset our salaries. But basically we had to justify ourselves the whole time we were there.

Storey: Uh-hmm. To the board or to whom?

Moody: To the . . . to the Flathead Joint Board of Control. To the tribe we would provide reports to the tribe, but that was as a courtesy to keep them informed. (Storey: Uh-hmm.) But the . . . it was the water users that were the ones that were paying the assessments.

Storey: Okay.

Moody: So we had to, we had to justify everything to the water users.

Storey: So, how far along did you get in this?

Moody: We actually, if I were to get out that report, which was three volumes, we actually accomplished a large portion of it, we had in motion actually, when I left, the accomplishment of a couple of more pieces. One of which got put on hold by the superintendent after I left, and the, in fact a couple of them got put on hold by the superintendent after

I left because – and, I don't know why. It was just the politics between him and the tribe. (Storey: Uh-hmm.) And he pulled, he pulled the rug out from underneath the B-I-A person that replaced me. (Storey: Hmm.) See, Bill Brooks had already left and come over to the construction, Reclamation's Northwest Construction Office at Yakima. (Storey: Yeah.) And so that left me by myself, as the lone Bureau of Reclamation person running a B-I-A project. Even, even had one good day for the superintendent because he didn't have anyone else to take his place, so he asked me, I literally have an acting superintendent role at the agency. (Laugh) (Storey: Uh huh.) So.

Storey: So, what happened?

Moody: Well, when we made a decision that Reclamation . . . we had, in other words, we had done for that project as much as we could do, given the politics of the situation with the tribe and the agency. Because the tribe by that . . . by the time I left the tribe had essentially, under the Indian Self Determination and Education Act, and its amendments, had fully taken over all the agency work, except for irrigation. (Storey: Uh huh.) So, that left the superintendent with just himself and a secretary and nothing under him but irrigation. So,

he decided that he would, after I left, he would become the . . . well he was the superintendent but he made the decisions for irrigation. And the fella that was there to actually do that, he was then butting heads with the superintendent. And, I hate to say it that way, but that's what was happening, until he had, and he had told me he was going to stick it out but it got to be too much for him. So, he ended up going over to Yakima. (Storey: Uh huh.) And, so one of my key watermasters, who learned a lot in construction. In other words, he was really a good student as far as construction techniques, and had a good handle on running water, became the irrigation manager and he's there today. (Laugh) So, there's no engineers at that project now, that I'm aware of.

Storey: And now, what did you do?

Moody: I was the, I was the engineer . . . well, both Bill and I were engineers, and then he was the manager and I was the irrigation manager.

Storey: How did you move out of that to your next position?

Transfers to the Columbia Basin Project

Moody: Well, my next position was here as the Manager for the Irrigation, Operations, and Technical Services Division for the Columbia Basin Project. (Storey: Uh huh.) So, I went from 139–130,000 acres to 670,000 acre. Well, 670,000 acres counting what's under wells also, under license.

Storey: That was 130,000 acre project up there?

Moody: Yeah.

Storey: And, why did you decide to leave?

Moody: Because the job that we were there to do could no longer be done.

Storey: So, you start looking around for another job?

Moody: Well, to a point. I was . . . by that time I was already, in our reorganization in 19 – let's see, I came here in 1990, late '96, early '97. So in other words, starting in '95 under reorganization, instead of me being under Ken Pedde at the Region, and under John Keys before that, we were, I was switched over to Bill Gray. So, Bill Gray's my current supervisor. Before him was John . . . was Ken Pedde. And before that John Keys was Bill Brooks's supervisor, and of course Bill was my

supervisor. (Storey: Uh-hmm.) So, when, in the reorganization which essentially began in '92 and culminated for Reclamation there in about, well '96, you know everything was put in place. We had our Area Offices established, so Bill just saw this as a way to . . . instead of me applying . . . actually, I applied elsewhere. But, knowing that Bill was willing to lateral me over to here when Francis Jensen [spelling?] retired. And we actually did that lateral about three months before Francis retired so that I could have that overlap with him.

Storey: Uh-hmm. And so, when did you come over here?

Moody: Well, officially Thanksgiving of 1996, which was just eight years later (Laugh) of going to Flathead. So, I was at Flathead for almost eight years, except I stayed on at Flathead after my transfer here to finish up work. Our actual move here was January 4th.

Storey: Of '97?

Moody: Ninety-seven. Yup.

Storey: Why don't we stop for the day. It's noon. (Moody: Uh-hmm.) Let me ask . . . this is still April 6. (Moody: Uh-hmm.) Let me ask you

again, or let me ask you if you're willing for researchers to use the information in these tapes and the resulting transcripts?

Moody: Sure.

Storey: Good. Thank you very much.

END SIDE 2, TAPE 3. APRIL 6, 2004.
BEGIN SIDE 1, TAPE 4. APRIL 7, 2004.

Storey: This is tape four of an interview by Brit Storey, with John Moody, on April 7, 2004, at about nine o'clock in the morning.

January of '97, huh?

Moody: Uh-hmm.

Storey: And your move over here. So, let's start out with what you were doing.

Moody: Okay. Starting out with what I was doing after I got here?

Storey: Yeah. When you got here.

Moody: Well, of course . . .

Storey: You finished up over there.

Moody: Pretty much, I guess. (Laugh)

Storey: You had, was that some construction that had to be finished?

Moody: Yeah. [tape paused]

Storey: You were talking about why you stayed in St. Ignatius for a little while after you actually reported down here, as I recall.

Moody: Oh, okay. Part of that was because there were some jobs that . . . tasks that needed to be completed after my transfer, that also allowed me to complete my move from St. Ignatius to Ephrata. It was very extreme, some extreme winter conditions at Thanksgiving period. In fact such that during that period that was when the ice storm occurred over in Spokane that shut off power for up to several weeks in many locations. And, we ran into a lot of people in our travel that were in that situation, where their houses had been out of power for a couple of weeks. They weren't worried about their frozen food, because they could take it outside. (Laugh) But, their houses were getting cold, and they had to take the winterizing,

they actually had to winterize their houses to keep their houses from freezing, with the understanding that it might be a week or two more before power would be reestablished. The ice storms tore down power lines. A lot of trees were just overweighted by the rainfall and the ice. And, that occurred from western Montana all the way to, through Spokane out into the what we call the Drumheller Area or the Scabland, just immediately west of, or not too far west of Spokane. So it was a very severe rainfall-icing condition that took place during that period.

Storey: So, how would an event like that affect the project?

Moody: Well, it didn't affect the project here.

Storey: No, the . . .

Moody: And, it didn't affect the Flathead Irrigation Project, but what it did it slowed down my move, and since I had tasks to do for Flathead, rather than trying to accomplish them from here I just stayed and accomplished them at my office there at Flathead. (Storey: Uh-hmm.)

And so my actual date that I left that office was about, I think was January 3 or 4, because I

worked up through that Friday, that first Friday of January in 1997. And then that next morning, on Saturday, we loaded up the remainder of our goods at our house and, as we pulled out of our garage, the people that we were renting the house to were pulling in. So, (Laugh) the house didn't stay vacant. (Storey: Uh-hmm.) Then those folks lived in our house then for the next five years, which was very nice for us. It's just that that was a burden also because my wife wasn't willing to buy a house here until we sold the house there. So, we rented a house here for that, actually for the first five years that we were here.

Storey: Uh-hmm. So, tell me about the job you came to and what the issues were when you got here?

Moody: Okay, the job that I came to here had one advantage. Where we were responsible for the day-to-day operation at the Flathead Irrigation Project, and directing that day-to-day operation, at least that my job through the time I was there, that put me one phone call away from every farmer on that project. Because, if they weren't happy with the watermaster, then I was the one that got the phone call.

Here, there was another layer involved. The

layer here was, I stayed with Bureau of Reclamation, not operating the day-to-day event that took place with delivery out to the farm, because that's at the district level. The district watermaster takes care of that. And then if they're not happy with the watermaster there, they call that watermaster's supervisor which is one of the assistant managers at whatever district they're at. Plus, we're dealing with, except for the East District, the South District and the Quincy District are both larger districts than I worked at over at Flathead. So, here my responsibility switched from overseeing the intimate day-to-day operation to overseeing a water, the delivery of the annual water supply and planning for operation and maintenance on sort of a larger scale for the reserved works, because I came over to be responsible for what we call "reserved works."

Managing Reclamation Reserved Works

Now, the reserved works in this sense are unique in Reclamation on this project because even though they're titled reserved works and special reserved works, the actual funding for that, for their operation and maintenance, is from the farmer through the districts. In other words the water users pay for it. They're not from appropriated

dollars from Congress. Where, in all of the other Reclamation projects, if it's titled a reserved works, then it's receiving appropriated dollars. So that's a little difference. But, we're calling them reserved works here on this project because they were not transferred to the districts for operation and maintenance, they were held by this office for operation and maintenance. And the districts then pay for all of the operation and maintenance associated with them by paying us. [tape paused]

Storey: About . . .

Moody: The reserved works.

Storey: Right.

Moody: And, so the uniqueness of the reserved works here is that the water user does pay, through the districts, for all of our activity regarding reserved works. Not only that, we don't have a maintenance force in our Reclamation team that operates the system. So, we actually utilize the districts. In other words, when we identify maintenance, the districts with their maintenance teams are given the first opportunity to do the work. In most cases they do that work. If necessary that something has to be contracted out,

we generally go through the district to set up that work, and then what they do they just, they prepare the contract as an entity, and hire the contractor. We review that decision. And then we, working with the contractor, we do all the inspection. So that has been, that has worked extremely well. An example of that would be just the recent re-coating of the gates at Pinto Dam. A year ago we did the bifurcation gates. The Quincy Irrigation District set up the contract for doing that. We wrote up what the specifications had to be, and then the district set forward the contract. And that works out very well because then when the district completes that the bill then is spread to the other two districts from Quincy, and we administer it through our reserved works funding, but it's just a very clean, straight-forward process. And, it falls within the guidelines that the districts have to follow for the state of Washington. So, it works out very well that way.

Storey: So, what does it mean to be a reserved work?

Reclamation Reserved Works on the CBP

Moody: A reserved work would be that Reclamation constructed and owned facility that is being maintained, being operated and maintained by Reclamation staff, or a Reclamation office. Now,

we're responsible for that. So, in most cases, such as at Yakima and other locations, when it's titled reserved works, then that staff, each year seeks, through their activity plans and their budget appropriations, funding from Congress, through the general Reclamation appropriations, to have that funding come all the way down for what they will be doing specifically on those reserved works for that given year, whether it be just pure operation or a combination of operation and maintenance.

In our case, each August we sit down with the districts and their boards of directors as they have what they call a Reserved Works Committee, and essentially all the, well all of the managers of the districts are at that, their attorney, and generally all of the board members from all of the districts are at that meeting. And then they approve the budget that we present to them. And, what they do is they then recommend that that budget be approved, and then of course the individual piece of that budget that goes back to each district has to be approved by the board at the next district meeting as part of their overall budget. (Storey: Uh-hmm.) It goes into their budgeting process that they have to then approve for the next calendar year.

Storey: In other words, they're paying this up front?

Moody: They're paying this . . .

Storey: On the Columbia Basin?

Moody: On the Columbia Basin Project, we bill them at the beginning of each year. Not only for any work that wasn't paid for in the previous year, but for all the projected costs of the coming year.

Storey: Now, this money that comes down from Congress, it still has to be repaid, right?

Moody: No. To reserved works? The reserved works are, Reclamation in other projects is normally responsible for that item because it's held as an important piece of Reclamation. And that funding is part of Reclamation's operation. Just like in the work you're doing right now, that's coming through a federal appropriation, (Storey: Uh-hmm.) and the reserved works are normally handled in that manner. In the case of the Columbia Basin Project it's still called a reserved work, but under the contract signed by the districts they pay for all of the activity. So, we do not seek appropriations from Congress. We seek the funding directly from the district through the water user through the districts.

Storey: Uh-hmm. Could you give me some examples of the reserved works on the Columbia Basin Project?

CBP Reserved Works

Moody: Okay. Reserved works on the Columbia Basin Project include Dry Falls Dam, which was when it was built called North Dam. Pinto Dam which is a re-regulation facility within the main canal system. And so, Billy Clapp Lake is that reservoir, but Pinto Dam is part of that. The main canal itself and all the associated facilities with the main canal, which starts at Dry Falls Dam and goes south into and through Pinto Dam, and around to the bifurcations. So, the bifurcation itself is a reserved work. Then we have special reserved works, and that includes the Soap Lake Protective Pumping and all of that facility, which is a number of wells and a couple of pumping plants, to protect the aesthetic quality of the water body called Soap Lake. The Quincy Irrigation District actually pays directly sixty percent of that. And that is one unique piece within our reserved works where we do have federal appropriation paying forty percent of it, because on that forty percent that comes out of the flood control authorization, which included the line, "to protect Soap Lake." So, Quincy pays

sixty percent of all the work to maintain that, and any other thing done to improve that system. And we, Reclamation, pay forty percent out of the appropriation from flood control.

And we do have the Esquatzel-Coulee that has a similar thing related to flood control, where the South District does the operation and maintenance for us but we pay, I think, it's forty-three percent of the costs through the flood control appropriation, because it is a flood control facility. But, the district pays the larger portion, (Storey: Uh-hmm.) again, on that case specific to the South District. The other special reserved works include this Moses Lake Outlet, because we convey water through our canal system and directly feed Moses Lake. Then Moses Lake elevation is controlled by that outlet work, so that's a special reserved works that the districts fully fund. O'Sullivan Dam is a special reserved works. And, that is for the benefit of the South District, so that they actually pay all the operation and maintenance of O'Sullivan Dam because that is their water supply. Because it stores the recollected water from the other two districts in addition to the feed water that we have to put in there to make it.

Storey: And that's Potholes?

Moody: And that's Potholes Reservoir. And then the last piece of the special reserved works would be the Potholes Canal through the first several miles, and that includes Soda Lake, Soda Lake Dike, and Soda Lake Outlet Works. But again, even though we operate and maintain those facilities, we work in intimate partnership with the districts at each location for assuring that their maintenance is accomplished.

Storey: Uh-hmm. Hmm. You were telling me about what you found when you got here. What the job was?

Supervising Operations and Maintenance

Moody: Well, okay. What I found when I . . . when the job is here. In other words we're responsible for operating and maintaining the reserved works, as well as assuring the annual supply out of . . . assuring that the annual supply out of Grand Coulee Dam is delivered through our infrastructure to each farmer. But, we take it just to the point of, in other words, the point of a diversion into a lateral. So, all of the main canal system is monitored and controlled from this office, the Ephrata Field Office. And that's all the way from Coulee City to the Tri Cities.

There are some, a little bit of exception to that in that the Quincy District pretty much operates all of the West Canal system. It's just that we do monitor it, and we assure that all the alarming, such as if water is getting too high or too low at any one place, is in here. We also have the ability to control and even override what the district's doing if the there is an emergency situation. So, we have the ability to control all of the main delivery system of the Columbia Basin Project canal system from Coulee City all the way down into the Tri Cities. So it's a very extensive infrastructure. We have, I mean, we actually can see every piece of that system through our SCADA, which is, of course, the Supervisory Control and Data Acquisition system that's in place. That's one reason that it's been a little busy this morning is because we're also in the middle of the Information Technology Security the Department of Interior has sent down. So, we're doing that right now, getting ready for all of the security testing and evaluation for that Columbia Basin Project SCADA system. And, that's been pushed up in time. So, not by our will but by others. (Laugh)

Storey: Now, if I'm hearing this correctly, the district is operating the canals and we're sort of watching the canals?

Moody: Well, that's in the Quincy system. We actually look at that very closely if there was a situation, because we monitor the power plants. There are one, two, three, seven, seven power plants on the project: Dry Falls, Summer Falls, let's see. Is that right? One, two, three, four, yeah, five, six. Five by, five that are operated directly by the Grand Coulee Project Hydroelectric Authority, and two that are operated by the Grant County Public Utility District, although the districts own all seven. So, they're on our system. But because we monitor them, any situation that happens then we pass that information back out to the watermaster that would be in the affected area, so that he knows that there's been a change in how the canal in his area is being operated. We actually do all of the logical control of delivery through the main system for the East and South District. And, we have the ability to do all of it for the Quincy District. And we do, on their request, we may operate points, simply because of situations they may have electronically, or maybe due to power outage or whatever, at a given location. We have the ability to do it. We have some redundancy because, if necessary, any portion of the system could be operated from a district office at one of three locations, one or more of three, one or, excuse me. At any one of, more, there's actually, I think we have twenty-two

locations where we could dial up from and operate the system, as long as our core system is unaffected. And, it should be. There's, we have backup energy for us.

Storey: So, what I think I'm hearing is that we have the control center here in this office?

Moody: That's correct.

Storey: And the districts look at that same data?

Moody: They have the ability to dial in and see for their district what we can see. We can see the whole thing, but each district can only see their portion.

Storey: Okay. That must be an interesting I-T Security issue?

Ensuring Security on the Irrigation System

Moody: It is. And that's why it's set up that way so that they can, so that the districts, if control is given to an individual out in the field then here in-house, when that individual dials in with his specific user I-D and password, by where he dials in from, that's the first check; that automatically tells the system which controls he's limited to. And then, further

than that by his I-D and password, then that puts him into a certain category. Such as if anyone in the East District dials in they can only see the system. They can't do any control.

In the South District there's just certain individuals that have the ability to do control at certain locations. But, everybody can see the system. But, in this case, if you're out dialing in you can only see that portion of the system from where you're dialing in. In other words, if you dial in from the East District that's all the system you're going to see. You won't be able to see more than that. The exception to that would be the radio shop, and then they have view capability of the whole system because they're working with us, and they're actually doing the physical work of going out and maintaining the in-field site that's at a specific location. So, they would be looking at that site from their office to see what they need to do as far as maintenance goes, and then they would go out and physically accomplish that on-site. But, as they'd accomplish it onsite, they're either on the phone or radio with us while they're doing the work so that they can tell us how long the site's going to be offline, what they're going to be doing, what changes they're making. And then when they come back, when the systems then ready, then we

actually test it remotely from this office to be sure that it's doing what it's supposed to be.

Storey: So, do each of the districts have a control room, or whatever?

Moody: No. No, the districts have a stand-alone computer at various locations, and that computer is used then to dial up into the system that we have. And then, through a secured process, they're allowed certain privileges once they've dialed up.

Storey: So there aren't even just four sets of privileges? There are multiple layers of privileges?

Moody: There's a number of layers of privileges that . . .

Storey: Interesting.

Moody: Yeah.

Storey: Very interesting.

SCADA System

Moody: And so that's part of the job. That has been the real push for this last several months, is to get a reconfigured SCADA system, because we had

several things that were already in process. First, we were changing the operating system of our SCADA system. So that was accomplished, in part, last year and refined for this year with an updated version of software. We have the radio system that carries these data packages used for the SCADA controls, and all of the, of course, all of the alarms, and all of the data transfer from field sites back into the core system, as well as from the core system for command back out to the field sites. So, but that radio system by rule of the Federal Communications Commission has to be converted to digital narrow-band by January 1, 2005.

We have a field, what we call our remote units, out in the field. And, those R-T-Us [Remote Terminal Units] out in the field are of an age that the manufacturer no longer supports them. (Storey: Uh-hmm.) So we had to then field test, first find units that would take its place, field test them, and then order them. Well, those units won't be here for another couple of weeks. And then the process is that as we install those new R-T-Us out in the field, we will be installing the narrow-band radio. But, our resource of technicians, we just have essentially three, and one of them is changing their job. So, that leaves just two for field work. The

idea was to get around to every site between now and the start of the next irrigation season to install all of the new equipment at each site and test it during the irrigation season and next winter. But, because of staff changes and because of this I-T Security testing, that has delayed us to this point almost, in other words, we're about six months behind in where we originally had planned to be, simply because of the push for I-T Security. And, I-T Security, when we were first involved in this and getting everything in place, we were given into 2005 for accomplishing that, and then all of a sudden we were told we had to have it by this coming June. So, it was moved up, essentially, a full year on us. (Storey: Uh-hmm.)

And that's been, been a very challenging task. (Storey: Hmm.) (Laugh) Especially when we're talking about . . . the tool is important to Reclamation and to the districts, because it is a management tool for ensuring that we convey the water efficiently and effectively through our canal system. It's also a tool for seeing how the canal system's performing. And to alarm us so that a situation doesn't become threatening to the canal system. We don't want any situation out in the field where we'd have high water over the bank. And the other, conversely, we don't want a situation

where we have a sudden low-water situation that could pull lining off the canal bank, or cause bank sloughing in the case of the earth canals. So, it's a matter of maintaining water elevations in the canals through a tolerance that we've set, based on the amount of flow that's required. So it's complex. We have actually six engineers right here in this office that work on that system. And that's, of course, that's just one portion that's roughly, but it's roughly about twenty-five percent of, actually except for Alan Schrom; Alan Schrom it ends up being ninety percent of what he does. But, for the other five it's about twenty-five percent of what they do.

Storey: Uh-hmm. So, what is your total staff?

Moody: Our total staff . . . well, that's irrigation operations. Irrigation Op . . .

END SIDE 1, TAPE 4. APRIL 7, 2004.
BEGIN SIDE 2, TAPE 4. APRIL 7, 2004.

Staff Requirements and Responsibilities

Moody: That for irrigation operations. We have three individuals that are hydrologic technicians, and they do, they do a lot of other work besides the

monitoring of the system during irrigation season. So they're at, during irrigation season, they work swing and graveyard shifts in a manner to cover that for the dispatchers. We have four full-time dispatchers. And, by four full-time, I'm saying that, in other words, those four individuals on a rotational basis cover a week of 24/7 where they're responsible for the canal operation before transferring it to the next one. So, every four weeks it rotates through those dispatchers. So, then during the other three weeks, of course, those individuals are doing work other than dispatching, which may be related or not related to irrigation operations.

The division that I'm managing for is called the Irrigations, Operations, and Technical Services Division. So, that includes all Safety of Dams related work for the six dams that we oversee. We have three dams on this project that are called high-hazard dams. And that's Dry Falls, Pinto, and O'Sullivan. We have three dams off this project, in two other districts, that are high-hazard dams, Salmon Lake and Conconully dams, where the Okanogan Irrigation District; Como Dam for the Bitterroot Irrigation District. Then we have, in addition to the districts on this project, there's three, East, South, and Quincy. And the Okanogan

and Como, I mean Bitterroot Irrigation Districts, then we oversee twelve other irrigation districts and their delivery infrastructures that are associated with them. So, in the case of Whitestone, Okanogan, Greater Wenatchee, Bridgeport, Brewster . . . Bridgeport Bar and Brewster, they all divert water from surface sources and convey it into federal systems that serve either in an open canal system or a combination of open canal and pipe. Or in the case of Greater Wenatchee that's, except for a couple of reservoirs, they're all closed. But see, Brewster would be an all-closed system, including their tank reservoirs.

Then we have, over in the eastern Washington-Northern Idaho area, we have five districts. And, of course, then we have the three that we see, oversee in western Montana, (Storey: Uh-hmm.) Bitterroot being one. So it's . . . we have to then assure, on a rotational basis, that we accomplish review of operation and maintenance of all those facilities. That's done by some of the same people that dispatch. And then we have, related to that, all of our emergency action planning; the exercises that are associated with that. We try and rotate that around so that it's, we're not trying to do every one of them every year. I mean, in any given year we're trying to do a couple every year.

We have a survey crew and survey team, teams actually. It's sort of a department within our division, and that has six individuals in it. They're responsible for surveying for Reclamation, and they also do work for irrigation districts and for other agencies on request. Then they travel from the Tetons on the east to the Pacific Ocean on the west, the Canadian border on the North, and down into Nevada on the south. So, that's quite an extensive area that they're responsible for accomplishing surveys in. And so they're the main regional survey crew for the Pacific Northwest Region, but of course they're, by them being here we do have probably about thirty percent of their work related to right here on the Columbia Basin Project. Or, and even to a greater percentage would be work related to the whole upper Columbia area. (Storey: Uh-hmm.) And then the remainder of the work. So that's about forty percent, and then sixty percent would be for the region and for other entities. (Storey: Uh-hmm.)

Then we have our geologist, that's Dan Hubbs [spelling?], and, he is sort of our area geologist as well as the geologist right here on this project. So, pretty nice to have him here. We have one of our other, well one of our dispatchers

has some geologic background, geology background, who could possibly step in for Dan, or at least step in for a portion of Dan's duties, down the road when Dan retires. So we, that's part of it too is planning for where we're going to be, not just next year, with our staff, but where we're going to be ten years from now with our staff and this program.

Storey: Uh-hmm. And how many people does this involve all together?

Moody: This involves about, I think we have eighteen on staff right now, and we have positions for up to twenty. So, not quite half of the Ephrata Field Office.

Storey: Uh-hmm. You were talking about I-T Security a little earlier. One of the things I'm interested in is how has the attack on the World Trade Center affected Reclamation's projects? What kinds of issues come up?

Security Heightened after 9/11

Moody: Well, the issues come up from both – it's not just I-T Security. I put it in the broader envelope of security in general. So, we're looking at hardening

of physical facilities, as well as hardening of our electronic facilities, including, of course, in any computer system. In the case of our Columbia Basin Project SCADA, and in the case of most SCADA systems, they are stand-alone. In other words they are not tied to the Internet. They're not tied in any manner to where people can come in through an electronic path, other than by, in our case, dial-up. In other cases they may be using, well let's see, in our case it's strictly by dial-up. I was going to say, in the other cases even though they're stand-alone, they may use interconnect, secured connections from an agency to an agency. But, that isn't our case. Our case is strictly that. Your question though is how did that affect us? It affects us in that we are rapidly trying to at least provide certain security measures at each of our dams, as well as for our CBP [Columbia Basin Project] SCADA, accomplish the hardening of the system and the protection of it, so that it would be very difficult for anybody to come in and do an unauthorized action to the canal system. And then. . .

Storey: Either physically or computer-wise?

Moody: Well, computer-wise, of course, with I-T Security. Physically, no, there's still the vulnerability out there

with any given site on the canal system that somebody could go out and do something. The advantage of having a SCADA is that if that occurs we can see it fairly quickly, because there'll be a response to whatever happens out in the field just through the physical parameters of the system. So, by looking at that response, we can know pretty much that a happening took place, and it either breached the canal bank, or it created a plug in the delivery such that we have to evacuate water. In any case, if, in either of those cases, we literally have to evacuate the water. (Woman Laughing)

Storey: We were talking about shuttling water out of the system, (Moody: Right.) and things like that.

Moody: Right. If, in any situation, whether the water has to be, in other words, say we have just an occurrence of a semi truck going into the canal at a point where, that it's, the physical size of the truck or whatever gets into the canal is such that it begins to block the flow, then that raises in elevation. We would know that something occurred then because above that location the elevation will increase. Below that location the elevation will decrease, and we can see that very quickly here. In fact it will, the canal system is set up with the monitoring locations to alarm us to that event. In the case of a

breach you're looking at decreases at both locations, upstream and downstream, of the breach. And so, that pretty much tells you the reach that the breach is in, so you would close gates upstream. And then, and you would close gates downstream so that the water downstream doesn't continue to flow back in either. So we have check gates within the canal infrastructure that we can isolate reaches. So there's some protection to that type of event.

If it was a terrorist activity we could, again say they decided they wanted to take out some gates, or they wanted to take out something within the canal infrastructure, for whatever reason, we have, again, that same monitoring capability. We would have probably a site suddenly go off the air, and it would tell us that communication is lost. So, we could dispatch then someone from nearby to go and see why it was lost. Especially if there was no other power outage known in the area. So we, we're monitoring a lot of different events to make decisions on.

Storey: But that, then, raises the issue of the safety of our employees. How do we deal with that? If we think . . . how do we decide whether or not we think this is just something that's happened or that there should be protection for our employees out there?

Moody: Well if something's happened we're going to probably . . . we're probably not going to look at it as a terrorist-initiated activity. We're probably going to look at it as something done either by accident, or even if it was deliberate, that it was, that whoever did it isn't there to go after an employee. (Storey: Uh-hmm.) They're there because they're either angry, or they're, just something else has taken place. In most cases if we see a failure in the system, we're going to assume that that has probably occurred because the system itself had a weakness, physical weakness. And that, in other words, either by a gopher, or by the failure of a structure, a failure of lining. I mean, seepage, canal systems as large as these, seepage is always an issue. And then that seepage finding just an, say tree roots that were in the canal bank and through the years those decayed and now those are (Storey: Finding a route?) there that routes out and seepage is increased through that portion of the canal to the point where it's now piping, and that piping increases to a failure. Hopefully, just through the eyes that are out on the canal bank, and the farmers that are around, they would see that seepage before it became too great.

We listen to radio calls all the time of where a

ditchrider is calling in to maintenance saying, "I have a . . . I need the hydraulic bucket out here to go out and close a, close a hole." In other words he's probably done what he could to minimize the water getting in there, but then they have to go out and either dig up the bank or dig up the location where that hole is and recompress all of that so that that (Storey: Uh-hmm.) is not an issue anymore. But, we do have rodents. And rodent holes, badger holes, which are enlarged because of the badger going after rodent, all of those are issues in a canal system and we have to put up with it. (Storey: Uh-hmm.) And then be ready to respond to that. And especially when you're filling a canal, that's when your eyes have to be the sharpest.

Storey: Yeah, what about vandalism?

Moody: Vandalism is an issue, and it's, again, it's having the field people out there with their eyes open to look for it. And we do. We look at all of the reserved works, and special reserved works. Those are all looked at every day. And so, vandalism is generally evident, and it can be as simple as somebody taking a cherry bomb or an M-80 and tying it to a doorknob on a control house, to just painting. Where . . .

Storey: Graffiti and stuff?

Moody: The graffiti that we really don't want out there. We have not had, I don't know of any vandalism case yet, that has been disruptive to our operation. It's basically been just some more prank-type (Storey: Uh-hmm.) vandalism than somebody really out to do damage.

Storey: "I wonder if this will take this doorknob off," kind of stuff?

Moody: Well, or "If I do this will it, what else will it do?" (Storey: Yeah.) So. (Storey: Hmm.) And some, in some cases I'm guessing they want access into the site. But, most of our sites are reasonably hardened. That doesn't mean they couldn't put a high-power bullet through something and create a problem for us. That isn't happening yet, and I hope that it doesn't happen. (Storey: Yeah.) There's a lot of watchfulness out there. It's not just the staff of the district that's out there. A lot of farmers are pretty aware of what's going on, and they're out watching too. That's just, you know, it's their supply. They don't want anything to happen to the (Storey: Yeah.) system because that's their water.

Storey: Lots of eyes.

Moody: Their land resource is not valuable without that water.

Storey: Let's see. What haven't we talked about that's a major responsibility? The reserved works I find very interesting, and the special reserved works.

Moody: It's interesting for a lot of others in Reclamation also, because it's, I've been told we shouldn't be calling it reserved works. And I keep telling them, "No, because it falls under that portion of the definition where the Reclamation Office is responsible for the operation and maintenance of the Reclamation constructed facility. The federally-owned facility." The only difference is our funding comes from the water user, not from the taxpayer-at-large through congressional (Storey: Yeah.) appropriation. And that's the part of the definition that our reserved works don't fit.

Storey: Tell me the kinds of issues that come up when you go out and inspect a district. I presume you don't do that every year?

Project Inspections

Moody: No. But we try and do it once every three years. And, that's even on the districts that are doing a very good job of maintenance. In the case of the Columbia Basin Project, the Quincy Irrigation District operates a system that services well over a quarter million acres. So, we definitely want to do that every three years, not because they're not doing a good job but because on any given inspection you won't see all of the system. So, through a nine or ten year period, at least, with the Review of Operation and Maintenance, you're now getting out there and you're going to see all of the system and you'll have it documented it somewhere in one of the reports. So we're just looking at the size of that, because you normally only allow about three days, or maybe four, on any given Review of Operation and Maintenance. On the smaller districts, yes you can get out there and you can see the system in the matter of a couple of days, and see all of it. But, on these larger districts we insist that – the reason for doing a Review of Operation and Maintenance first is to assure that the system is being kept up. Why? Because you want the longevity of that system to be maintained.

In other words, we want to know that the next generation of farmers on this project is going to have the same assurity of water delivery as what

they're getting now with a quality system in place to deliver it. We want to assure that it's being kept up, because we want to keep the systems, the districts viable because they're making capital repayment on the investment, on the federal investment. So that means that the farmers themselves have to be making enough money to at least pay the operation and maintenance of the system, in addition to their own costs on the project, and a profit so that they can continue to farm. (Storey: Uh-hmm.) (Laugh) Pay, and to maintain and support their families. That's just to give you . . . I mean we're talking a system here on the Columbia Basin Project that presently is providing water to over 670,000 acres, and directly delivers to about 630,000 acres. And when I say, and the indirectly part is that the water's there through recharge, and those individuals then that are paying license fees want the water there because they are paying the license fee and the operation and maintenance of the project on about 40,000 acres, because they're pumping it out of the ground, which gives them instant on and off. They don't have to order their water. (Laugh) (Storey: Uh-hmm.) But they do have a limitation on what they can pump each year, (Storey: Uh-hmm.) by their license.

So, it's just the size of the system and getting out to see every piece of it. And so every year there's something going on on this project, in the way of inspection. Somewhere on this project we do a Review of Operation and Maintenance. Very shortly we'll be doing the Review of Operation and Maintenance, and that'll be next month, for the – excuse me, at the end of this month. This is April; the end of this month we'll be doing all of the Quincy Columbia Basin Irrigation District, and specifically with a number of items that they've identified. We'll be looking at that. And that will be three full intensive days looking at that system, looking to see how the maintenance has been accomplished to date, and also, in many cases, you know, the district staff will say, "Well, we can do this much because this is what we're budgeted." Now, we can go out and say, "Okay, this is now a priority for getting done." And they can take that back to their district board and say, "Reclamation says that we need to do this, and you need to authorize us to do it." So, there's a little bit of play that way too, to influence the boards of directors to the importance of maintenance of certain features. Because, we all think that we can get by, "If it isn't broke, don't fix it." Well, that's really not where we want to be. (Storey: Yeah.) We don't want it to break. So, there's preventative maintenance that

is going on all the time, and then there's major maintenance that has to go on, but is often put off until the funding's there to do it. (Storey: Yeah.)

So, on the smaller districts we still get out based on the district, we try and get out every three years, but definitely by the fifth year they've had a Review of Operation and Maintenance. So, every district is visited by our by somebody of our staff for the purposes of Review of Operation and Maintenance; generally every third year. And, of course, we're interfacing with them more often than that because there's always something of issue (Storey: Uh-hmm.) that needs to, that takes our time to go up and (Storey: Yeah.) look at.

Storey: A project like this, 670,000 acres under irrigation (Moody: Uh-hmm.) roughly, that means a lot of processing of products off the land? And, I assume your office has water quality responsibilities?

Moody: Within my group, we do not. We assist, as necessary, with some of the water quality work that's done, but that is actually handled out of Donna Postman's [spelling?] shop, and that's because she's Contracts and Environment. And so the water quality specialist, actually she has two, operate from her shop, but that's because she's

also responsible for environmental, which includes hazardous material (Storey: Oh, okay.) and other things too.

Storey: Well, where I was going is, what kinds of water quality issues come out of that processing, if any?

Moody: Well, well for us, of course, we want to assure the quality of the water that's getting to the farmland. And that quality, in this case, we're just looking at really the mineral content. The districts are also the eyes and the enforcement on that to assure that a farmer doesn't go and place his chemical applications up on a ditchbank that could then jeopardize either that farmer's crop, or somebody downstream. So, and then if the districts are having a problem with that we can actually, with the districts, go out and be some of the enforcement, as necessary, based on . . . that's when water quality . . . that's when we can use that as the hammer if we have to. Districts do a very good job of policing that type of thing. (Storey: Uh-hmm.)

We deal with processing plants. You know, it's very easy for a processing plant to say, "Well gee, My process water should be able to go into the canal, because dilution is the solution." Well, we don't want that. So, that's where Donna's

shop comes in, because if we discover that to be a situation from anything, even a landowner along the canal, then we can go after them ourselves too. It's . . . but water quality, we really are very blessed here on this project because you're talking very good water quality. Having grown up in the Yuma Valley, and farmed in the Yuma and Wellton-Mohawk Valleys, the quality there we're looking at 800 parts per million high-sulfate water coming out of the Colorado River, or even higher parts per million based on the condition. Such as right now, we're dealing with a low Lake Mead, evaporation. So, water quality in the Yuma area, probably, and going into Mexico right now is probably around the 950 part per million. (Storey: Uh-hmm.) Up here if it gets up to 200 part per million we're, we're saying that that's not very good water quality. (Laugh) And I see that I need to give you a new pen. (Laugh)

Storey: Well.

Moody: So, you know, it's just a different perspective on water quality. Up here we're trying to maintain a . . . a really good quality water. Now, if you're talking to fisheries people, they're going to add in to that, "Well, the temperature of the water." But we don't . . . we don't consider [that] if the water

that we're delivering is for agricultural purposes, and agricultural purposes means that that water is to the quality that the plant can utilize it without damage to the plant; the plant can be productive; the soils that the water's applied to can handle the water, and in a manner that the water doesn't leave deposits that years from now, will become a problem. So, here on this project even the outflow from this project is what we would consider a good quality water if you were in the desert Southwest. And, of course here we're in the desert Northwest.

Storey: Yeah. My understanding of the history of this area was that there were very few very small towns before the project? So, I'm assuming there's some M&I [Municipal and Industrial] water involved?

M&I Water Issues

Moody: There's M&I water involved, and Reclamation really holds the purse, the bucket of M&I water. So those contracts for M&I water are really issued from here. And, that again comes under Donna Postman [spelling?]. (Laugh) (Storey: Uh huh.) So, all of that bucket of M&I, the contracts are drawn up and issued from this office. And, that's primarily for processing facilities, where they may have water that they take and then use for

processing. Then, what they'll do, they'll work with us to convey their process water to a location that they can generally land-apply it.

END SIDE 2, TAPE 4. APRIL 7, 2004.
BEGIN SIDE 1, TAPE 5. APRIL 7, 2004.

Storey: This is tape five of an interview by Brit Storey with John Moody in Ephrata, Washington on April 7, 2004.

Well, we were talking about M&I.

Moody: M&I.

Storey: And you were mentioning the, I think the processing plant's at Othello?

Moody: Oh yeah. An example would be – well, let's back up just a little bit. For M&I contracts to the processing, agricultural processing facilities, that are scattered across this project, basically what they've done, they've contracted for water. Then they have process outflow, and that process outflow in nearly every case, I know of only one case where it's not, is applied then back on land that is agricultural land. So, what's happened is, you've taken an agricultural supply that went to the land

and now you've put an M&I tag on it in order for the processing facility to use it, then that outflow from the process goes to the land in place of the direct delivery of agricultural water. An example is in the Othello area the processing facilities there actually take their process water east, eastward, from the town to reservoirs, or holding, large holding ponds, and that process water is stored then, and that way they can use it as an irrigation supply on demand during the irrigation season.

So, where they're processing year round and they're storing water in that processing pond, in that pond through the whole year, what it does the pond is large enough to hold their winter delivery, and then, of course they have . . . they use from that pond then through the irrigation season along with what their process water's making up through the irrigation season to irrigate fields. And so they grow a number of crops. (Storey: Uh-hmm.) Just on that basis, based on the type of water they're applying. And, their process water is generally high nutrient, so it means that in some cases they're also . . . they may be mixing it with agricultural water to that land in order to reduce the amount of nutrition, or I say it's a large nitrate load, that they would use other waters to dilute that as they apply it.

Storey: Uh-hmm. Okay, I was out there the other day and saw those big processing plants, and cryo-something boxcars (Moody: Uh-hmm.) and stuff where they (Moody: That's right.) transport frozen stuff.

Moody: Cryogenic. Just, what they do that's using liquified nitrogen or other gas, generally a liquified nitrogen, and by releasing that slowly through a piping system within the car that cools that whole car. (Storey: Uh-hmm.) Very, very efficient cooling system.

Storey: Hmm. Let's see. What else should we be talking about for your job since '97, right, '96, '97?

Moody: That's right. Since the first of '97 being here. Well, of course what was nice is that I did have, at the time that I was transferred to here or relocated from the Flathead Irrigation Project to the Columbia Basin Project, we, the first three months was an overlap with Francis Jensen [spelling?], so I had some sense with that as to all the things that were under his governance while he was the supervisor. Actually the division was expanded to include the geology and the surveying prior to my coming here, but where Francis had just been over just irrigation at that time. So there was a change, actually, from Francis. It's just that for the

irrigation portion of it, I could be there with Francis and get his sense of why he did things the way he did. He was here through the whole development of the SCADA. I mean, all of that was under the time that he was with the project. (Storey: Uh-hmm.) He was here for over thirty years on this project, from the time he graduated from college to the time he retired in March of '97. So, he had the opportunity to see all of that transition from ditchriders in pickups to fewer ditchriders, and more, and the personnel being more focused on other things, and the SCADA picking up, being the eyes out on the ditchbank.

Storey: Uh-hmm. Hmm. What other major issues have come up since you've been here?

Soap Lake Revitalization

Moody: Well, one of the issues that continued ever since the beginning of this project is the small water body that is just north of town here called Soap Lake. And that was a health spa; a health recreation area. They had resorts actually on that lake in the late 1800s. With the railroad coming through here, that really opened up this area to tourism, and Soap Lake was one of the towns that did viable. And of course we'll get back to your other question, which

we forgot about when we talked about small towns sprung up across this project, but let's talk about Soap Lake.

Soap Lake was a viable town well before this project. I mean, we're talking fifty years prior to this project. Soap Lake had been found and was being used for health spa purposes. It's an alkaline lake. It's what we call meromictic, in that it's layered, and the layers do not turn over. Then, it's highly mineralized water on the alkaline side, but it's unique in that there are life forms in it, primarily bacteria, other microfauna that are in the lake and unique to that water body. In fact, recently, I think they've identified six species that had not previously been cataloged in microfauna. So, that's really sort of a neat thing here. Previously it was sort of a disjointed effort in that community. You'd get one or two individuals that would say, "Hey. We have to protect this lake. Reclamation you're not doing enough to protect it." And then the uproar would die down six months to a year later and nothing would happen.

Now two groups have come together, for that community, and it's been fun to watch and participate in. The first is the Soap Lake

Conservancy.[6] It began with a few individuals being concerned about the quality Soap Lake, the aesthetic quality, and the maintenance of the healing qualities. This was apart from the community. The community, of course, is a town that was on the verge of dying just a few years ago. And, you could almost say that, in looking at it, "Well, it's still on the verge of dying," but I disagree because I've seen the changes that have occurred just since I've moved here. The town was a bedroom community, but dying as far as a downtown area goes, when I arrived seven years ago. There were a few viable things in downtown, but they were really separate from the lake, and not relying on the health quality of the lake. The health benefits I should say. So the people, from a few, developed into what is now known and actually incorporated as the Soap Lake Conservancy.

And that Soap Lake Conservancy is focused on maintaining, and if possible, taking the lake back to a quality that was there prior to the project, but at least maintaining what is there now, protecting the lake as it's known. That group, members of

6. For more information on the Soap Lake Conservancy see Cooperative Conservation America, "Soap Lake Science and Community Collaborative," www.cooperativeconservation.org (accessed May 2013).

that group, are also part of what just started two years ago, is what they call Soap Lake Revitalization. I won't say committee. It's Soap Lake Revitalization Team. And, that is focused on "What can we do to enhance the community, the town, making it more viable for business, while at the same time stepping off of the lake?" In other words, the lake is still the focus for that group. They want to maintain the lake, but they want to look at it, "What are the benefits of that lake for the community at large?" And looking at what they can do to enhance business in the town of Soap Lake. And, in the past two years actually there's been three businesses opened in Soap Lake, as well as an arts center. They just finished constructing a small amphitheater, on the southeast shore of the lake, that overlooks the lake, for small concerts and things. They've completed a theater in that town that rivals any theater in the area for plays. The Soap Lake Maskers has been an ongoing theatrical group for a number of years. And, so all of these things are now coming together through those two groups.

The real trigger for the Soap Lake Revitalization Team was a concept that occurred a little over two years ago, of "What can we do to spark public interest in the community?"

Somebody, well in fact the two, the two Brent Payton and John Glassco sort of had a little think-tank meeting and they said, "Well, let's just say, let's just look at," and I think it was probably Brent Payton that said, "Well, what about a lava lamp?" And they decided, "Well, if we do a lava lamp, let's do," because that means, you know, it's spiritual. It's moving. It's a, with a little bit of energy you have a lot of motion. (Storey: Uh-hmm.) And so, "Well, let's just throw it out as a conceptual idea. We're going to build a lava lamp in Soap Lake." (Storey: Uh-hmm.) And they took that . . . they took this conceptual idea to the council and of course everybody poo-pooed it. But Brent Payton went ahead and built a little website that showed this lava lamp, sitting at the main crossroad in Soap Lake, that's sixty-five feet high and "Gadzooks. here's this big thing."

Well, that simple idea has made it around the world in this past two years, in papers, in all kinds of languages, expressing what it is. I mean, I got tickled because my mom read it down in Yuma, in the *Yuma Daily Sun*. We have seen articles that came out of Russia about it. It's been out of Africa. I mean it's just been phenomenal, the publicity that conceptual idea has brought to Soap Lake. And because of that publicity people are

now taking an interest in, "Well, let's go through Soap Lake." (Laugh) "Let's see what's really there. Let's stop in and dip in that water." Of course, we have a large Russian community that makes use of not just the water but the mud that is there. So, there's that perimeter portion of Soap Lake that's getting used by people for its health benefits.

The town of Soap Lake, also, and this is unique going back to the turn of the century, in that they actually had a pump in those days, and that system's been improved, but they pump the water into a tank where it can flow by gravity back into tubs within each motel room to, for people that want to soak in the privacy of their tub in their motel room rather than out in the Soap Lake itself. Plus, the water can be warmed somewhat so that it's not, in the wintertime, not a frigid (Storey: Experience?) condition. Yes. (Laugh) So those are things that are happening. And that's been fun. Early, well just four years ago we had the situation where precipitation, at the time that I arrived here, had been well above normal. As a result the lake was showing a marked increase in elevation a year and a half later. And the town did come to us to say, "You have the ability to pump it. We're requesting that you reduce the elevation of Soap

Lake under your authorization for flood control." And they did pass that as a resolution, and then using a facility that was already in place as part of the Soap Lake protective works, water was actually diverted from the lake was up high enough that it could be diverted through a small control structure into that pumping facility. And we pumped approximately six acre-feet a day from that surface portion of the lake for a period of about eight total months. But, with that water also went a portion of the mineral that was in that upper part of the lake. So, and that was a measurable amount. I can't remember the number of tons of mineral that were removed with that water, but nevertheless that was an unreplaceable about of mineral from the lake that was taken. And, I think that was probably the trigger to form the Soap Lake Conservancy, at that time.

So that's one of the issues that we get into. And, of course, we report; we visit the city council at their request on a irregular basis, but, nevertheless, once or twice a year they're wanting a report on Soap Lake; the protective works. So, there's five to ten minutes given to that (Storey: Uh-hmm.) once or twice a year. And the community is waking up to, "We have a lake out here. We don't want it to become fresh. We want it to make it the

way it is." National Science Foundation provided a grant to study the lake. Part of that was because of the Mars exploration. They wanted to know how to remotely identify life form, and what to look for. The universities at, in other words, Washington State University, Central Washington University, and Western Washington University are all involved. Prior to that time University of Washington had been involved, some years ago, in monitoring the quality of the lake, but the individual who had the interest on that, of course, retired and then nobody picked up from that from him. So, all of that information that he gathered is now back in an archives right here at Soap Lake for the other three universities to have access to.

So, they've done a fairly good job of protecting what records have been gathered through the years, as well as becoming a gathering point for anything out there that they can find, that had any reference to Soap Lake. So, the Soap Lake Conservancy has been a good group for accomplishing that. And the Soap Lake Revitalization Team is very, a very ongoing group, sparked by the lava lamp idea, with people on one . . . people with saying, "Oh, not, let's not spend money that way. I mean, we can do so much more with that money than just the lava lamp." But

nevertheless with the lava lamp sort of as the beacon, this team is coming together. They actually have an individual from the state of Washington whose job is to work with groups like this and help them stay on track, with redevelopment, with revitalization. And, I apologize, I can't remember his name, other than first name right now. But, George has been, for whatever reason something sparked him. (Storey: Uh-hmm.) And so he has a personal interest in it as well as it being a part of his job. Meetings are kept very on-track. The Garden Club, everybody has a report to give at these meetings. And they have, before the meeting's over, the tasks are re-identified that are ongoing, or any new tasks that are brought up so that assignments are kept track of, and everybody comes back once a month to report on progress. (Storey: Uh-hmm.) So, it's, in a two and a half hour period, once a month, it's just amazing how much has been accomplished.

The Coulee Corridor

There's also been another group that we're a part of, and that's what's called Coulee Corridor. It's actually Coulee Corridor Byways Consortium. That started as an idea because we do have such interesting things through this project. The focus

was, starting with Othello on Highway 17 and going north to Coulee City, that's a corridor that has some unique features, from agriculture to geologic, and then the communities of Othello, Moses Lake, Ephrata, Soap Lake, and Coulee City. Actually the Coulee Corridor was expanded all the way up into Grand Coulee so that Grand Coulee Dam's at the north end of the corridor, or Scooteney Reservoir System, which you were at night before last, is at the south end. (Storey: Uh-hmm.) So you have some, a real unique . . . you can have a quite a unique experience just following the Coulee Corridor and stopping off and visiting all these sites. The corridor, the byways, highway-byways, in Washington, they've actually produced a map now that includes this Coulee Corridor as one of the byways. And it's, it really fits in nicely right in the middle of the state, whereas the others are north, and south, and west of the area. And one over on the very eastern side, near Spokane. But, so, here's the Coulee Corridor.

And it's, and it is . . . what's happening is it's taking members of all these communities and it's getting them together on a fairly regular basis to say, "Okay here's where we've, here's what we've done so far, but where do you want to be going?" And so, there's the opportunity to assign tasks and

get that. So this byways is now in the process of being recognized across the United States. It's also getting this group to work with the Colville community that's immediately north of us, the Confederated Colville Tribes. And they're very interested in having the corridor actually extended through their reservation to Omak. And then what's nice is then, if that happens is, that'll be the intercept with the Highway 97 corridor that goes up along the Okanogan River. (Storey: Uh-hmm.) So these are all coming into play, and I think you got, you were able to see a sign or two alongside the highway that identified Coulee Corridor. A little round circle showing, I think it's a tri-colored sign, (Storey: Uh-hmm.) identifying the Coulee Corridor. (Storey: Yeah.) And those were just recently put up. So, that's Coulee Corridor.

Sandhill Crane Festival

Of course, [there's] the Sandhill Crane Festival. Without this project, a lot of the wildlife that's seen in this area wouldn't be here. In fact, it's amazing when we get people up in the air that they're surprised at how much water surface is out across this project, because of the project. I mean, there were small bodies of water here fully dependent upon either spring flow or rainfall,

mostly rainfall. And, of course, they would wane during drought years and fill during wet (Storey: Uh-hmm.) years. Now it's a very wet area, thanks to the diversion of water from the Columbia River down into this area. So we have over, you know, 300, roughly 300,000 acres of wetlands. It goes over 400,000 when you include all the lakes. So it's a large, it's a large area that's beneficial to fish and wildlife. (Storey: Uh-hmm.) The flyways of birds, and the Sandhill Crane Festival is a spinoff from that, because it started just seven years ago. Actually just six years ago, because we just had the seventh Sandhill Crane Festival.

It started as, "Well, let's have a festival. Something, because we have sandhill cranes in here." They've, about, probably first in, I mean they were probably seen in here earlier, but their numbers started increasing in the early '70s, and by the mid '80s you were seeing thousands of sandhill cranes flying through this area and using this area as a stopover to build, to build body and supply . . . to build energy for their last flights into Canada to their nesting areas. A good rest and stopover. So, we've been able to capitalize on that. And that started with just a small group at Othello, but it involved the Fish and Wildlife Service, who took us by the hand and said, "You know, you're the

reason for this so you have to be involved too." (Laugh) (Storey: Uh huh.) So, we're involved with the Sandhill Crane Festival, and helping with the tours.

Storey: Did that mean they wanted money or they just wanted warm bodies?

Moody: No. This is . . . this is in-kind. No. Basically, for the Soap Lake Conservancy, we can't . . . we don't have funding that we can throw to a group like that. Same way with the Soap Lake Revitalization Team, and the Coulee Corridor. But we can provide some service, in staff time, to the efforts that are ongoing because there's a benefit to the project-at-large from each of these groups. So, some of that time is staff time is volunteer. In fact, probably the larger portion of it is volunteer. And then some of it, of course, is within that.

Call Before You Dig

One of the other things that we're involved with, and that's been for a long time, is the underground utility. You have, you know, "Call before you dig." Well, that's a real serious thing. And, we actually . . . we are a member of that group as an office, because we have an

infrastructure that we want to maintain, and so we don't want people digging into that infrastructure without being forewarned about it so that we can work with them and prepare the proper documents for that. So, "Call before you dig," includes something like a canal. Don't dig in the canal bank just because it's there. (Storey: Yeah.) (Laugh) But then it also includes the gas pipelines, the fuel pipeline systems that are across the area, all of the utilities. We're talking power, especially. But we're a utility. So, all of the utility groups are coming together and monitoring the, and reporting to each other as to what's going on. Yeah, of course fiber optics was a big push over the last number of years, the last seven and eight years. The pushing of fiber optics across all this farm land has been . . . there have been companies just coming across. And, of course we don't want them just to start slicing in a wire underground and then when somebody goes and cuts it, saying, you know, "Because no one knew it was there." We want to know where it is and this group is responsible for making sure that that's documented, and assuring that those companies provide the documentation, (Storey: Uh-hmm.) so that, at the call center – fortunately now we have one major call center that covers the whole state, that information is there. It's in digital format so that

when a person calls in and gives them their location then the dispatcher at the call center can look on that map at that location and say, "Okay, this involves these companies." And the dispatch will notify those companies. And, you're asked to call in three days before you do any digging so that those companies, then, have the opportunity to get out and locate their facilities for you. And, of course, then if you ignore that and you dig into it you have a liability and it's understood that you have a liability for not carefully protecting the systems that are identified. (Storey: Uh-hmm.) So that's, those are all parts of our division, what we do.

Storey: Good. Well, let's go back and talk about your family for a little while.

Moody: Okay.

END SIDE 1, TAPE 5. APRIL 7, 2004.
BEGIN SIDE 2, TAPE 5. APRIL 7, 2004.

Moody Family and Reclamation

Moody: Alright. So, we're going to talk about family. Well, yes, I have, in a sense, I'm a third generation member of Reclamation, as well as my brother

Charles. And Charles works . . . is located at the T-S-C [Technical Services Center], although he works out of the Phoenix Area Office at this time. Of course, I have, in my history, having worked of the Phoenix Area Office, or what became the Phoenix Area Office. But, my grandfather graduated from the University of Maine, went to work for U.S. Steel, and a number of his classmates went to work for Reclamation. Well, after they got out to Montana they wrote him and said, and twisted his arm in such a way, they said, "You've got to come out and really be a part of what we're doing." And that was Clare Joseph Moody. And, it was Clare, not Clarence. But Clare Joseph Moody, or C-J Moody . . .

Storey: Spelled C-L-A-I-R-E? Or C-L-A . . .

Moody: C-L-A-R-E.

Storey: Okay.

Moody: Just a, just Clare. C-L-A-R-E.

Storey: Yeah.

Moody: And Clare Joseph. So, he came west (Laugh) and joined up with a group of graduates form the

University of Maine, and a couple of other universities that apparently Geologic Survey had early on gone to and pushed for getting graduates to consider going to work for the government. And then, by that, by the time my grandfather actually went to work for Reclamation Service, that was after 1904. So, Reclamation Service was fully its own entity, no longer a part of the Geologic Survey.[7] But, you had a lot of individuals that had been in the Geologic Survey that came across. So, you had this cadre of people that were then placed in different portions of the United States, which was, in my grandfather's case he was in the northern states, on the east side of the Rockies initially, primarily Montana. And this, this cadre . . . of course the very first things you had to do as an engineer in those days was survey. So, you had, after a couple of years of survey then you became a . . . you became recognized as an engineer. (Laugh) (Storey: Uh-hmm.) It didn't matter that you had a degree in it, you had to prove yourself in the field. So, that took place.

He had . . . he had fun telling some of his stories, although it was, it was interesting. He actually, in looking at some of the history that we

7. By 1905 the Reclamation Service had separated from the U.S. Geological Survey.

came across later, we realized the extent of the work that he did in Montana, and part of the Dakotas. He was responsible for putting the first road into what we know as Glacier [National] Park, on the east side. And, that was the road that went from Babb up through past where Sherburne Dam is now into the area that where Mini Glacier Resort is. And, that narrow little road is paved today, but still, (Laugh) still narrow. (Storey: Uh-hmm.) And, fortunately I was on it just last summer. But, so that was part, that was part of preparing for the St. Mary's Diversion which was to take water from the upper St. Mary's River and convey it by canal system to the Milk River in order to supply the Milk River with a more sustainable supply for irrigation downstream.

He worked over on the Lower Yellowstone. That was in southeastern Montana. And then, after he met my grandmother, they moved him over onto the west side for a while, where he was involved in the construction of Little Bitterroot Dam, which was part of the Flathead Irrigation Project, and that was west of Kalispell. They liked that area and they actually bought a farm just south of Kalispell, and owned and farmed it for a couple of years while he worked for Reclamation. Somewhere in that time frame the position opened for him to go

over onto the Flathead Project, and then . . . and positions, I think, by that time, by 1908 to 1910 were starting to become more permanent. The cadre of people were moving around less and less. He, actually in 19– by, let's see . . . he was at Little Bitterroot Dam for its construction, but his . . . there was also in that time frame, just before or just after, he was at Browning. And so Browning would take you up to 1912, because my grandfather, my dad was born at that time. But, he built Two Medicine, there in about 1910, Two Medicine Dam. He was responsible for the oversight and construction of that facility, and all of the distribution system that served the irrigated lands at Browning. And that system was essentially, as far as development, was essentially completed in around 1912. So, because there wasn't a hospital at Browning, my grandmother was taken to Great Falls and my dad was actually born in Great Falls. But soon thereafter was, so it was after that time, then they moved over into Kalispell and my grandfather worked in the Hot Springs area constructing a dam at that location, known as Lone Pine Dam. And that dam is still there today as part of the Flathead Irrigation Project. He became the first watermaster at Lone Pine, for the Kamus Division of the Flathead Irrigation Project.

And soon thereafter was moved over to be in the office at St. Ignatius, where he then became superintendent, or the – actually I shouldn't say superintendent, the project engineer for the Flathead (Storey: Uh-hmm.) Irrigation and Power Project. And it became power sometime during the time he was there. There was always supposed to have power with it because they had started the Newell Tunnel at the falls on the Flathead River, to take run of the river water through that tunnel to a generator that would produce power for project needs. That tunnel was completed while my grandfather was the project engineer. But, about 1928 or '29, the, what became Montana Power negotiated with the federal government to take over the site, and actually built a dam on the Flathead River. And so that dam was built and operated by the, by Montana Power, up until recently. So, anyway that, so, but the idea of that was then, the power that would have been generated, Montana Power agreed that, or the, in the contract signed, they agreed that they would provide power to the project in perpetuity for, that would, and it was a designated amount. That power actually was available then and used for the construction of Hungry Horse Dam. So that was, that was where the power was taken during that period.

But that's just one of the benefits of having that power there for the benefit of Flathead Irrigation Project. And he served there from the time when he arrived there on the project, in the teens, to 1933. So it was quite a number of years there that he was on that project and served as project engineer for twelve, I think roughly right around twelve years of that time. (Storey: Uh-hmm.) And then he went down to the San Carlos Project where he was responsible for the construction of the irrigation system, that was diverted at Ashurst-Hayden Dam, and of course, the construction of that facility, on the Gila River. And that serves, that was designed to serve 100,000 acres, 50,000 on the Gila River Indian Reservation and 50,000 just off the Gila River Indian Reservation.

Storey: This was still working for Reclamation?

Moody: Actually, in 1924 the transition occurred form Reclamation Service to Indian Irrigation Service.[8] So, at that point in time he came under the envelope, apart from Reclamation, as well as did many of the Reclamation engineers, and they

8. For more information on the Indian Irrigation Service, see Andrew Denny Rodgers, III, "Indian Irrigation: Its Organization and Achievements," unpublished manuscript, 196_.

became part of Indian Irrigation Service, continuing to do their work of construction, operation, and maintenance. In other words, it was a full-folding. It wasn't . . . they actually were still going out and looking for water supply to go with the land, assuring that the land, that it would be viable, and building the system, designing and constructing those systems to that land. So, Indian Irrigation Service was this split-off out of Reclamation Service, and of course came up, came under the umbrella of Bureau of Indian Affairs when the Bureaus were formed later, the Bureau of Reclamation and Bureau of Indian Affairs.[9] So, he actually worked under the Bureau of Indian Affairs, in that sense, from 19– from, I think it was February of '24 on.

Storey: Okay. And how long was he at San Carlos?

Moody: He was at San Carlos until he retired in 1949. So that was over fifteen years. And then when he retired from there he was about, he was almost seventy-one, and the Gila River Indian Community was a little disappointed because the secretary of interior didn't allow them, they petitioned to keep my grandfather on in that position. But, the

9. Originally titled the Office of Indian Affairs, it became the Bureau of Indian Affairs in 1947.

secretary of interior said, "Give a younger man a chance." So, I think my grandfather received one of the highest rewards that they could offer from Interior at that time. But he then went to work, and of course he did engineering work for others, as well as working for the Gila River Indian Community from that time until he was eighty-five. And then he decided, "Well, I'll fully retire." (Storey: Uh huh.) So, at the tender age of eighty-five he retired, and about four years later he decided, "Well, I won't drive anymore, but I'm still going to go Montana each year." And he did that for several more years, and of course, by that time, I was old enough to help transport him, and as well as my uncles assured that they got to Montana for the summer, (Storey: Uh-hmm.) where they enjoyed. And of course, it was never a problem with transportation once they got there. And then, I think ninety, when he turned ninety-two, that was the last year, probably the last year that they did that traveling. And shortly afterwards my grandmother, standing in the kitchen, twisted and broke her hip. She recovered from that and started walking, but about a year, a year and half later that, she passed away. And then he followed her about a year after that. So.

Storey: At what age?

Moody: They were both over ninety-three. So he . . . she was actually a year older than he was. So, he was close to ninety-four when he passed away. (Storey: Uh-hmm.)

And in the meantime, my dad's farming, in the Yuma Valley. He had done work under – well, what they did, they would do him as a temporary hire to help with the land classification out in the Wellton-Mohawk. So.

Storey: That was Reclamation?

Moody: That was Reclamation. The Yuma Project's Office that would pick him up about every three years for that, because they would go out and the land's originally classified in the Wellton-Mohawk as Class III or Class V and VI, that were being farmed, they would take a look at, and as those lands were brought up to productivity they would do an economic analysis on them, and he would work with whoever they brought in as the classifier from Boulder City and Denver.

Storey: When would that have been?

Moody: Well that was, that actually started, Wellton-Mohawk was put online in '52. The first

reclassification would have been in ‘55. And, so starting about that time, ‘55 or ‘56, whenever they did it, then every three years thereafter there would be several days of getting out and looking at those fields, and looking at whether that class needed to be up or not. (Storey: Uh huh.) And I can’t remember how the contract with the Wellton-Mohawk was, but it seemed like Reclamation footed the bill every other time. I think it was, it had to be done every sixth year and the district could request it every third year. Well, it was to the advantage of the district to do it every third year because that increased the revenues because of the structured payment, structured operation and maintenance costs for the water, and then it was good for the county because the higher valuation of the land in class meant a higher tax base for (Storey: Uh huh.) the county. So.

Storey: So, what was he doing, exactly?

Moody: Well he . . . he would be in under these temporary hires, helping with that land reclassification. And his background was in agronomy, and he having been county agent for Yuma County, and active in the Wellton-Mohawk, he was, actually went back to Congress with the group from Wellton-Mohawk to present the benefits of that as a federal project

so that the Gila Basin Project Act,[10] which was passed in '48, authorizing the work that was done in the Wellton-Mohawk. (Storey: Uh-hmm.) So he was, he actually went back and made presentations to committees.

Storey: So, he was doing land classification? How long did he do that?

Moody: Well he . . . he . . . actually when he went to work for Reclamation full-time in, let's see, '63 I think it was, '62 or '63. He actually started working at Reclamation full-time, as a classifier and lands person. He worked under Bob Coutchee [spelling?] there in the Yuma Project's Office. He retired, I was farming when he retired, so that was in roughly 1978, I think it was. So, I had left Reclamation, he retired from Reclamation, and then a little over two years later I was working for Reclamation again. (Laugh) (Storey: Uh huh.) So. But, he was, he did, he actually had planned to retire a little sooner from Reclamation than he did, but with the Brownell Agreement and the buyback in the Wellton-Mohawk, he actually stayed on to

10. For more information on the Gila Basin Project Act see "Gila Project," in United States Department of the Interior, Bureau of Reclamation, *Federal Reclamation and Related Laws Annotated*, Volume II of Three Volumes 1958, Richard K. Pelz, editor (Washington, D.C.: United States Government Printing Office, 1972), 858-61.

do all the appraisal work for Reclamation on all of that buyback.

Storey: Tell me what the Brownell Agreement is.

Brownell Agreement

Moody: Okay, the Brownell Agreement, this goes back to the closing of the gates at Glen Canyon Dam. When that occurred, that was at a time when the Colorado River did not have any surplus water in it. And, of course the closing of the gates at Glen Canyon Dam meant that only a minimum in-stream flow was maintained through the Grand Canyon for that period, because they were beginning storage behind Glen Canyon. So, you were using out of storage then at the, at Hoover, out of Lake Mead. The demands on the system, now you were set with I think it was six million acre-feet per year as the water that could flow downstream, and that included the water that had to go to Mexico. Well, at that time, we had other methods for getting some of the water into Mexico, and we were bringing on, in '64, we were also bringing on wells in the Wellton-Mohawk to alleviate the high saline, high groundwater saline conditions that were there. So, we were bringing water out of Wellton-Mohawk into the Colorado River. We had other salinity

sources going into the Colorado River. The South Gila Valley drainage system was put in. Soon after that the well field, along the Yuma-Mesa, was put in, and that pumped all water into the Colorado River.

Well, then water releases out of Imperial Dam, downstream in the river, they weren't sluicing extra water downstream anymore with the closing of the gates at Glen Canyon Dam, and this meant that a lot of the water going across the border was highly saline. And the wells in the, such as in the Mexicali Valley, and down in the areas below San Luis, in that portion of the Colorado River valley, were also saline. And, they had crop failure. Seed that was planted didn't germinate because of the saline waters that were being applied. Land became salty. So there were a number of things that took place. The United States was meeting the quantity of water going by the treaty, the International Treaty with Mexico, down the Colorado River, but the argument was with quality. And so, of course, the political process means that you set up committees, you study this, and it took about three years. You came up then with a group, and it was headed by Brownell[11], and he came up

11. Herbert Brownell was President Dwight D. Eisenhower's
(continued...)

with a settlement process whereby the water quality going into Mexico would be equivalent to what was at Imperial Dam. So, that changed how it was viewed from the standpoint of what crossed the boundary into Mexico. So, there was some leeway to that because you had to account for this. So that put in place several things.

The Brownell Agreement set up that, where the Wellton-Mohawk the Soil Conservation Service would work with the farmers to reduce the amount of water applied to the land. So conservation measures which included better ditching, laser leveling, systems that made water . . . water delivery efficient on the farm and effective, both, accomplishing both, and maintaining crop. The desalting plant, the emphasis, the impetus for that was pushed. (Storey: Uh-hmm.) Not only that then they were looking at, "Well, upstream on the Colorado there's other saline things. Let's take a look at all the way up the Colorado and look at

11. (...continued)
Attorney General from 1953-1957. President Richard Nixon selected Brownell to lead the American delegation in negotiations with Mexico over the water quality of the Colorado River. For more information of Brownell see The Free Online Law Dictionary, "Herbert Brownell Legal Definition of Herbert Brownell," www.legal-dictionary.thefreelegaldictionary.com/p/Herbert Brownell (accessed May 2013).

reducing influence from saline sources on the whole, whole of the Colorado River from upstream of Glen Canyon to the Mexican border." And so all of that came into play under the Brownell Agreement. (Storey: Uh-hmm.) And, of course, for us in the Wellton-Mohawk we, by that time I was farming, we were able to take advantage with the Soil Conservation Service Office that was set up, we had already started the process. In fact, I think on the Schneider Ranch the high-head irrigation, the single turnout with high-head irrigation, I don't know that it was initiated there but it was definitely proved there. And, I can remember Bill Wooten [spelling?] went around talking about how you could, through a ditch system, simplifying your ditch system, going to borders with high-head turnouts, you could then enlarge your . . . the size of the border from the small, on sandy ground, from a roughly one-acre size to up to five or six acres, because you could push the water so rapidly across it your time of infiltration. The difference of infiltration and penetration of the water at the head end of the field was only the time difference from the water getting from there to the foot of the field. So, if you wanted to apply two and half inches at the foot of the field, then that might mean that you would have three inches at the head of the field. (Storey: Uh-

hmm.) And on the better soils, of course, it was even a smaller difference.

Storey: So, the Brownell Agreement was in the late '70s?

Moody: The Brownell Agreement came about in the buyout. No, it was about 1974.

Storey: Seventy-four?

Moody: Uh-hmm.

Storey: And that's what resulted in the desalt plant at Yuma?

Moody: Well, it, what it did it defined . . . let's see, it still took authorization for the desalting plant.[12] (Storey: Uh-hmm.) And I'm trying to remember, the desalting plant construction began in the '70s, or at least the preparation of the site began in the '70s. And I can't, I don't remember the exact time frame, and I don't know that authorization for that. (Storey: Hmm.) I know that by that time Bill

12. For more information on construction of the desalting plant see "Colorado River Basin Salinity Control Act," in United States Department of the Interior, Bureau of Reclamation, *Federal Reclamation and Related Laws Annotated*, Volume IV of Four Volumes 1967-1892, Louis D Mauro and Richard K. Pelz, editors (Denver: United States Government Printing Office, 1989), 2857-76.

Brooks was the construction engineer at Boulder City, and that construction, of course, came under him. I know that they had been in construction for a couple of years when they realized the quality of the water out of the Wellton-Mohawk had improved markedly and they were talking about, in the middle of construction, actually terminating construction. And, they did an economic analysis on that and found out that the cost of termination was about equivalent to the cost of completing construction. So, they made an active decision to, and Bill Brooks was somewhat instrumental in that, to complete the construction of that facility at Yuma, even if it meant that it would have to be maintained for a period of time until its need was actually confirmed or made use of.

Storey: Yeah. Let's go back to when you were down, you were in Yuma right?

Moody: Uh-hmm.

Storey: I think I picked up last night that you were on the dive team, maybe?

Lower Colorado Region Dive Team

Moody: (Laugh) Well, I was. I was actually part of the

Lower Colorado River, or Lower Colorado Region Dive Team for a short time. And, I wish I could remember, and I probably, I know I have it in my notes somewhere. I'd have to go back and look. But, the actual person that headed that was at Boulder City, and later moved on. But, for a short time, yes, I was on that. The only . . . we had looked at diving, in other words, I was to be part of a diving task that was to be done in the Laguna, excuse me, in the above Imperial Dam, in the . . . in that area to take a look at stumps and sediment in the river. As it turned out we did not do that dive, and that would have been the one that I would have really had a part of. The other one was just for the Gila Gravity Canal. And the purpose of doing the Gila Gravity Canal was to find out where obstructions were in that canal, because the canal was designed to convey a certain amount of water and it wasn't conveying that water. Well, through that process we found that because of cross drainage that canal, typical of many canals built during that time frame, they were designed so that rather than carrying side drainage over or under them, the side drainage came into them.

Well, at various locations where that side drainage came in, it also deposited tremendous amounts of material. Some of that material was

conveyed downstream into the two tunnels that the Gila Gravity Canal flowed through, and access into those tunnels was limited to just when the canal would be de-watered. Well, we were de-watering; that was in Thanksgiving of '64. The canal was de-watered. I went in and did find where some of those obstructions were, identified them, and then we actually did some initial clean out at that time, and the next time was set up that we did . . . they actually planned for an outage the next year where quite a bit of work was done to remove material. But, we identified enough material, enough of the problem areas that the Yuma Project's Office, with their equipment, actually went out and did some removal in the tunnels. We then studied the flow of the tunnels that summer and actually during the time that . . .

END SIDE 2, TAPE 5. APRIL 7, 2004.
BEGIN SIDE 1, TAPE 6. APRIL 7, 2004.

Storey: Tape six of an interview by Brit Storey with John Moody, on April 7, 2004, in Ephrata, Washington.

Moody: During the outage that was in '64, the decision was made to look at what we had to do to make those . . . to study the flow in those tunnels. And, I'm pretty sure that it was in '64 they made the decision

to put in the track that went in about 100-plus feet on the start of the second tunnel, to look at if there was wave action in the tunnel that was closing . . . causing the closure. Well, with the clean out that was done, actually [flow in] the tunnels did increase. The capacity of the tunnels was increased about 100 c-f-s, and then they increased it again when they did work downstream the following year. They did quite a bit of clean out. The next year was, with the outage, that left them about five good working days to get in. And when we talk about outage, you need to remember that in the Yuma area the canals are not de-watered. It's very . . . the de-watering in '64 was the first de-watering of that canal in a long time. (Storey: Uh-hmm.) It had to be a planned outage, and it was done right at Thanksgiving time, and it was done so the track actually had to wait a year. That year, basically, all we did was get in front-end loaders to clean out the tunnels themselves, and inspect the tunnels. They said, "Well, there's growth in the tunnels. That has to be what's slowing it down." Well, no, what it was it was sediment and clams. And the clams had really cemented that sediment together. So, it, it took a front end loader to break it.

Storey: And you say, "putting track in?"

Moody: Okay. You put a track in the ceiling of the tunnel. The track was hung. And what it was, it was a truss, double truss, so that it carried . . . so that a camera could be run in on the track hung from the tunnel, from the ceiling of the tunnel, to look at the water flow, the character of the surface of the water at different flows as we approach the maximum flow in that tunnel.

Storey: Oh, okay. Good. I also got the idea that you had worked with the Mexican government on some desalt stuff?

Working with the Mexican Government

Moody: Actually, I worked with them, but it was, it was sort of unique. My understanding is that when Stewart Udall was the secretary of interior, he did make a promise to Mexico that Reclamation would study and seriously consider – and I say, "Reclamation," that the United States would study and look at providing a nuclear-powered desalting facility. And, of course, with that desalting facility that meant generating of electricity too, for the benefit of Mexico in that area that was east and south of San Luis, Sonora. So, I was tasked with the opportunity and getting the job done of sampling the sediments and the waters of the Gulf of

California, in that head-end of the Gulf, and sending those samples in. To do that, that meant meeting with the officiales of the state of Sonora; the town of San Luis. And, the mayor of San Luis was a good facilitator. He gathered a lot of these people together. Apparently the funding was with a grant from the United States to Mexico to take care of the people in Mexico that would be helping. They did the paperwork. All I had to do was go and find, meet with, in the case of a person at El Golfo De Santa Clara; find one of the shrimp boat captains that would be willing to do it, and then the person from San Luis made arrangements for payment. I got to take a nice boat ride out into the Gulf and do sampling, also do a lot of photography from the water, of the site, as well as at the site. And of course, that meant several trips. In those days it was unique because this being a joint project nobody thought anything about taking our government rig into Mexico. That was just part of the job. The rig, the rig that was a Yuma Project Office rig was taken into Mexico, and later on that continued because we also had groundwater wells that we monitored that were on the United States side of the border, but the only way to them was through the highway along the border in Mexico. So, that process of taking federal vehicles into Mexico continued (Laugh) (Storey: Uh-hmm.) for a

number of years. But, that was just a little aside, because you don't even think of doing that now. You can't. I don't . . . I would think it would be very difficult to even get permission to take a federal vehicle into Canada, (Laugh) (Storey: Hmm.) in today's environment, under the Department of Interior.

Storey: Yeah. Now, as I understand it this was a desalting plant that was supposed to take water form the Gulf?

Moody: Right. It would take water in the area of, in the upper, in that upper portion of the Gulf, but it was to be located south of where the tidal action kept the turbidity of the Gulf fairly high. So, that was one of the reasons of measuring the turbidity, was to go out and take not only water samples but bottom samples. So I took samples both of the bottom sediment of the Gulf, as well as the water at different depths from the surface. And then those samples, once collected, were taken in and analyzed. And, we could, as we worked south in the Gulf, we actually reached a point where the Gulf waters were fairly clean, very low turbidity as far as sediments go. And that was about the location, in an area called Aguadulce, where springs were coming out of the sediment cliffs there.

And that would have been one of the locations proposed. That was actually probably the major proposed location for that desalting facility, at least in that portion of the Gulf. That was, I'm thinking other sites were also looked at, but at least for that site that was what we considered probably the best location for a nuclear plant where it would have waters for cooling and desalting, because that process would go hand in hand. (Storey: Uh-hmm.) As well as generating electricity for the benefit of the San Luis area, and the Mexicali area.

Storey: So, the water was to go there too?

Moody: That water would have actually been taken to the boundary of the United States and half of the water was to benefit Mexico and half benefit the United States in the Yuma area.

Storey: So, were they expecting the United States to pay for this?

Moody: Yes. As part of, remember this is pre-Brownell. This is when, when the salt was a problem. (Storey: Uh-hmm.) And that was . . .

Storey: So, it was going to replace some of the water?

Moody: Right.

Storey: The treaty water from the United States?

Moody: As a pure water source, or a fairly pure water source. (Storey: Uh huh.) That's right. So that by its introduction into the waters that were being used for irrigation and M&I, and of course in today's world that would have all become M&I water. But, at that time they were looking at it as a benefit for agriculture also.

Storey: That was back in the days when they really liked nuclear power?

Deep Water Sea Port at Yuma

Moody: That was in the days when nuclear power was on the forefront of being the energy source.

Storey: Somebody once told me about a plan to use small nuclear devices to create a channel into Yuma so that it would be a deep-water port. Did you every hear anything about that?

Moody: Well yes. In fact, Senator Giss from Yuma . . .

Storey: Senator?

Moody: Giss. G-I-S-S. (Storey: Uh huh.) Harold Giss touted that for years. And, because he saw the real benefit of Yuma being a sea port. And that would have meant the deepest portion of that, because let's see, what, Yuma itself is about ninety, downtown Yuma's about ninety feet above sea level. And so by channeling the Colorado River up to Yuma, that would have provided a sea port at least to the Yuma Valley. Maybe not up to Yuma, but at least into Arizona at the boundary. Into what we call the Limitrophe Section. And the Limitrophe Section is bordered on the west by Baja, California, and on the east by Arizona. And that's that section between the boundary of California and the boundary of Sonora. (Laugh) (Storey: Uh-hmm.) Where the river truly goes into Mexico. (Storey: Yeah.) And of course Morelos Dam was built in the fifties, so that meant that it would have come up to a point just below Morelos Dam.

Storey: That would have been in Mexico?

Moody: Morelos Dam was built by Mexico, but it sits on the eastern meander of the line that separated Arizona from Baja, California. (Laugh)

Storey: That would be the state of Baja, California and

Mexico?

Moody: Right.

Storey: Yeah, okay.

Moody: Yeah, yeah.

Storey: Interesting.

Moody: Baja, California Norte.

Storey: Interesting. Senator Giss, huh?

Moody: Senator Giss. G-I-S-S. Harold Giss. But, no, and Operation Ploughshare[13] actually had come up with tools that could be utilized for that, because it's called casting, and that is having an explosive placed in a manner that it, when it occurs it takes the material out. Today trenches, you put a certain amount of ammonium nitrate and its partner together and you put small drill holes into an area that you want to trench, and you can open a trench.

13. Operation Plowshare was designed "to explore the technical and economic feasibility of using nuclear explosions for industrial applications. For more information on Project Plowshare see United States Department of Energy, Nevada Operations Office, "Plowshare Program," www.osti.gov/opennet/reports/plowshare.pdf (accessed May 2013).

That technique is used today for trenching in places where you have, such as locally here, basalt. (Storey: Uh huh.) And so by placing it into the broken basalt, which is somewhat difficult to dig with a backhoe, that the casting can be done and then the backhoe's used to clean it. Using a nuclear explosive placed at intervals, the idea was to cast. And actually in Russia they actually did that. They cast for the construction of a dam. They cast off of a two abutments, and filled a valley with an earth-fill dam. We've seen that happen near Salt Lake City just from a landslide. (Storey: Uh-hmm.) That, over on the, west of, between Spanish Fork and . . .

Storey: Price, or Helper maybe?

Moody: Yeah. Right. But it's closer to Spanish Fork. It's on that drainage that's not very far east of Spanish Fork. Then, that whole hill slide came in and the tunnel, the railroad track tunnel in the one side became the outlet for the water behind the dam. (Laugh) And the train had to . . . I mean the railroad company had to build a tunnel at a higher elevation. Interestingly enough Bill Brooks, and I keep bringing his name up because he and I did work together there at Flathead, and of course I'd worked with him previously but not to the extent

that we did together at Flathead, but he was involved in mitigating, you know, taking a look at what they had to do there to mitigate the impoundment behind that dam. (Laugh)

Storey: Well let me ask you my, the last question I know of right now. And that's, you talk, you and your wife, last night, talked about entertaining foreign visitors. Could you talk about that program some for me?

Hosting Foreign Visitors

Moody: Sure. Early on when I started at the Yuma Project's Office, in those days Reclamation was a tremendous resource for construction, design construction, and operation and maintenance. So, visitors, especially in areas where they were expanding, and one of those areas of course was Brazil. Another area was the Mideast. I was just amazed how many visitors we got from the Middle Eastern area of the world, and that included India, Pakistan, Iraq, Iran, Afghanistan. Similar, what are now separate republics, but portions of Russia. Let's see. I'm trying to remember. It seems like we did have people from up from South Africa. I don't remember that we entertained anyone from there directly, but nevertheless we would have engineers, engineers in particular, coming in. I

learned early on, as a result of that, such as Pakistan, I mean, we talked about our large canal, the All-American Canal being the large canal for the desert Southwest, and although it was not constructed until the mid '30s and a little after, but here they were talking about a canal system that was a thousand or more years old and it conveyed 2000 cubic feet per second, from a diversion, before it split up. (Storey: Uh-hmm.)

So, it helped, it helped my own personal education with these visitors because we had a chance to understand what systems they had been using through the years, and then they were coming here to look at our techniques for modernization and application. Sometimes it was modernization of their older existing systems, but more it was for expansion of the agricultural areas to include their, to improve their agronomic base through the development of additional water supply.

So, they're, they were always interested to see how we dealt with things. I can't remember how early we entertained. It seems like it was probably, Sharon and I were married in August of '64, so I'm guessing that we probably did our first entertainment with a – no, I take that back, because before I was married, working there at the

Yuma office, as a bachelor I entertained a couple of different engineers. And so it was, that was just part of getting to know people. And it's been fun because of the variety of people. And I forgot one of the, one of the areas that engineers came from was Taiwan, or Formosa, the Republic of China as its called, it's titled. (Storey: Uh-hmm.) And they came, and they had each had a unique thing they were working on. It's just amazing; they learned about dealing with sediments. I mean, we were concerned about desert sediments, which would include material up to six or eight inches in size, but lots of blow sand conveyed by water, so you aeolian as well as river-born sediments that we dealt with in the canals, and in our facilities. To there, they were talking about sediments that were three meters in size. And that's just hard to imagine. (Laugh) But, when they get their downpours on their steep slopes they move rock. They don't (Laugh) just move . . .

Storey: And we call those boulders. (Laugh)

Moody: That's right. So, that, that's, the exchange was good from the standpoint of just getting to know people on a world-wide basis, and getting to share ourselves with them. I think that as much as anything. We shared, and learned in the process.

Storey: Uh-hmm. Good. Well, anything else you need to, you want to talk about? Do you think we ought to talk about?

Moody: I don't know. It depends on what kind of extracurricular activities (Laugh) you want to get into.

Storey: No. I mean for Reclamation.

Moody: But for Reclamation, that's, Reclamation, it's just, it's been a fun time. It's not just a career. It's in some, it's family. It's hobby, at times. And, of course, at times like right now with the I-T Security crunch it's, it's an extreme challenge. And, it's a different challenge from anything I've dealt with before. Because before, such as if you were in a window for construction, you knew what you had to do and you planned ahead for it. In this case it came in on top of what we'd already planned. And it's sort of like, I'm thinking of doing a construction in a river, and then having that river go to flood stage well before runoff is supposed to occur. (Storey: Uh-hmm.) And yet you still have to get the work done while the flood's still going. (Laugh) (Storey: Yeah.) So, that's been the real difficulty and challenge here, is we still have the work that still had to be kept on track and kept going, and yet

with our staff resources we're thrust into I-T Security and getting all of that accomplished in an extremely short time frame that's mandated, and only brought some funding with it just recently.

Storey: Uh-hmm. Well, let me ask if you're willing for the information on these tapes and the resulting transcripts to be used by researchers?

Moody: Very definitely.

Storey: Good. Thank you.

END SIDE 1, TAPE 6. APRIL 7, 2004.
END OF INTERVIEWS.