

Oral History

Bonnie Leverton (Q):

This is Saturday, July 31, 2004, I'm Bonnie Leverton with Agave Productions, Bill Leverton is the photographer. And we're going to start with just having you say your entire name.

Bob Towles (A):

Robert Joseph Towles.

Q: Spell that last name for me.

A: T-O-W-L-E-S.

Q: Tell me about when and where you were born.

A: I was born in Phoenix and that was in 1925. And we stayed there for, I'm guessing about, until I was about six or seven and then my mother passed away and so a good friend of the family's raised me and she worked for the Bureau of Reclamation on the All American Canal. And so we moved to Yuma for like a year or so and we stayed in the Delamine Hotel there in Yuma. And they had the Bureau office at the Post Office and I can remember going to school and going down to the Bureau office and so forth. And then we moved to Friant, California, they were building Friant Dam and we were there and lived in the government camp. And while I was going to high school, I was a gardener for the Bureau. They could hire, at that period of time, they could hire people just for the summer to do garden work and so forth in the government camp.

Then I worked as a janitor for the Bureau in their dormitories and worked in the service department for the vehicles. Then I went, I finished high school and then I went into the service and was in the service for close to two years. Then I got out and I went to the University of Arizona and during the summer, I worked for the

Bureau in surveys and lab technician and so forth. Then when I graduated, I just continued working for the Bureau from then on and so virtually I've been working for the Bureau all of my life. And that's how I ended up with 49 years or so.

Q: Did you intend to work for them that long?

A: No, it was just handy and I enjoyed the work. It was really exciting. We were on the Friant-Kern canal which came out of the Friant Dam and we went down to Bakersfield, California, and then I transferred up to Weaverville which we were building the Trinity Dam up there. Now this was a period of time after the war where water projects were really getting a good start. And like the Central Valley Project in California is somewhat similar to the Central Arizona Project. We built dams on the various rivers and we tunneled the water from one range to another to get water to Southern California. And so I was on quite a few projects in California; the Trinity Project and the San Luis Project and various canals and pumping plants. So it's just kind of like a prelude to come into the CAP.

But when I was transferred to Texas to build a dam, Palmetto Bend Dam just 20 miles east of Victoria, Texas, we were there nine years. From there, I went up as Assistant Regional Director for the Southwest Region in Amarillo. Was there a year and I was transferred to the Engineering and Research Center in Denver as Deputy Assistant Commissioner for Engineering and Research. And I was there for about three and a half, four years and that is when I got the call if I wanted to go to Arizona to CAP following Ed Hallenbeck because he was transferred to the Boulder City Office as Regional Director. So I asked Gladys what she thought, she thought it was risky but a try. We've always gone where people have asked us to go.

Q: From the time you left Phoenix, when you were six so when you came back, it pretty much stayed the same?

A: I noticed one thing, I thought well I'll go back and see where we used to live when I was young, and that was on East Moreland Street. Well, I think the freeway took out East Moreland Street or at least a portion of it, and so I really couldn't tell much in that area any difference. I went to the Catholic school there by downtown and it was still there, at least the Catholic Church was. I remember going out, my dad would drive us out to Indian School and that seemed like that was way out of town and now Indian School Road is not that far out of town, it's practically in town. Those were the kinds of things that I noticed.

Q: When you went to college, what were you going to major in?

A: Civil Engineering and it was interesting. I went on the GI Bill and so one of the classes of public speaking and so forth, I gave a talk on the Central Arizona Project. At that time, this was in the 50's, so at that time, you know, there was the lawsuit of *California vs. Arizona* and Arizona was worried about losing their entitlement. So it was a good subject to talk on and never did I dream that I would end up being on the Central Arizona Project. So I sort of made a loop.

Q: Do you remember what kind of a position you made in your paper or were you just talking about this as the facts of what happened?

A: No, what it was is something that was coming up. It was kind of a current topic. And so, it was there was a lot of information on it and it was easy to research and so that's why I chose it.

Q: Were you kind of fascinated with the idea at the time?

A: Oh yes, I knew all along that I wanted to work for the Bureau of Reclamation because I grew up in the Bureau of Reclamation and I wanted to be an engineer. And I had worked with a lot of young engineers out of school. The Bureau at that time were hiring quite a few of young engineers from all over the country. So I wanted to be kind of like them. I was in the scouts growing up and the scout

leaders were generally a lot of the young engineers that were working for Bureau. And so, you sort of had a relationship and you kind of wanted to be like them.

Q: When you got out of college, did you go right into the Bureau?

A: Yes, in fact I was working for the Bureau during the summer while I was going to college.

Q: Did you start as an engineer?

A: I did when I got my degree. Up, until then I was what they called sub-professional. And I was primarily on surveys and so forth.

Q: Tell me what the connection is between, because I don't think people understand, there is a definite connection between the Bureau and the Central Arizona Project.

A: Oh yes, I mean I think it was...well after the war in 1944/45, I got out in '45 out of the service. At that time, investigations were going on, on the Central Arizona Project that early. And then of course by the time it was authorized for construction and then construction began in '73, well there was a lot of activity pre-design work and investigations and so forth for the Central Arizona Project. So a lot happened in the early years before construction which is normal for all projects. It takes a lot of engineering work before you can actually put a specification out and get a bid for the work.

Q: Was it a thing where it took 50 years to finally get it approved and let's go ahead and do this? Had enough of the work been done so you just smoothly went into that?

A: I think, I'm trying to remember, but I think in '68 it was authorized for construction or something like that, and I think construction started on Havasu in '73. So from '68

to '73, you know, it's not necessarily about five years but to be able to come up with the specifications and so forth on a large pumping plant like that, a lot of work had to be done early.

Q: What year did you become involved in it?

A: In CAP? I was there in '86. I transferred to Phoenix.

Q: What were you hearing before then about what was going on with the Central Arizona Project?

A: Well, when I was in the Engineering and Research Center, that is where all the design work was done for the major contracts. The Arizona Projects Office and the Regional Office in Boulder City, they designed the smaller work such as some recreation facilities but the major work was designed in the Engineering and Research Center in Denver. And so while I was there, I was involved in a lot of the design meetings with the field people that would come in from APO and tell us the problems and give us all the design data and the designers would listen and do all this. So I was in on those meetings. So really I was fairly familiar with what was going on.

Q: Actually designing it, it just seems the way it's laid out and it zigzags and everything, it just like it had to be an incredibly complicated process.

A: Yeah, it is. You do a lot of survey work, a lot of topography work so you can get, get the points you know. That's what makes it so interesting, that's why for an engineer that's the kind of things you like.

Q: Now was the Bureau in charge of the construction or was CAP in charge?

A: No, the Bureau was in charge of construction. The CAP or the CAWCD they were with us but they didn't, they didn't have a lot of input with respect to the design work and so forth. That was really left to the Bureau.

Q: CAWCD what does that stand for?

A: Central Arizona Water Conservancy (sic) District Company.

Q: When you came back to, talk about some of your other jobs that you did because you had a lot of experiences.

A: Well, primarily after I graduated from college, I went to work on the Trinity River Project that was a large earth dam on the Trinity River. And then we had a 13-mile tunnel that we went through the mountains to bring water over to the central valley that emptied into the Sacramento River and then it flowed down to the Delta. And then we picked it up there with pumps and took it over to the San Luis Dam and I was on it with the pump generating storage similar to Waddell. You'd pump the water up at night when the power was cheap and release it, then generate power when there was a demand for power. And then the water went to irrigation and also for M&I use in southern California. So they are large canal systems and pumps and so forth.

Q: Anything prepare you for the Central Arizona Project?

A: No, I think – yes, that work certainly did fall right in to what is similar to the Central Arizona Project. And you just sort of learn from the people that went before you on how to do these things. Your education gives you the background. It's strictly certainly on the job training and the mistakes you make, you hope that you don't make them again.

Q: When they were designing the CAP or any of the things that you worked on, are they just paying attention to this engineering, engineering this is the perfect way to do it, or is it like politics are involved, or economics involved?

A: Politics, environmental issues are involved, and I think that's one thing over the years the engineers started to learn that they had to pay more attention to the environment. And you can point to a quite a few errors that were made in the past where all we did was, just live a beaver, we'd go in there and dam the river and didn't pay attention to what was really going to happen beyond that. After the Environmental Protection Act went through, it was brought to us that you better start paying attention to some of the other things, other than just building the structure.

Q: Did that affect how the Central Arizona Project was built?

A: Oh definitely, we spent a lot of money on environmental concerns and wet lands and so forth and so on like that, fish.

Q: When the Central Arizona Project was started, I'm pretty sure it was started because they thought, well they really need this water for agricultural, but everything changed, it took so long to build.

A: Yeah, well you know it's interesting and we're in a drought period now throughout the country. And when you stop and think about it, what started Central Arizona Project – Arizona was worried about losing their entitlement to California. California were the big kids on the block. They were taking all the water in the Colorado that they could take and if a state wasn't using their water, then California was grabbing it. And so there was one reason to do something with your entitlement. And then the other one was that Arizona felt that sooner or later, they were going to have to come up with some water because, you know, it was after the war and all the servicemen are back home. And you might say another thing that like caused it all to happen for the desert was air conditioning. And once you could

live in the desert and you had wonderful weather, although it was hot but things would grow. So Arizona was smart enough to realize, you know, someday we're going to have to have some water other than the Salt River and the Verde. The Salt River had managed and did a great job and we have numerous dams on those two rivers but that wasn't going to carry Arizona through all of their water needs. So there was that incentive, one was not to let California have it and the other that they were going to need it. And so with a dedicated congressional team working, the Senators and the Congressman and so forth, well Arizona went ahead and they had to work through some lawsuits but they went ahead with the Central Arizona Project.

As we said, the construction started in '73 and we finished, got water to Tucson, in '93. Well there was 20 years and this thing all started in the 40's. So if some state now were in a drought situation, thinks that they can hurry up and get water – well, they're going to miss the drought. And California, I mean Arizona has such a high priority with Congress, due to the congressional people, of getting funding for this project, you know it was four billion dollars. I remember working on other projects and we had to go without because Central Arizona was getting all the Bureau's money. We had budgets there at APO when I was there like two hundred sixty, two hundred seventy million dollars a year. And so it was sucking up all the money. That is why it had such a high priority to try and get it finished and quit taking all the money from other Bureau work.

Q: Why did it take 20 years?

A: It just does, it just does. You just can't run much faster. For instance, most of the dams that I've been on, they're just single purpose facilities take close to 10 years. By the time you go in and you get all the feasibility, you have to go through Congress and get approval, and then you have to get funding, and then you do funding for each year, and you have to prepare your budgets two years in advance. It just takes a long time. Construction doesn't take that long but it's all the stuff that goes with it.

Q: In retrospect, and I'm getting out of order, but in retrospect when you look back at the CAP was it worth all the time and effort and money that they did?

A: Oh yeah, I know it cost a lot of money and I know some mistakes were made and that happens on every project. But the thing is that when you're out of water, you need water you'll pay any price for water. So I just think Arizona was just so wise and so was California on the Central Valley Project, of building these facilities, because frankly right now, I don't think you can build another Central Arizona Project anywhere. I think there's so many other positions with respect to water development – conserve, let's do away with this, do away with that.

Q: Well, also just the fact the southwest has grown so much, would you be able to build it anywhere?

A: I don't know, I doubt it. There's still a strong movement that we just don't need any more water and if you put water, people would be there and maybe they don't belong in that part of the country. So you can go around that just by controlling growth. It's easy to say, but it's very difficult to do.

Q: But CAP is definitely a big contributor to the fact that there is a lot of people in the southwest or central Arizona?

A: Uh-hum.

Q: So the Bureau was in charge of the CAP when you came to Arizona to join, did you join into the CAP or were you working with the Bureau in connection with CAP?

A: I was working for the Bureau in connection with the CAP.

Q: Tell me about your job there.

A: Well, I was Project Manager there and that was the Arizona Project Office. And so we were in charge of all the construction, the design work and construction and when we would finish it, we would turn it over to CAWCD and they would operate it. And so that was the way it was. As we would finish a reach of canal and get it into position to turn over, they would take it over and operate it. And they're the managers of the facilities. And so, then we just...the Bureau just phased itself out when it finished with all the pumping plants and getting water to the end of the system.

Q: You said you went back to Phoenix in the 80's?

A: Yeah.

Q: And it was like over half built?

A: Oh yes, the water was...when I got there, water was being delivered to Phoenix and I was mostly involved in the work in the Tucson area. By then the water was up to about I-10 outside of Tucson. And then we were still working on part of the aqueduct and pumping plants from virtually I-10 to Pima Mine Road, across the Indian Reservation and so forth. So that's what I was in on and then also, I was in on Roosevelt Dam, Waddell Dam, and the Dam Safety Works on the Verde River.

Q: When you joined the, when you started working on the CAP project since it was like half-way finished or more than half-way, had it gone so smoothly that you just stepped in no problems what so ever or...

A: It wasn't, it was meeting the new people outside the Bureau. I knew enough of the managers in the Bureau by just being associated with them either on other projects or when they would come back to Denver for spec reviews and things like that. But I didn't know like the people in the Department of Water Resources. I knew quite a few people in Salt River because they went back to Denver redoing

Roosevelt modification. And so but, then I...the cities, and then the ag users, I was meeting them.

Q: It gradually changed though to where it wasn't so much agricultural that was going to be using the water.

A: Well, you know originally the idea was for the first twenty years or so, was ag was going to take all the water. And so we came in and we built the distribution systems for the various agricultural districts; Maricopa Stanfield and the Central Arizona and so forth. And then when theirs were built, they took the water – what water there was. At the time when the project was authorized, the agriculture was making a lot of money in growing their crops. And the idea of the project was that you take the water and then when the cities get their facilities built, each city had to build their own pumping plant to take the water out of the canal, treatment facilities and so forth. And that was going to take years and so ag was supposed to take all this water. What happened was during that interim time, the prices of agricultural dropped; farmers couldn't afford the water, the Central Arizona Project operators said, well we have to have so much money to get the water to the farmers and that was about \$60 an acre foot. And the farmers had said my God the prices have gone to the devil with respect to our crops and we can pump the water for \$20 right out of the ground. So the governor could see right away that this isn't working. And frankly it isn't that unusual by the time when you first, someone comes up with the idea of a project. And of course, 99% of the time it's the local officials that do this. And then they came up with the idea and then the government steps in and formulates it. Then it goes, on, and on, and on, well a lot of time has transpired. For instances in this project, CAP from around in the 40's clear up until well our first construction is in the 70's, and water delivered in the 90's. So things have changed and agricultural was changed with it. And so we had a whole new ball game you might say.

And so the governor convened a task force. They looked into all kinds of deals. And so they came up with some relief for the farmers that they would take the

water and things like that. And so that's how we are now. And just to kind of finish that trend, groundwater recharge came in since a lot of the farmers couldn't take the water, the cities weren't ready, so we ended up putting it into the ground which was the idea, a lot of it to start with, to keep from mining the groundwater in Arizona and causing subsidence and so forth and all the damages. So that's kind of the way it all ended up.

Q: We're kind of getting more and more involved with groundwater.

A: Oh yes, uh-hum.

Q: What a project, you're taking water from the ground or from sea level and you're pumping it up.

A: 2900 feet.

Q: Yeah, that's got to be...

A: There are tremendous pumps there at Havasu and they're, I believe, they're around 60,000 horse power and they pump the water eight hundred and some odd feet up to the first the canal. And as I say, they're six pumps there. A lot of lifts that are on the CAP since it was so large, it was a first time for anything that large. You were really on the edge of engineering for a lot of those facilities.

Q: A challenge for you, big time?

A: Yeah and a lot of problems. For instance, we had a lot of vibration problems at Havasu. These pumps were having to pump that water so high; on all of these we did model studies before we do construction to be sure it will work. And then of course, the manufactures have to do model studies on what they supply to be sure they can meet it. And a lot of times things just pop up that you don't expect. At Havasu, we had a lot of vibration problems and they were just shaking the

plant. And so we went into studies on how to correct that and it, I don't know just what the results were. I know we could still pump the water that wasn't a problem, it was trying to hold everything together while we pumping the water.

Q: Did they solve that eventually?

A: I believe that they did. I noticed that they're delivering maximum of, I think their system is designed for 3,000 cubic feet per second, and they got it up to around 3,900 cubic feet per second and they are quite pleased at the way the system is working. But it takes time to shake these things out.

Q: Wasn't there some kind of problem with either the pipes or the...

A: A tremendous problem, tremendous problem, we have six large siphons. These are inverted siphons they call them.

Q: Tell me what does a siphon do?

A: Well, what it is it takes water from one elevation, drops it under a stream or a river, and brings it up to another elevation. You develop high pressures in these pipes. And this had been going on for years and years and years all over the world. And so they came up with a siphon deal, where you could make a big concrete pipe so thick that it could hold any pressure. In other words, you just keep making it thicker and thicker to counteract any pressure from the water. Well, then they developed pre-stress pipe and what that is, is skid wire. You take like a tin can and you wrap wire all around that tin can and you stretch that wire to like, this wire was stressed to about 186,000 pounds per square inch, and the wire was maybe less than a ½ inch in diameter. So you stretch that wire and then that holds the, counteracts the pressure from the water. And so the walls of your pipe may only be six or eight inches thick, its economics is what it is. And I say, it was occurring all over the country. Well, when I was in the Engineering and Research Center in Denver, we started to get reports that pipes were starting to explode throughout

the country. Now these pipes, not near as large as the CAP, but these pipes are used for water systems, delivering water right through residential districts, and all in pre-stress pipe because was most economical. When all of the sudden we were hearing of pipes exploding, they don't leak, they just blow up. And that really started to bother people. So there was a lot of research done on what was the cause of this and they were finding that these pre-stress wires were starting to shear. And they were, the idea was that the concrete was just to protect the wires from corrosion or anything like that. And so evidently it wasn't working because there was, I think I read something, there was around \$25 billion worth of problems throughout the country – in the world. And here we are at CAP with 21-foot diameter pipe the same design and the largest in the world. So when I was there, we decided to investigate them.

Well, it kind of was a skittish job because you were worried that the darn pipe would explode while you were down there tapping on the side of it and checking for skid wires. But we did, we dewatered the siphons and we took samples of the wire, took them back to Denver to the Engineering and Research Center. They'd stretched them and x-rayed them. It was a tremendous project or job. We found cracks in the wires. So we said we got a problem and so then everybody got worried. What are we going to do, are we going to shut the project down, and so you know, no one wanted to make the answer or wanted to come up with the answer. And so we filled the canal up again. And we went through a procedure in case we had, for instance the Agua Fria Siphon, in case we had a rupture how fast we could drop the gates on each side. Luckily, siphons have gates on each side that you can drop the gates, drain the siphons, and go in there and do work on them if you had to. So we knew we could stop the water quickly but there was this volume of water and then we looked at what was downstream and so forth. So to make a long story short, we started to – we knew we had the problem and so we went in and we put a collar around a section of the pipe. And we went in there with the collar to support the pipe. We went in there and chipped out some of these wires and we did find problems. So then we knew we had to go ahead and fix it. And the only fix we knew was to go back to the more expensive way

that we would have done originally if we haven't had this pipe. And that was either a steel liner which would be maybe an inch or so thick, inch and a half or two inches – inch and a half thick, or we would go to reinforced concrete which made big thick walls for pipe. And that's how we ended up where we are and so that caused a lot of problems with the entity that had to pay for the project. Here we are, we built the project and now before we even get it completed, we're going in and ripping out things that we built. And we're talking about a big bill, around a \$150 million. All the Bureau could do was charge their costs, their design and personnel costs and the construction costs to the water user. The general of what happened in a situation like that and everybody that's in the business knows, the District said well we're not going to pay for it and the Bureau says well we're not going to pay for it and so what happened they go to the congressional people. And after they look in to and think it over and if they think it's wise, they'll introduce – legislation will be introduced that that will be absorbed by the federal government because it was nobody's fault. You use whatever the standard was at the time of the design and so we had to go in and replace three siphons; the Salt, the Agua Fria, and the New River probably. The others we could do just slight modifications to them and it was okay.

Q: Did the legislature let you...

A: Yeah.

Q: Okay they did. And which solution did you go for? The reinforced concrete or the...

A: I think it was an option. We gave the contractor an option. I think on the Salt River it went to the steel. And I'm not sure on the others but they had the option.

Q: On the concrete, I don't know if this has anything to do with it, I know that when there was flooding in '83 that the spillways at the Glen Canyon had so much

trouble and they were concrete right, they had some much trouble with the water and stuff like that, there wasn't going to be a problem with safety?

A: No, that was another issue. I was in Denver when that occurred. We had to come in and they had so much water coming in behind Glen Canyon and we were getting vibrations on the outlet ports, on the spillway tunnels. And in fact, you could see red water coming through. What happened was we were having cavitation and the water was coming dropping down the slopes and it was causing a vacuum right where it hit the bend where it would go from vertical to horizontal. And it was pulling concrete out of the structure and so we had to go in there and put in air slots to break up the vacuum. We knew we had troubles on both Glen and Hoover, but we could never get the money to, and take them out of service long enough, to do these air slots. That was something that came up over years after those structures were built and that was the cause of that. It wasn't anything to do with pre-stressing the concrete or anything.

Q: You had a little problem then with the vibrations, would it have been the same that you had at Lake Havasu?

A: No, no, no, those vibrations there were just raising the water so high up. And then the flows weren't that strong.

Q: Did CAP ever have a pipe explode?

A: No.

Q: That would've moved you right along as far as being able to fix it right.

A: We were worried about it. I mean it was...

Q: What would've happened if it would?

A: Well, I don't know because it doesn't just leak or crack and then leak, when it goes, it just blows the whole thing out. And that's what scared everybody. And it scared them mostly in the cities. Metropolitan Water District in California had some of the same problems. They were afraid in the residential where you have maybe a sixty inch or seventy two inch pipe all of the sudden explodes right down the middle of the street. It was a serious situation.

Q: Pretty confident they got it solved.

A: Oh yeah, all you do is make it so dog gone big that it'll hold the pressure.

Q: I remember going when they had those...

A: It goes horizontal right in that area it causes a vacuum and the vacuum just sucked the concrete right out, the pre-steel and all. And then the water gets in there and it just digs a hole and it digs right into the foundation and we were getting red water out of that sandstone.

Q: All the sudden to be on the alert.

A: Oh man, we worked at night and everything. That was a miserable such time.

Q: If they knew if there was a problem there again but don't let you fix it until you see red water coming out of the spillways.

A: Yeah, yeah.

Q: So we are talking about the siphon problem, was that your biggest challenge you think when you were there?

A: I guess that was one of my biggest disappointments that everything didn't go as planned. I think the other disappointment was and I had left CAP and came up to

the Regional Office, but when Tucson ended up getting their water. And that was the goal to get water to Tucson, I'm not too sure Tucson ever really wanted the water to start with. I think they felt they had groundwater and it was good water and leave us alone.

But of course the State of Arizona came out with the Groundwater Act and they were striving to protect the groundwater in Arizona, not just deplete it. And so CAP was to try and help these cities and so forth to get off groundwater. Where lo and behold, everybody was so happy that we got water to Tucson and we had quite a time getting it there because there was a lot of opinions where the treatment plant would be in the City of Tucson. And then also the alignment of the canal or to get it there and Morris Udall, bless his soul, he helped us finally get it through. And there was a lot of meetings with the citizens of Tucson and the surrounding community. Well lo and behold, we get the water there and we had a big celebration and so everybody went on their way. And then about a year later or so, the city finishes their treatment plant and they start to put this water into their system and my God, I guess the pipes corroded and the fixtures in their house turned different colors and wore out, and then swimming pools had a stain around them. And the water ended up being that the system brought in a different type of water which was maybe more hard and more dissolved solids and so forth and then also it counteracted some of the mains. I imagine the mains were under a different pressure and so they started having trouble with some the old system throughout the city. It was something that no one could have anticipated. It was just a shame that it happened. But some of the people in the Tucson Water lost their jobs and so the city came out and said we're just not going to take CAP water and so that was quite a shock to everybody. And so groundwater recharge was the next step so they developed an area in the Avra Valley area and started to recharge it. And so one thing about, the area can take recharge, lots of times the soil is such that it won't take recharge. But these will, and so that is what's happening now. They are taking the CAP water. They are recharging it and they plan, what their plan is that they will mix it with groundwater. Take the CAP water out of the ground, mix it with other wells they have in their system and go that

way. They're going to straighten the mess out but it was a mess that we didn't plan on.

Q: When you say recharge water, what's the process there?

A: Well what it is you can inject a few wells or you can just flood a big area. Put a dike around an area and flood it and let it percolate down through. And they're experimenting now with various methods of doing this, some soils work better one way than others.

Q: So the CAP thing isn't really finished yet, it's now going...

A: No, as Tucson comes on line and they will in time, they'll work it out. That's where a lot of their allocation CAP water is going now into the recharge area.

Q: Let's talk a little bit about the desalination problem and stuff like that. Is that involved with CAP?

A: No, that is on the Colorado River and that came about, are you referring to the Yuma Desalting Plant? That came about through the dealings of the allocations on the river, Colorado River, and then Mexico gets water. And so the desalination plant was built so they could treat the water and have it meet a certain standard before it got into Mexico. Well, the problem is that they've never run the plant. They keep saying that someday we'll need it. But the problem they got is that the membranes that they use to treat this water only have a shelf life of so many years. And so there that plant sits and no one seems to want to spend the money to put it in operation because they can meet Mexico's requirement of the water without the plant. Now as this drought continues and so forth, they could be headed towards that. And they're looking into that more all the time but the trouble is you need a lead time to get the membranes manufactured and so forth. And so it's a problem.

Q: What kind of lead time are you talking about?

A: I really don't know but I'm going to guess at least a year.

Q: Do they meet Mexico requirements because the desalination rumors is not such that it's over the requirements?

A: Yes, that's the way it is right now. And that can be due to a lot of things. As you get down to low flows and you can only release so much water and the water that you do release will probably become a lot of some of the drain water out of the Wellton-Mohawk system and so forth and they'll have to start treating.

Q: Now that comes from, the salinity of the river is part of that natural or is a lot of it from agriculture?

A: A lot of it is natural right along the Colorado River there is a lot of areas that are very, very high salinity.

Q: Wouldn't that become our problem though for the water that's being released and taken and put through the CAP that you'd have to take care of that too?

A: Yes, well most of that water we get at that stage is coming out of the lakes and so forth and it's pretty well diluted, but as you drop that lake, yes – you could be running into trouble. But I don't think it will ever get to the point to bother CAP, but it's certainly going to bother Mexico when you get Wellton-Mohawk to use their water and CAP uses their water, there's not much left except some water that may need treated.

Q: If I understand it right, CAP, they get a certain amount of that water no matter what's going on. How can anything keep taking what's allocated if there is no water coming in?

A: That's true.

Q: At one time, we did a story up here and it might have been with Julia Rhinehart and we talked about the, everybody was allotted so much water and actually the river was over allotted and at that time, they didn't have a lot problem because Colorado couldn't store everything that it needed. But if you look back over a historical average of something and the river is over allotted and this may be an unfair question to you I don't know, in your mind what happens when this over allocation reaches a point where sometime there just isn't enough water and we might be coming in to some of that. Where do we go from there?

A: You know at one time...allocations are all based on historical flows and historical weather patterns and if you hit a period of time where your weather patterns are changing all that and it's lasting for quite a while and all the sudden you start to look at your allocations and I think that is what the Bureau did. They found out that, my God we over allocated this river, this river can't be producing this kind of water flow. And so then you say, well what's going to happen. Well, you can say an easy way is that everybody will take a percent cut, whatever that percent may be. That's certainly what has, right now without even looking at the allocation you think you have, Nevada is facing a real problem. I think they had 300,000 acre-feet of allotted water. Well, look what's happened to Vegas, the way they're growing. And when they worked on the allocations, Vegas was nothing. And so now we've got this, well a lot of people say well water flows where the money is. You know, it's uphill or downhill. Well, it'd be interesting to see because, of course, Vegas has got the money. But I think what's going to catch Vegas and the areas that all of the sudden they'll find out that the banks are not going to loan money if you can't show that you got a dependable water resource. And so if there is a drought and you have an over allocated system and you can get your water from any people that aren't using water or you're going to find yourself in world of hurt.

Q: During construction on the CAP, they couldn't even conceive of these problems. Who would think that Phoenix is going to be over a million people?

A: Yeah, and that was a point, it's an interesting point that the people who went before us, the foresight that they had. That I know they were worried about losing their water to California that was one of the initiatives, but the idea that they'd go ahead and spend of their money, two billion, to get water for us in the future way back in the 40's, you got to give them a hand. They were - they really did the country a great service.

Q: What was your involvement with Colorado River issues per say before the actual CAP?

A: Virtually none.

Q: When we're talking about the CAP, and also we're talking about the drought and everything else, was anything put into mind about are there ways we can do this and figure out a way to store water so it's not evaporated so it's not just gone, was any of that involved?

A: Of course evaporation is always a problem. That's the big thing with respect to how much water you lose through evaporation, especially in the desert. But I don't think anyone has ever come up with an idea of how to correct that issue. The Bureau had experimented years and years ago with respect to spraying a film on the lakes and then they found out that wave action and the wind came broke the film and here we go. I don't know any way that you could do that that we haven't done. I know a lot of the Upper Basin states, Colorado and some of those, they haven't put all of their allocation to use but I'm sure as the west becomes drier and drier that they will.

Q: Did your opinion of how things were with the CAP did they change once you actually were there all the time dealing with all the issues?

A: I guess the thing that surprised me the most was first the difference between the cities and the ag users that kind of caught me, I didn't expect that. I thought we

were all in this game together. I quickly became aware that the cities said if the ag has a problem that's their problem, we got a problem that's our problem. And there wasn't a lot of trying to resolve that until the governor stepped in with his task force and said we got a problem. We've all got a problem. So that surprised me a little bit.

Q: Who was the governor then?

A: I think Symington was.

Q: You were saying before that it was because of Arizona's really strong congressional thing, who were the ones that helped you the most.

A: While I was there? Barry Goldwater had just...I think he was retired by then. I was dealing mostly with Rhodes, Jay Rhodes, and I'm trying to think who else there was. Of course, Kyl was there and Stump, no Stump wasn't in Arizona. I think they were the ones that I dealt with mostly.

Q: Were they helpful or were they...

A: Oh no, they were helpful. They were all helpful. It was kind of embarrassing to have to go back and explain why the siphons weren't up or why the irrigation districts are having so much trouble. See we'd been trying to get the irrigation districts to; we wanted to put them in repayment. Because you've got to remember, the federal government put all this money up and we got people in Washington that want that money paid. And they don't won't to listen to a bunch a stories why. And so one of my jobs was going back and try to explain why this hasn't happened or why this has happened. And so, I'd always go back there and brief the congressional people, their staffs mostly. And they would, they were very, very good to deal with.

Q: Very understanding?

A: They were. It was surprising how understanding they were. But still they wanted to know, they didn't want to be caught blindsided. That was the worst thing you could do to a congressional person is not tell them everything and then let them go out and they'd find out from someone that this isn't so. Being truthful and just laying your cards on the table was the easiest way.

Q: Who were the biggest obstacles that you had to solve, not necessarily the siphon thing, but what were other obstacles you had to solve?

A: Well, I think looking back on it, it was trying to stay on schedule. Everybody was giving the CAP the highest priority. Of course, we were working two years ahead on our budgets all the time and not to let something to interfere with slowing something down that would just have a domino effect on the other features. That was a big problem and that could easily happen by someone trying to negotiate something so you could go ahead and then have someone sit back and just say, you know I don't think so we'll just think about it. While we were running out of time, they were thinking about it. That was a difficult problem.

Q: Did it become a time when maybe like the administration or somebody would change and then somebody would say, well why don't we just start cutting some budgets...

A: They always wanted to cut budgets that was just a constant of all of the budgeting was always that they wanted to cut. You'd have to explain why, why if you did that what would happen and the ramifications of it. And then as we got through along the CAP, they started to realize that let's give them the money and get them out of here because they're just using up all funds. And so that's kind of the way it went.

Q: Was there also a movement here to get to where CAP was its own entity and was running the whole thing or was the Bureau always going to be involved in it?

A: No, once the construction was over with we were to get out. And so that's pretty well the way it went. When the siphons went bad and the CAP said, well we can do a lot of that ourselves. They said Bureau get out of here and let us do it, because we were an expense to them. And I always felt that they felt that we probably weren't getting out fast enough. And so it was mutually agreed we would get out as fast as we can.

Q: Kind of a different thing for you though?

A: Yeah, well I wasn't there.

Q: Who or what helped you the most when you were there?

A: You mean an individual?

Q: Yeah.

A: I had the highest respect for a gentleman by the name of Larry Morton. He was on our staff. He graduated from Arizona State in Phoenix and Tucson and went to work for the Bureau. And he was a resource that he knew everything and a very smart individual. And he knew everything about the project. He was a walking history and when I came in all I had to do was take Larry's advice and stay out of trouble. And that was the easiest part for me; I had great division chiefs and branch chiefs. And they had the problem solved before it would ever get up to my level. I just had to kind of shake my head okay and I was quite fortunate because a lot of jobs you don't have that. You have a learning curve, but CAP I had no learning curve. I just walked in and we were doing business as normal.

Q: So was part of that because it had been going on for so long or was it...

A: Yeah, it had gone on so long and fortunately I had been somewhat involved in the design and to where it was just a very smooth transition. And Ed Hallenbeck

and he delegated a lot of the authority down to the division chiefs and so forth. So they were used to making decisions and they were used to stepping out forward and doing things. And I had the same philosophy and so it was a real good match.

Q: Were you on site a lot or were you pretty much in your office?

A: No, I was on site quite a bit.

Q: Were you kind of amazed at what was going on?

A: Yeah and I enjoyed it. I came up through construction, so I felt real comfortable in construction. There wasn't anything that much surprised me and I think the most exasperating thing would be when you're sitting in a meeting with various entities and the attorneys and everyone would be word smithing an article or a paragraph. And you could spend hours doing that. You know, you could go out on construction and you'd see the dozers moving and this happening and that and things were getting done and then you'd go back into these meetings and time just stopped. That was the most exasperating.

Q: You were saying who helped you the most was there any particular person or group that stopped you the most or tried to halt you?

A: No, I don't think anybody tried to stop it.

Q: Put up so many obstacles.

A: Yeah, there was a lot of that. We dealt with a lot of attorneys that worked for the various Indian tribes, worked for the city, worked for the county, and then we would bring in our attorneys. So now you got the attorneys back and forth and you pretty well need to take the advice of your attorneys. You can't pretty well just shove them off to the side because especially in government. And so a lot of

times you were caught right in the middle of this thing, you'd like to say let's just split the difference and get on with it. Well, you just don't split the difference when you have the attorneys reading these things and so forth trying to protect you. And so that was if you would say was there anyone that was actually kind of slowing things down. They were, but they were doing their job. They keep me out of trouble and out of jail too. Yes that was sort of rough getting through those there times, contract negotiations.

Q: How about dealing with...because you had to deal with the Indian tribes and some of those places as far as to ask permission go through.

A: That was very, very tough. Of course Indian tribes consider that they're a nation within a nation. And you had to treat them that way. They did most of it, most of their decisions by a consensus. And they may have representatives from various parts of their tribe in there maybe fourteen or fifteen people and until everyone would agree on something. And everyone had to have their say, you had to sit there and just work through it. And it was very tough. Because they really didn't want you to come through anyway, I was thinking right now like going through their lands. They'd just assume you go home and leave them alone. Well, there you were trying to make the schedules and get budgets, not knowing for sure whether or not they're even going to get through. And for sure you didn't want to condemn an Indian reservation. And so condemnation was something that you could use elsewhere, but it wasn't there. So you pretty well did what they said and tried to work out the best deal you could make out of it. And a lot of time it was just counter to what you would like to do.

Q: So what do you do, zig instead of zag at that point?

A: One simple thing would be just clearing of the pipeline or the canal, they wanted the cactus all removed and transplanted over here and this and that. I mean they were serious about it. Where we would go in there and clear it and get on with life,

well that wasn't the way. Those kinds of things but it worked out. You had to respect them because it was their land and their beliefs.

Q: (change tape) Okay, we were talking about the Indians and stuff, it would be to their advantage to have CAP kind of going through there money wise and also they provide...

A: They'd be...Indians believe a lot in nature and leaving things like they were. I don't think they were particularly wild about us coming right through their reservation. Now it's different when you have like the Gilas with respect to farming. Now they're in the process now of developing an irrigation system to take CAP water and so forth. Now they certainly do welcome it. Just going across the bare land for something that they're not particularly getting in use out of, they're not that interested.

Q: As you came closer to Phoenix and Tucson where you running into other groups like that that would be you well were not too sure, it's not really going to benefit us.

A: No, no there was a lot of barren land out there which made it so much easier, state land and so forth. But no we really didn't run into that much trouble.

Q: Where there any people out there who were opposed to the CAP actually succeeding or actually...

A: Oh, I think so, but I think that's true on any project you go. You never get a hundred percent backing from everyone. A lot of the projects I was on, the land owners, you know, they wanted to be left alone and now you come in and say we're going to put a dam over here and this farm or this ranch land has been in their possession for generations. You can say, you know, usually if someone doesn't agree with our appraisals, we get three appraisals from various appraisers. Then you try to take the mean of them or something like that and before we'll

over go to condemnation but the thing is they always say you can't replace my exact land. So it's always a problem but on the CAP we had no problems that I know of that way.

Q: What do you think, as far you are concerned, what are the proudest of as far as the CAP?

A: I think getting water to Tucson, my portion of it. It was such a long project that there were a lot of people involved that have retired. But I think in general you might say we were all proud of the job we did. I don't think we certainly didn't do any harm other than maybe some individual or something they lost that they didn't want to lose. But in general for the good of the people of Arizona, I think it was a wonderful project and I just admire the people who are willing to pay for it. Because it is two billion dollars is a lot of money.

Q: It is also kind of a massive piece of technology, too.

A: Yes, it was state of the art at the time. For some of us, it's too far.

Q: Of course now as you look to far in the near future as Arizona continues growing, growing, growing, the CAP is even more vital than it ever was.

A: If people were just willing to stop and think how lucky they are to have it in the desert that kind of water, it's really something.

Q: Is it going to be enough? Are we going to have to do a second CAP?

A: I don't know. I don't think that they'd have the water. I think that's the last water. Other states want the water out of the Colorado. You got the Verde and Salt pretty well taken care of. You can go to; I don't know where you would go for anymore. I think that is just about it.

Q: Just stop growing.

A: Yeah, our future generations they'll have to curtail water more than we are now.

Q: If it wasn't for the Colorado River, what kind of population do you think the west would have?

A: It would certainly be a lot less than it is now even if you did have air conditioning. If you can't have any water to drink, it's not going to help you much.

Q: And why did you leave Phoenix? Where did you go?

A: From Phoenix, I came right up to Boulder City as Regional Director.

Q: And did what?

A: Well, there I was in charge of the Lower Colorado Region and that is the operations of the Colorado River and the various activities that go on along the river and the Yuma Desalting Plant. Then there was the...mostly a lot of the environmental work along the river and so forth.

Q: So you've had a long varied career?

A: Yes.

Q: Kind of interesting, huh?

A: I was with the Bureau of Reclamation at the time of its hay day. I can see when I retired, of course I was 69 years old - I was darn near 70 that's getting embarrassing, at 69 years old it was time for me to retire. The Bureau had left the part that I enjoyed, the construction. We were now getting into environmental

issues and things like that and to me I wasn't that interested in that. And so it was time for younger people to take over and so I was ready to retire.

Q: Do you think there will be any more construction along the Colorado?

A: I don't think so. I think they pretty well...one thing I think they might do is maybe put new pumps in that are more efficient pumping. And improve on what they got. But to seem...I can't hardly see where they would be able to do much new type construction.

Q: Talk a little bit about how the transition was so that it went from the Bureau, you said after construction then it became and what the CAP is doing with it now? How it's changed?

A: It was sort of interesting when I moved to the Arizona Project Office there, we were in the same building with CAWCD. And the Bureau, not that they were all in that one building, but the Bureau had close to 630 or 640 people working throughout the Central Arizona Project. So we were a big organization, a lot of surveys, a lot of investigation work going on the dams, on the Salt the Verde and Agua Fria and so forth. And so a lot of our engineering work was done there at the Arizona Project Office. Well, as our work started to drop off, the District's work started to increase. They had people doing the engineering work for their operation and so forth. And so we had a lot of trailers and so forth we would move into. We would move out of the building, they would move. And of course, there was always trying to synchronize those type of activities because it took a little bit of thinking to do. Because no one wants to move, but yet you have to make room for the other people coming in and so that kind of went on that way. As far as, there wasn't any problem in transferring a reach of canal or anything over to them. They were ready and willing to take it. So there was always a punch list of things that had to be corrected before they would take final acceptance. And of course then you get to the repayment portion. That was a sort of an interesting exercise. I think the way the law reads when the project is complete, the District will start paying their

two billion dollars. Well, there's two things wrong with that, one is they're not sure the bill should be two billion and the other thing is they're not sure if it's completed yet, because they weren't interested in starting a payment. The farmers aren't using the water. And so this whole thing was dreamed up years and years ago and so first of all they took exception to the bill. And for instance the siphons, they didn't want to pay that for the siphons. They paid it once, how many more times. Then they weren't sure Havasu was even going to hold together. And the canal was subsiding in spots that we had to go in a replace the canal due to subsidence and so there was just a lot of little things that they didn't particularly anxious to take over.

So we went through a year or so of negotiations first on the bill and then on what needed to be repaired. So there was a punch list of things so we ended up agreeing on a date. I think it was October '93 or '94, I forget somewhere in there, and that's the way it went. They were very professional. They had a very sharp staff. In fact, a lot of the staff worked for the Bureau previously. So they knew their way around and, you know, they were in a tight spot too. Because they had a Board of Directors, I think fifteen, and they were all ex-Governors or ex-Senators, or ex this or ex that, so they were very influential and very smart people. So you couldn't just go in there and throw something at them and they'd shake their head okay. So the District had to do their homework before they'd go to a board meeting and explain why they were doing this or why they were doing that. I think they did a very good job. But you know during the hay day of the construction, the Bureau of Reclamation pretty well called all the shots. And then as you got near the end and you started to turn over these facilities and started saying now you owe us this much, now all the sudden the junior partner stands up and say, hey wait a minute you know. And so it worked out well though. Tom Clark was involved and Larry Dozier and you couldn't ask for anybody better than those two. They're very capable.

Q: Isn't it kind of amazing that just your staff was almost 700 people or whatever CAP and now basically I mean it's not like they have somebody manned at every single inch at CAP. It's just kind of unmanned with just the cameras.

A: I think they're close, I may be mistaken, but I think there around maybe up to 500 or 600 people. I don't know. But a lot of those plants are designed to be remotely operated from the control room. And that was, you know, that was kind of a trying experience because to just not have anyone there and looking at a control board hoping everything is working. And a lot of it was out in the middle of the desert where by helicopter it would take you awhile to get there. All those, the remote control system was another thing that was kind of unique to CAP.

Q: Is that something the Bureau designed?

A: Yeah, yeah.

Q: Were you like this waiting?

A: Everybody was. The hardware and the software would change every five minutes. And if you work with computers, you buy it today and it's obsolete by the time you open it up. The District hired some very capable people and of course they trained a lot of people.

Q: And they're going to keep on training them right?

A: Oh yeah, it changes every day.

Q: You brought up helicopters, tell me about the CAP air force?

A: Oh yeah, you know it was criticized by other projects in the Bureau. What in the heck are you doing with all those helicopters? Well if you try to fly from Phoenix to Havasu and back...and a lot of times, we had fixed wings too, where we had to fly

the people out to the plants for maintenance and things like that. So we had our own air force. The canal was 330 or 40, 50 miles long. And it was being operated mostly out of the Phoenix area and so you had to be able to get there.

Q: How did that start? Did you just start with one helicopter?

A: When I was there I think we had two and maybe three. And we had one that they called the "Vomit Comet," it was a heavy duty helicopter that could lift a lot of stuff. And when that darn thing would fly, it would fly back and forth and it would wiggle. And boy with that Arizona sun coming through a Plexiglas cabin and then that movement, if you weren't ready to get out of that thing as fast as you can...so helicopter riding wasn't the greatest. But it was a way of getting to the sites.

Q: And did you vomit?

A: No, but I got mighty sick.

Q: How big did it get?

A: I think we just had one fixed wing and I think we had three helicopters; two to haul passengers and one for the heavy duty stuff.

Q: What happen to those?

A: I think we transferred them over to...the helicopters were also being used by the other government agencies. In fact, it ended up as work started to get less and less, the helicopters were being used more and more by other government agencies housed out of Phoenix there. And then I think they were finally transferred out to other government agencies such as BLM or Forest Service or whatever.

Q: I bet they had to come in mighty handy.

A: Oh yeah, can you imagine getting into a car and trying to drive to Havasu or something. You'd have to stay overnight, you had to do this and that.

Q: How would you even inspect the canal or look at the canal if you were in a vehicle?

A: You couldn't. I mean it was very difficult.

Q: So it worked out real good for you?

A: It did.

Q: What do you think the problems are relating to Arizona's water resources, where do you think the most critical is right now?

A: Well, I think protecting their groundwater. I think they certainly don't want to start mining their groundwater and taking out more than what they can get put back into the ground. So I think they're going to...and that was the object of the whole thing is to stop that. I think that's something they'll definitely have to watch. And they are, they're doing a good job.

Q: With the current drought, I mean if this goes on like another ten or fifteen years they're going to run into some problems.

A: Oh yeah, then all bets are off. You'll take whatever you can do. But you know, while we were building the canal, there were a lot of areas around there we had subsidence. You can see cracks go way deep and that worried a lot of us. In fact, we had some trouble on a couple reaches of canal where the soil would just ended up being so light that it couldn't support the canal. And normally in those cases, you'd come in and you'll introduce groundwater to them and flood them

and settle that down and then build your system. And we had to do that in some reaches especially where you drop into the Santa Cruz River around Marana. We had a stretch just before you reach, you go to this hike, and it goes under the Santa Cruz. We had a stretch there of the canal that collapsed and the sides came in. And that happens a lot though; we had that in California just really bad.

Q: Do you know did they have that from Havasu up to Phoenix?

A: Not much, not much that was pretty dense. You might, if you have it anywhere generally it's in the river bottom. Where the river has flowed at one time and deposited lightweight materials and now the river is much narrower. And then you put your canal through those lightweight materials and all of the sudden, the bottom drops out especially if you have any seepage out of your canal that just compounds the problem.

Q: There was right around Picacho, and you may be talking about the same thing, there was a very large subsidence and they almost had to keep building the freeway over there.

A: Yeah, that's in the same area. You know, you could be extra cautious and reinforce your lining but that would be so darn expensive. All of this canal is about 3 ½ or 4 inch lining and it's not reinforced. Well, if you had to reinforce that canal, your bill would jump so high. So you pretty well do all your soil testing out ahead to be sure you don't have a real trend of something happening. And if you have bad spots just go in there and fix them. So the way you fix them is you consolidate that area the best you can, because some of it goes down a couple hundred feet, and so you consolidate maybe the top fifty or sixty feet and then you end up reinforcing your canal lining through those areas. And we've only had a couple of them that we had to do that.

Q: Will a severe drought like we're in now, will that change things?

A: Well, only if they start to take the groundwater out more and that's usually in areas where there is population.

Q: What are some water challenges that you see not necessarily involving CAP, I mean not only concerning CAP, but what are some water challenges you see in the Pacific Southwest?

A: Well you know it's just anybody's guess on this drought. I mean some people think it will end any day now, other people think it will go on forever. And I think that the challenge to everyone is going to be – when are you going to quit building houses and do something about it. Now you can cut down by putting rock in your front yard instead of lawn or you can stop all the lawns. And you can go to drip irrigation rather than doing flooding of any kind but the politicians are going to have to face up to it. And that's tough to do because most of the politicians are supported by big business and big business is not interested in curtailing much activity in the business areas. So it's going to have to get bad. And that's the problem is, it has to get bad before we do anything but to do anything, it takes so long. Again going back to CAP had the highest priority that the Bureau had ever had and strongest congressional delegation and but yet look how long it took. So it's just going to be a problem.

Q: Any advice for those who are running CAP right now?

A: No, I certainly don't. I think they'll have to; they'll be influenced strictly by the political atmosphere. As the drought continues and I'm sure they'll start talking about increasing the price of water to people to try and get them to conserve, that's probably just the easiest. Raise everybody's bill ten percent of so and try to get them to reduce the usage of water and that will affect...but the trouble is that these utilities run into is the fact that they have fixed costs. It costs so much to run a pumping plant. It costs so much for labor and so much for supplies and they have to pay the loan. You tell the people to quit using water so now they quit using

water and we got up your rates because you're not using water and it's sort of a catch 22 but that's the way it happens.

Q: My last thing is if you could look into the future do you see there's going to be a solution to any of this or do you just think okay half of you people here move out of the state or move out of the southwest and we'll get back to real life.

A: I don't know. Unless you want to really say that the worst thing that could happen is all of the sudden we have a global warming and a climate change and all the earlier predictions are out the window now and you say well now the desert is going to dry up. Well I think that will gradually...if that happens that will gradually happen, I doubt that it happens overnight. And I think all of the sudden you'll see Phoenix is starting to lose population. Now where it goes or goes wherever on the planet, there's water. And now if it doesn't happen and then we have a reverse effect and all the sudden we're getting the floods like we had early through the Phoenix area and Roosevelt's full and the Colorado is full. You'll see more people coming because I think the west is where it's all happening as far as we look back east, where all the factories and this and that and the standard of living. I think the west is it. But we certainly do have a problem with water.

Q: Anything that I didn't ask you that you thought I was going to that you think would be interesting?

A: No I'm trying to think if there was anything that I wanted to make...

Q: Well Hallenbeck was talking about a lot of this stuff and he seemed quite upset with Babbitt.

A: Well that was way above me. I wasn't that politically inclined. I thought they all did whatever they had to do at the time. When Babbitt was in there, we had Vice President Gore. Vice President Gore had an agenda with respect to the environment and so that trickled down to the secretary, it trickled down to the

Bureau heads. We all go through that, it happens in every administration. You can't make anybody look bad. If you make them look bad in a meeting or something like that, they'll get you, you know. It's not going to work because they'll get you somewhere down the line.

Q: Well some of them if they have a particular point of view, it could work out well for you.

A: Well sure and there's a lot we haven't thought of yet. But somebody...it's odd how you meet these people after they leave office ex-congress people and all that.

Q: What were you thinking?

A: Yeah, I thought Arizona was quite fortunate in having the people that they did have.

Q: Oh that's something we didn't talk about that Ed Hallenbeck talked about was the Navajo Generating. How some of these things that you guys ended up having to do, not necessarily about CAP but having to do. Actually it's going to work out pretty good for them if they get that desalination back in service. It may really work at well for them.

A: We own about twenty four percent or so of that Navajo Generating Plant. We need it to power up all these pumps.

--- End of Interview ---