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WILLIAM A. SELLS INTERVIEW

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WILLIAM A. SELLS," FEBRUARY 23 AND MARCH 8, 1990

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Los Angeles Department of Water and Power

POWER SYSTEM ORAL HISTORY PROJECT

**Service for a Growing City:
An Interview with William A. Sells**

Interviewed by Thomas Connors
The Bancroft Group

Dates: February 23, 1990 and March 8, 1990

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BIOGRAPHICAL SUMMARY

PERSONAL HISTORY

Born: December 1, 1912

Education: Public schools in Effingham, Kansas; Kansas State College (BS, 1933).

CAREER

- 1934 Surveyor for WPA in central Kansas
- 1936 Electrical welding inspector, Inner City Viaduct, Kansas City
- 1937 Engineer of rural distribution, Iowa-Nebraska Light and Power
- 1940 Officer, Coast Artillery Corps, San Diego Harbor Defense
- 1945 Electrical Engineering Assistant, Overhead Distribution Design, Power Design & Construction Division, LADWP
- 1950 Engineer of Feeder and Primary Design, Power Design & Construction Division, LADWP
- 1953 Engineer of System Design, Distribution System Design, Power Design & Construction Division, LADWP
- 1958 Engineer of Overhead Distribution Design, Overhead Distribution Design, Power Design & Construction Division, LADWP
- 1963 Senior Engineer, Overhead Distribution Design, Overhead Distribution Design, Power Design & Construction Division, LADWP
- 1964 Principal Engineer, Transmission & Distribution Design, Power Design & Construction Division, LADWP
- 1966 Engineer of Design & Construction, Power Design & Construction Division, LADWP
- 1971 Assistant Chief Electrical Engineer, Power System, LADWP
- 1977 Retirement

MEMBERSHIPS

Colonel, U.S. Army Reserve (Ret.)
Senior Member, Institute of Electrical and Electronics
Engineers
American Nuclear Society
Water and Power Post, American Legion
Water and Power Speakers' Club

TAPE NUMBER: 1, Side A

February 23, 1990

TC: I'd like to start with general background and your personal history. I know you were born and bred in Kansas.

WS: Yes, I was born in Huron, Kansas.

TC: And what year was that?

WS: December 1, 1912.

TC: Huron is located where?

WS: It's in the northeast portion in Atchison County.

TC: Atchison?

WS: Yes, it's only about fifteen miles from the Missouri River and probably forty miles from the Nebraska border.

TC: Talking a little bit here about family background, what was your father's occupation?

WS: Well, when I was born, Dad was a schoolteacher. He taught school until 1917 and then a brother-in-law had a chance to get him into the hardware business, so he came back to Effingham, Kansas, which was originally his home, and was a part-owner of a hardware business there.

TC: And so the family moved back there?

WS: Yes, they moved back to Effingham. So I grew up in Effingham.

TC: Were your father's people and your mother's people from Kansas? Were they Kansans?

WS: Yes. My mother's people, her mother was a Hawk and the Hawks are a big family back there. There were three Hawk brothers that moved there from Ohio along about the end of the Civil War, and since then they have expanded. We have a reunion once a year back there.

TC: Oh, no kidding?

WS: About 150 at the reunion every year.

TC: That must be a lot of fun.

WS: It is, yes. A lot of people that I never see, of course, except at that reunion.

TC: Yes. So I suppose there's a lot of far-flung relatives that get together.

WS: Yes.

TC: How about siblings, brothers and sisters?

WS: Well, I've got three brothers, all younger than I am. The next younger is Harold. He lives in Las Vegas. He was a petroleum engineer and worked for Rockefeller Brothers in New York City. Then he decided he didn't like the way they ran their business, so he went out on his own and he came to Wichita, [Kansas] where he had worked before. That didn't work and eventually he went back to New York and did some consulting but that didn't work out very well either. Eventually, he lost his wife and he retired and came to the West Coast. So he lived in Los Angeles a little while, was down here awhile, and then he went to Las Vegas.

The second youngest brother is Howard. He was the smartest one of the four of us. He got a Summerfield Scholarship at KU [Kansas University] and he had it for three years. But he got interested in a girl down there and they got married during the war, of course, at the end of it, so he went out on a sales job and he was running around on sales job work for Goodyear and three or four other companies. But he was an alcoholic and, while he recovered somewhat from that, he has moved back to Kansas City and isn't able to do anything and can hardly walk, in fact. He isn't going to live very long, I don't think.

And the youngest boy is John. He was a mechanical engineer from Kansas University. He went back and worked for Westinghouse for a few years in their turbine plant.

TC: Westinghouse back east?

WS: Yes, he was in Philadelphia, at a plant in south Philadelphia. He met his wife back there and they were married. He decided to leave Westinghouse and he came out to Los Angeles and he settled down there and went to work for . . . oh, I don't know, in a company that made small power plants, anyway.

TC: Oh, it was a company that manufactured power plants?

WS: It manufactured power plants. But they moved the headquarters of that particular section to Phoenix, I think it was; and he didn't like Arizona, so he quit them and he went to work for

Hughes Aircraft Company. He has just retired from them about two years ago. He lives up in Van Nuys.

TC: So, of the four of you, three of you went into engineering.

WS: Yes, three of us were engineers.

TC: Can you locate that somewhere in your education?

WS: Oh, I don't know. We were five years apart, see, and I was the oldest. I was particularly good in mathematics in high school and that naturally led into engineering at Kansas State.

TC: So, when you decided to go to Kansas State to go to college, was engineering in your mind then?

WS: Oh, yes. I went there and enrolled in electrical engineering.

TC: How about in high school? Did you take things like drafting and that sort of thing?

WS: No, they didn't offer drafting in school, but I took physics and three years of math and four years of English and so forth. I was editor of the school newspaper and so forth.

TC: Well, from my notes, you graduated in about 1933.

WS: Nineteen thirty-three, yes, from Kansas State.

TC: And, of course, right before that when you were in high school, the Depression started.

WS: Boy, that Depression, that was a rough time to get through college in those days.

TC: You had to have the extra money to go.

WS: Yes. My mother was very insistent that I stay in college. She worked along with Dad, and I worked in the summer and made enough to stay.

TC: How did the hardware store fare during the Depression?

WS: It didn't fare very well. Dad had rented part of his building to a meat market, and the guy eventually went broke and Dad took over the meat market. So he ran this little grocery store, along with the hardware store, clear through the Depression, up until World War Two. And then he couldn't get any hardware to sell, so he closed down.

TC: Well, during the New Deal period, the Depression and then [Franklin D.] Roosevelt's period, there was a lot of Works Progress Administration [WPA] activity, especially with things like big hydro projects around the country.

WS: Oh, sure.

TC: Were you aware of those?

WS: Oh, yes, yes, I was. Right after I graduated in 1934, I think it was, the WPA had a survey project of some kind out in central Kansas. I got on there for three or four months and it kept me going.

TC: As a surveyor?

WS: Surveyor, yes. I was on a surveying party. Then I got onto the state highway, on the survey, and got into drafting, went out in the field as a surveyor again, and over in construction as an inspector. They found out I was an electrical engineer

and they thought I should be able to inspect electrical welding; so they started that at Inner City Viaduct in Kansas City and so I inspected all the welding on the Inner City Viaduct during the time I was there.

TC: And that would have been in . . . ?

WS: Nineteen thirty-six.

TC: Nineteen thirty-six.

WS: Yes.

TC: Well, your college courses were largely electrical engineering.

WS: They all were.

TC: In those days, did you get a smattering of all engineering?

WS: Well, not too much. I used up all my electives on taking the ROTC [Reserve Officers' Training Corps]. I took ROTC in college, but I graduated when I was twenty and I couldn't get commissioned until I was twenty-one, so I didn't get commissioned until the next spring. Then I was commissioned as second lieutenant in the Coast Artillery in the spring of 1934.

TC: Well, when did you start working for Iowa-Nebraska . . .

WS: Iowa-Nebraska Light and Power? That was in December of 1937, I believe. I always wanted to get back into electrical engineering, and there weren't any jobs when I graduated from college, of course, anywhere. So I worked for the highway department in various jobs, in drafting and then out in the

field as a surveyor, and finally on the construction of the Inner City Viaduct in Kansas City. But then my wife was up in Lincoln. She went to the Lincoln School of Commerce up there, her aunt lived up there, so it looked like a good thing to try to get on with Iowa-Nebraska. So I interviewed with the head of engineering and the head of the meter department and so forth, and got a job as a district tester over in Iowa. But I was only over there three or four months. They needed an engineer to look after their rural distribution, which they had just started then, and they brought me into the office and I was in there until the summer of 1940, when the Army called me into service here in San Diego.

TC: Was Iowa-Nebraska Light and Power a municipal or was it private?

WS: Oh, no. No, it was private owners.

TC: Private.

WS: I've forgotten which group they belonged to, what they called the outfit.

TC: What kind of generating plants did they have there?

WS: They had steam. They had two plants in Lincoln and one up in Norfolk, Nebraska and one over in Missouri Valley, Iowa, and an internal combustion plant at Red Oak, Iowa. But it was all steam. They had some little hydroelectric plants on the Blue River there in southern Nebraska, just little places, but they really didn't do too much.

TC: Yes. You were involved in the rural distribution. Was that part of Rural Electrification [Administration, REA].

WS: No, we were in competition with REA.

TC: In competition?

WS: Yes. We tried to reach in and get all of the best areas that would actually pay out, but REA had all the rest of it.

TC: What were the politics of all that? I don't know that much about it, other than what I've read. REA had a fiftieth anniversary not long ago.

WS: Yes.

TC: And people were interviewed on that and they spoke about how great it was to be able to have lights in their cabins and farmhouses.

WS: Yes, they went in there and put electricity in the farmhouses. They had, of course, government money back-up and so they were able to go out and build these lines and give the farmers electricity where they never would have been able to afford it. As a private company, we couldn't afford it.

TC: You just couldn't afford it?

WS: We couldn't afford to bring it to them.

TC: But yet, you said you were in competition. So you started to reach out to some of them?

WS: We tried to reach out and pick out the areas where there were enough farmers per mile of line so that we could afford to build. So we kept busy there.

TC: Yes. Well, that was Nebraska-Iowa.

WS: Yes.

TC: Politically, was that a pro-New Deal agency?

WS: No. Well, of course, we were Republicans back there, where the REA was Democrat.

TC: Yes. Just one last thought on working out there on the rural electrification. In more recent years, public opposition arose around high-voltage transmission lines going across fields. Minnesota had a big fight about that.

WS: Yes.

TC: Did you ever run into that sort of thing?

WS: Yes, we got some opposition. After I started working for the City of Los Angeles, why, for some of our lines we had difficulty getting right-of-ways through, and we fought considerably on that line from the Navajo Power Plant over in Arizona, to get the line back into our substation just southwest of Boulder Dam.

TC: Yes.

WS: And we were tied into the lines and brought the power into Los Angeles that way.

TC: Oh, I didn't realize that there was opposition. That's the Page, Arizona plant.

WS: Oh, yes. You know, the environmentalists hollered to beat the devil about crossing Paria Canyon and so forth, but we eventually beat them down.

TC: Yes, but that sort of thing didn't happen, in your experience, back in Nebraska and Iowa, did it?

WS: No, no, people were glad to have it.

TC: People wanted it.

WS: Yes. And anyway, it was small stuff. They didn't build any big transmission lines.

TC: Yes, it wasn't high-voltage that way, nothing like Boulder.

WS: No.

TC: So then, by 1940 you were drafted? Is that what happened?

WS: No, see, I was in the reserve.

TC: So you were an officer.

WS: Yes. They ordered me to active duty. I was a first lieutenant and I went to Coast Artillery and they ordered me out here to Fort Rosecrans at Point Loma. So I went there in the summer of 1940 and started off with a battery, as a range officer, as I remember it. But the old man soon found out I was an electrical engineer, so I went into communications. (chuckling) I was in and out of communications all the time I was at Fort Rosecrans, which was five years and a half.

TC: What sort of communications?

WS: We had quite a telephone system out there. We had local stations as far north as Del Mar and we went to the Mexican border, our own telephone lines the whole way, and we built those.

TC: Well, the San Diego area was quite a bustling area.

WS: It was, yes.

TC: So your wife came out?

WS: Oh, yes, she was here the whole time.

TC: And did you have any kids at that time?

WS: I had one daughter [Peggy]. She was born in the summer of 1941 in San Diego.

TC: I was interviewing for another project some time ago a man who had worked for Ryan Aircraft Company and he came out here during the war from the Midwest. He was telling me about the hell of a time that they had finding housing.

WS: Oh, yes, the housing was terrible. We didn't have much trouble when we came in, you see, in August of 1940. We got an apartment over there in Ocean Beach fairly easily. But as soon as the war started, things tightened up to beat the devil.

TC: Yes.

WS: Once somebody at Rosecrans got a house, when he got transferred out, somebody else at Rosecrans took the house over. (chuckling) They didn't let it get away from them. We moved several times, had to move, because the apartment we lived in, when Peggy started coming, they didn't allow children in the apartment and we managed to find a Navy house over in Ocean Beach. The husband was overseas and his daughter, I think, moved in with her mother or something like that, and we rented their house. But after a year or so he

came home, so we had to get out of there. Then Judge Sherry's house, his daughter and wife lived in the house, but his wife decided to move out and the daughter couldn't handle it by herself, so she asked us to move in. We moved in with her and lived there for a couple of years. But we finally had to get out of there and we found a place that wasn't much more than a cabin, actually; but we were only there about a month until we got this house over in Loma Portal.

TC: That would have been midway through the war?

WS: Yes.

TC: As a communications officer, you were able then to keep up with your electrical engineering skills and the literature and what was happening?

WS: Oh, yes, sure. Yes, right. Because I was in and out of that, eventually I was made operations officer of the harbor defense. So the last two years, I was operations officer in the harbor defense down there.

TC: What did those duties include?

WS: Well, we supervised the survey of the harbor defense, all the defense of the harbor from north of Del Mar down to the Mexican border. And we kept adding guns and materiel and so forth, so it got to be quite a good-sized installation.

TC: The whole coast was guarded very well.

WS: Yes.

TC: Was there any real thought that there'd be an invasion?

WS: Oh, yes, they expected some light stuff, submarine stuff off the coast, but they never showed up here. We never had a chance to do any firing. I had the authority to open fire any time I thought it was necessary. The old man said, "If you think it's necessary, you go ahead and shoot." (chuckling)

TC: What was your rank at that time?

WS: Lieutenant colonel.

TC: Lieutenant colonel.

WS: Yes. So when I finally went on terminal leave, let's see, about Thanksgiving of 1945, then in January of 1946 I was promoted to colonel. So that's a nice retirement. I get about \$1,000 a month. It is now, it keeps going up and up.

TC: Well, did you have thoughts of staying in as a career?

WS: No, no. The adjutant came down to see me one day and he said, "Do you want to go home?" I said, "Yes, I want to go home. The war is over and I'm through here. I'm ready to go home." So, in about a month, here come my orders. (chuckling)

TC: Well, you didn't go home, did you?

WS: No, I didn't go home. I went up to L.A. and got a job up there. (chuckling)

TC: Yes. Well, let's talk about that. Was the Department of Water and Power the first job you got out of the Army?

WS: Yes, that was the first and only.

TC: Yes. Did you approach them and just go to them and say, "What have you got?"

WS: Yes. Yes, I came in and told them I was interested in a job. They said, "Boy, we've got a bunch of them."

TC: Oh, good.

WS: Yes. They had Overhead Distribution Design, and the man who was in charge of it interviewed me and liked my background and offered me a job. I said, "Well, let me call you in the morning." In the morning, I called him up and said, "I'll take it." (chuckling) And I started there.

TC: Who was it that interviewed you? Can you recall? Would that have been somebody in personnel?

WS: No, no, that was the head of the Overhead Distribution Design section. That was Art [Arthur L.] Williams. That was in the spring of 1946. He was later on Chief Electrical Engineer.

TC: And so, the next day you hired on?

WS: Yes.

TC: Well, did the Department's reputation precede your approaching it for a job?

WS: Oh, yes, I had heard of the Department.

TC: Yes.

WS: It was the largest municipal in the country.

TC: Well, what did you think of that, working for a municipal versus a private entity?

WS: Well, at first I questioned working for a municipal because I'd been with private before. But after I got to work in it, why, I was glad I went to work for them.

TC: Well, had you thought at all of going to [Southern California] Edison, for instance?

WS: Oh, yes. I had a date over there to interview with them. After I decided to go with the Department, I called up and canceled it, so I never was interviewed by Edison. I found out that the Department worked on civil service exams, and, of course, I told him I was pretty well up in my classes in college and I didn't have any worry about taking the exams.

TC: Did you have to take an exam?

WS: Oh, sure, sure. You had to take an exam for EE, Electrical Engineering Assistant. They didn't get around to giving it until about a year after I started working. They give one for EE Associate and for Electrical Engineer, Senior Electrical Engineer, and Principal Electrical Engineer. And then the one for the Assistant Chief was oral, so that didn't amount to very much.

TC: Well, those tests then, are they technical tests?

WS: They are, they are, up through Engineer. They were very technical. Engineer was the worst one.

TC: Who prepared those tests?

WS: Well, the city, the civil service had their contacts around with principal engineers around the city that helped out. And then they had their own people at various colleges and so forth.

TC: Where was Overhead Distribution? Was that a section? That's all PD&C [Power Design and Construction].

WS: All PD&C, that's right.

TC: What building was that?

WS: When I went to work with them, they were in the building that fronted on the street there, Second Street.

TC: Yes, I think it was Third.

WS: Well, anyway, the main Water and Power building was there at the corner on Broadway and Second, I believe it was. Second and Broadway, I guess it was. We had three different buildings, but they were all connected.

TC: Yes.

WS: And I was in the building that fronted on Second Street.

TC: Okay.

WS: But we weren't there too long. Anyway, they bought a building that was being remodeled for attorneys down at Fourth and Hill [Streets].

TC: Okay.

WS: I was down there the rest of the time then, until I got promoted up to the executive office. Then I went back up to the main building again.

TC: You were an Engineering Assistant? Engineering Associate? What was it? Assistant?

WS: Yes, Engineering Assistant, Engineering Associate.

TC: Okay.

WS: Engineer, Senior Engineer and Principal Engineer.

TC: And in that first period there, when you were an Engineering Assistant, what were your duties? This was Overhead Distribution?

WS: Yes. I was in Design, Design of Overhead Distribution. So I worked on that. The place was expanding tremendously at that time--Los Angeles was.

TC: Yes.

WS: And the demand for overhead distribution was terrific. So we took the orders and designed the facilities to service the subdivisions and service individuals and so forth.

TAPE NUMBER: 1, Side B

February 23, 1990

TC: Los Angeles had grown tremendously during the war.

WS: Oh, yes.

TC: And a tremendous amount of manufacturing and production had been set up there, and continued on after the war, of course.

WS: Yes.

TC: But I'm trying to get a picture of what you'd actually be working on. Just the overhead lines on streets?

WS: Yes, when it started out, it was all residential. As areas came in, there was a lot of vacant land at the west end of the [San Fernando] Valley particularly, and they subdivided everything. And when they would subdivide an area, we'd lay out the distribution for the subdivision.

TC: So that involved a lot of field work.

WS: Not for us. We had field engineers.

TC: Oh, okay.

WS: We laid the thing out on a map and the field engineers worked the stuff in the field for us.

TC: Oh, okay.

WS: But then I advanced up through the section, eventually took over the section, a part of the Overhead Distribution Design that I was in, the residential stuff, and then I expanded and took over the sections that handled the overhead distribution

in the heavier stuff. Then the coordination with the Underground [Distribution]; we had a lot of coordination with the Underground where we decided that this area was going to be underground instead of overhead.

TC: How did that work? When you hired in and got involved in the Overhead Distribution part, was there any undergrounding going on at that time?

WS: Oh, yes. It was considerable.

TC: Oh, was it?

WS: Yes. Underground was a big subsection at that time. Yes, that's where Jim [James L.] Mulloy started, was in Underground.

TC: That's right, yes. In the fifties, say, by the time you had been there ten years or so, I know there was a movement to do even more underground, simply because of the aesthetics.

WS: Yes.

TC: Because of the way the overhead lines looked.

WS: That's right. In Overhead, we went along with the Underground. Wherever they felt that they had money or there was enough business to pay for underground, they went along. We never fought the Underground particularly on that. We just built the areas that wouldn't afford underground.

TC: Well, if you look around Los Angeles now, there's a remarkable scarcity of overhead lines.

WS: Yes. For instance, down at Wilshire Boulevard, there was overhead there and, eventually, it looked like it was going to go, so we went along with underground. Well, they put in two 34.5 kv cables, right out on Wilshire Boulevard to pick up the load.

TC: Would that have gone right down the middle of the boulevard or to the side?

WS: No, they went down the side of the street.

TC: How long would it have taken, from start to finish, of Wilshire Boulevard to . . .

WS: Oh, it probably took five years, six years, to where we finally got it, where they picked up most of their load.

TC: And how about going through Beverly Hills? You didn't do that?

WS: That was Edison.

TC: Edison did that?

WS: Edison, yes. We didn't have anything to do with it.

TC: But you'd have to pick it up on the Westwood side.

WS: Yes. Yes, we had to generally furnish the 34.5 kv distribution into the substations, so we got into that and the design of 34.5 kv. By that time, I was, I don't know, maybe Engineer of Transmission Distribution Design or something like that.

TC: In that period, though, say between the late forties and into the fifties, the big power projects at that time were the Owens Gorge Project, and the steam plants, the Harbor . . .

WS: Harbor, yes.

TC: Yes, Harbor had been built during the war.

WS: Was being built.

TC: Yes, and Valley [Steam Plant] was started.

WS: Yes.

TC: And the Third [Transmission] Line from Boulder was coming over. Did that have an affect on what you had to do, as far as your job went?

WS: No, no, that was all in the other sections and it didn't have any affect on Distribution.

TC: Distribution really had to do with servicing the growing city.

WS: Yes. We were the last part of the line. We serviced the customer.

TC: Yes, okay. Did you ever have anything to do with, say, the General Sales or Business Agent's Divisions? Did you have to coordinate things?

WS: Well, the Business Agent's Division got the orders. They contacted the customer and got the orders and gave them to us and we built them.

TC: From 1950 to 1952, you were Engineer of Feeder and Primary Design.

WS: Yes.

TC: Now, what was that particular work?

WS: Well, the primary was the 4800 [4.8 kv].

TC: Okay.

WS: And the feeder design, you brought feeders out of a substation to a central point and then the primary distribution took over from there. We had to lay out the design for the feeders. And if the feeder got overloaded, you had to lay another one.

TC: Yes, okay.

WS: So then we got into that. We got away from the customer and into servicing new lines to the customer. We didn't deal directly with the customer anymore.

TC: Okay. But in this time, of course, as we said before, Los Angeles is still growing by leaps and bounds. Coming from towns in the Midwest, how did you like the activity and the bustle around you?

WS: Oh, yes, I liked it. I enjoyed it all the way through my Department experience.

TC: I guess Los Angeles today is not quite what it was in the late forties.

WS: No, I don't think so.

TC: A little bit more manageable in those days, perhaps.

WS: I don't know. I've been away from there twelve years. As soon as I retired, I came back to San Diego. (chuckling)

TC: Yes. Okay, I'd like to go through some of these steps in the ladder of your career.

WS: Okay.

TC: I have 1953 to 1955, Engineer of Distribution System Design.

WS: Yes. I had the Transmission and Distribution. We had Transmission, Overhead and Underground Distribution; the three sections were under one group.

TC: Oh, I see.

WS: I had that job. I only had that for . . . oh, not too long.

TC: Yes.

WS: The engineer in charge of the Power Design and Construction Division moved up to the front office as Assistant Chief Electrical Engineer and that left that job open.

TC: Who was that?

WS: Ed [Edgar L.] Kanouse. He moved up there and he wanted to make his assistant head of the division. I can't think of his name now. He was a civil engineer and the civil service wouldn't go for it. You had to be an electrical engineer to be the Engineer of Design and Construction. So after looking around for six months and not being able to get the thing through, they finally appointed me.

TC: Oh, and what year is this now? Was this 1958 or so?

WS: Well, I expect so. The Engineer of Design and Construction was a heck of a job in those days because we were starting a lot of new projects. We had the project up on the aqueduct, where we built the aqueduct plant.

TC: Is that the Castaic Power Project?

WS: Castaic, yes.

TC: That was Castaic, okay.

WS: Yes, we built Castaic and we built Navajo. We were a partner in the Navajo Project over there and the transmission lines from Navajo to Boulder.

TC: How about the Intertie, the Pacific Intertie? Were you in on that?

WS: Yes, yes, I was in on that.

TC: In what capacity?

WS: Well, I was the Engineer of Design and Construction.

TC: This was towards 1964 or 1965, mid-sixties.

WS: Yes. That was the Engineer of Design and Construction and so I had a lot of appointments to make on who handled it, who actually did the work, how the work went along and so forth. And the deals with the Bonneville Power Administration, I spent a lot of time working on those.

TC: Did you have to go up there to Portland for that?

WS: Oh, yes, I was up there a number of times talking with them.

TC: Well, what sorts of things would you take up with them? Just divvying up the work, say? Is that what you did?

WS: Yes. We built the south terminal at Sylmar. They built the north terminal at Cellilo and things had to coordinate back and forth. And we had to build a communication line between the two of them, which is quite a job, incidentally.

TC: Yes, well, what did that entail, the communication line?

WS: Well, it was microwave, I guess you'd say. We had to build several stations between Los Angeles and the Oregon border, and then the Bonneville built from the Oregon border north to the Columbia River; and the microwave had to intermesh so that they would talk to each other.

TC: Those were like radio-telephone sort of things?

WS: No. Well, we had telephone circuits, too, but then it was radio. There was high frequency on the thing. You tied the two stations together and the controls on the Intertie. I forget what you call them, anyway it was the control of the Intertie.

TC: Just stepping back a bit, when did you first hear of this idea of building such an Intertie? Do you remember what the circumstances were, who brought it to your attention that the Department was planning this, or who was it that said, "This is your job."

WS: Well, I think it probably was Ted [T. M.] Blakeslee.

TC: Yes.

WS: They had a committee of the six or seven West Coast utilities and Ted was originally the Department representative on it. When I got upstairs as Assistant Chief Electrical Engineer, I became the Department's representative on the committee. We talked about all this business of tying together and building lines and so forth.

TC: Well, at the time, it was kind of a gamble to tie together at such a distance, wasn't it?

WS: Yes, it was. Yes, it was. In fact, it still is somewhat of a gamble.

TC: Yes, yes.

WS: The east side of the so-called "big doughnut" is still weak, I understand.

TC: Now, what is that doughnut? This is for the western states' connections?

WS: The western states. The west side of the doughnut has Edison's two 500 kv lines. They may have more now, but there's two 500 kv lines that went from out there north of Los Angeles up to John Day Dam on the Columbia. The DC Intertie ran from Sylmar to the Columbia River. And then the Bureau of Reclamation had lines that ran from there; and also they had private utility lines that ran there over through Idaho and Montana and over into Colorado.

TC: The eastern side would be what? Through Wyoming and Colorado.

WS: Through Wyoming and Colorado and on, and then tied into the New Mexico Public Service, and that then tied into Arizona Public Service and then back into L. A. So you had your big loop there. But they had these heavy lines from the west side, these two 500 kv lines and the Intertie that could handle a tremendous amount of power. But the eastern lines, if one of those big loops or big lines on the west side went

out, then the power would shift to the east side. We tried to run some of it through the east; and the east didn't have anything but 230 kv and it wouldn't take it.

TC: It wouldn't take it.

WS: It wouldn't take it.

TC: It knocked it out.

WS: So I don't know how much they've improved it. The last I read, it was still weak.

TC: I had a thought on that. Now, the part of the Intertie which is the west side of that, that's AC.

WS: No, that's DC.

TC: Well, our side . . .

WS: Our side is DC and Edison's is AC.

TC: Edison's is AC.

WS: That's right.

TC: What's the thought there on DC? It was new technology at that time, I know.

WS: Yes, well, we never were afraid to try new technology in the Department of Water and Power. And Una Lamb who was the Engineer for DC for ASEA in Sweden was very much promoting it, so, by God, we went along with him and we got this DC line designed. They designed the terminal.

TC: Well, did you think it could be done when you first looked at it?

WS: Yes, yes. We thought it could be done.

TC: And were there people in the Department that thought that we ought to steer clear of that?

WS: Oh, I don't know. They weren't very loud, anyway.

TC: Now, how was the connection made with ASEA? Were they the only ones really that had DC technology.

WS: They were the only ones that had DC terminal equipment. They had run the first DC line in the world, from Sweden down to the island of Gotland.

TC: Yes.

WS: And so they had that experience. But that was the only one until we built the Intertie.

TC: That's amazing, when you think . . . especially when you see those lines, when you think of the power that's traveling through those lines.

WS: Yes. It's since been increased from the original.

TC: Yes, it's been upgraded in the eighties, yes. Did ASEA come in through Bonneville Power?

WS: No, with us.

TC: The Department made the connection?

WS: Both of us, yes.

TC: So did somebody have to go to Sweden?

WS: Oh, yes, we had inspectors over there all during the building of it. They worked for Design and Construction. I went over two or three times.

TC: Oh, did you go?

WS: Yes.

TC: It was obviously to inspect and to see how they were getting along.

WS: To see what they were doing, yes.

TC: And you were satisfied that it was a decent job?

WS: Yes. They had the plant at Vastervik where they built the transformers, and the DC stuff was built up at Ludvika. So they were a good, sound outfit.

TC: Yes. Well, of course, they had a monopoly on this technology, I guess.

WS: Yes.

TC: But I know that the manufacturers often, in buying equipment for the in-basin steam plants or any other equipment, Westinghouse and General Electric had a "buy American" attitude.

WS: Yes.

TC: I know that eventually English Electric got involved, but was there any hassle around working with a Swedish company?

WS: No, we beat them down on that "buy American." We told them, "God damn it, the City Charter says you buy it from the cheapest guy, whoever and wherever he is." So they had no complaint. They had complaints, but they had no valid complaints about buying away from the U.S.A.

TC: Of course, there was a collusion there for awhile, I know, between Westinghouse and some of the other manufacturers with price fixing.

WS: I don't know about that.

TC: The Department went in with various other entities on the Intertie.

WS: Yes.

TC: And was willing to be project manager. Was it that you were going to have a big share in it or you didn't want to trust it with someone else? I know Edison, of course, had the other line.

WS: Well, Edison had 40 percent interest, I think, in the DC.

TC: Yes.

WS: But we were the only ones that had done any investigating at all into DC, so they didn't have the engineers capable, without doing an awful lot of work bringing themselves up to speed on the DC, so they just let us go ahead.

TC: Well, who were you working with most closely on the Pacific Intertie Project? I know Larry [Laurence] Schneider was involved in it.

WS: Larry Schneider. Art Burns was the Field Engineer on it. And I've forgotten who the construction man was, the Project Engineer for Construction.

TC: Well, once it was up and running, was that the end of your connection to it?

WS: Oh, no. No, we had people supervising the operation. By that time, I was Assistant Chief Electrical Engineer and responsible for the running of the thing.

TC: Oh, not just the Design side.

WS: Yes.

TC: How about when the earthquake hit?

WS: That was sickening.

TC: Where were you at the time?

WS: I was Assistant Chief Electrical Engineer.

TC: But physically, where were you at the time? It was early morning.

WS: Oh, I was in New Orleans [Louisiana].

TC: You were in New Orleans, oh.

WS: Yes, at the American Public Power Association convention. And, hell, I couldn't get a phone call into Los Angeles from there to find out what had gone on.

TC: Oh, boy.

WS: And the hotel apparently got screwed up on a phone message because Jim Mulloy tried to get me and the hotel said, "He isn't registered here, he isn't registered here." Christ, I'd been there for a week. But they finally got through and I talked to Mulloy and found out what all the damages were and got things going. But, hell, it took us a year to get that station back. You could go down to the basement and see how

that just slipped, concrete slipped, and you wondered how we ever got it back together.

TC: Oh, it slipped at different levels?

WS: No, a little bit, but it kind of broke the line of the foundation and just slipped down a little bit.

TC: Now, what happened to that equipment? There was quite a bit of destruction, I know.

WS: Yes, there was a lot of destruction. We were very fortunate there because we had been arguing with General Electric over accepting their part of it. So the contractor's insurance was still in force on the thing and so the insurance company had to pay for fixing it.

TC: Oh. Well, did they squawk about that?

WS: Well, not where I could hear them anyway. (chuckling) But anyway, they had to pay for it. We came out of that smelling like a rose.

TC: Oh, that's good.

WS: I think there were five out of the six mercury arc rectifiers that were damaged. We had mercury spilled all over the floor there, and that was hazardous, see. We had a hell of a time cleaning that stuff up.

TC: So did you return immediately from the APPA conference?

WS: Oh, I came back when it was time to come back. Mulloy had it well under hand. I didn't worry about it. (chuckling)

TC: Speaking about APPA, were you active in that organization?

WS: Well, not too much. As Assistant Chief Electrical Engineer, I was involved in a lot of the decisions and so forth about it but I wasn't too much directly involved in it. We had a number of people on their committees who were involved in it that were working for me.

TC: Well, there were a number of higher-ups that were on the board, I know.

WS: Yes.

TC: I believe Ivan Bateman was on the board.

WS: Ivan Bateman was very active in it.

TC: Was the general feeling in the Department one of support for APPA?

WS: Yes. We were by far the largest utility in the organization.

TC: Did the organization rely on the Department of Water and Power for different input?

WS: I don't know how much they relied on us. But we let them go ahead and handle the smaller utilities, and they didn't bother us and we didn't bother them, really.

TC: What about some of the other utilities? I know APPA is a professional organization and then there's Edison [Electrical] Institute, but that's private, I guess.

WS: Yes. The APPA was the municipal organization that corresponded to the Edison Electrical Institute, which was the private organization.

TC: Were you involved at all with, say, WEST Associates?

WS: Oh, yes. Yes, I was the Department's representative on the WEST Associates' committee there for two or three years, at least.

TC: Was that early on, when WEST Associates was formed?

WS: No. Ted Blakeslee was in on the formation of it. But I got in on it after they had gotten the legal opinion that they couldn't do certain things that they wanted to do because it would have been collusion.

TC: Yes, I heard about that. It's very curious that that sort of decision would come down.

WS: Yes.

TC: It was an antitrust thing, is that it?

WS: Yes. So I got in on it after that, and we didn't have to figure on any great projects because we couldn't build a great project jointly. They said we would be in violation of the antitrust laws.

TC: Yes. Well, what was the purpose then of being in it?

WS: Well, that was to get us to work together as we built our own sections of it, to coordinate and work together.

TC: So you would know what each other was doing.

WS: Yes, we'd know exactly what each other was doing and how they would connect and where they would connect.

TC: And you think it would help the interconnections.

WS: That sort of thing, yes.

TC: How about the WSCC, the Western Systems Coordinating Council?

Were you active in that, to any degree?

WS: Well, not particularly, no. I'm trying to remember what particular things they were involved in.

TC: Well, that was the electrical reliability stuff. Floyd Goss was big on that.

WS: Yes. I think it kind of faded out by the time I got there.

TAPE NUMBER: 2, Side A

February 23, 1990

TC: I think the WSCC was involved mostly in the matter of electrical power reliability.

WS: Yes.

TC: And there was a whole national . . . The NERC, the National Electric Reliability Council.

WS: Yes. Well, I had electrical engineers that worked in that, but I don't think I was ever directly involved in it.

TC: Well, with the WEST Associates, that's where the discussion to build Navajo and Mohave and those kinds of projects evolved.

WS: Well, I don't know. The discussion about building them was at the higher level, actually, the General Manager's level. We took over when they decided that we were in it; we took over and did all the spadework.

TC: Okay. So, once the decision had been made, you went in there and . . .

WS: Well, we ran it from there on.

TC: Navajo and Mohave, those are coal-fired plants.

WS: Yes.

TC: What was the thinking, as to using coal in those situations?

WS: Well, that was the only fuel that was really available for plants that size. We had to get together with a coal company

in St. Louis who owned the lease on the Navajo coal fields there, to sign a contract with them to supply the coal over a certain length of time. We thought that we were out in the desert enough that the effluent from the plant wouldn't affect them, but that's proved not to be true. I was just reading the other day about the Department of the Interior talking about where the effluent from the Navajo plant apparently is affecting the Grand Canyon.

TC: Oh, is it?

WS: Yes. It's cutting down on how far you can see in the Grand Canyon.

TC: It's creating smog?

WS: Not smog, but anyway it's enough to affect the visibility in the Grand Canyon. So we talked about having to put scrubbers on the stacks there, but we thought we were out far enough that we weren't going to bother anybody. But apparently that's not true now.

TC: Well, does that mean that they will have to put scrubbers on those stacks?

WS: Probably.

TC: There are a couple of different things you can do. I know you can build big stacks.

WS: Yes. That isn't going to do it over there because the wind carries the effluent over into the Grand Canyon. It probably means that as long as that plant operates, if it's going to

operate quite awhile, you probably have to build scrubbers over there. That's going to be an expensive proposition, too.

TC: If WEST Associates was discouraged from building projects as WEST Associates, how was it that these projects got built?

WS: The group itself did not figure as the project manager. You see, the particular owners of the project were the only ones that figured as a part of the agreement. At Navajo, for instance, was the . . .

TC: Yes, Salt River Project.

WS: Yes, it was Salt River and the Bureau of Reclamation. They were the only ones involved. The Salt River Project, as I remember, was the project manager for it, so we were under them that way.

TC: Oh, I see.

WS: But the projects worked that way. Just the owners were the only part of the project, so it wasn't a great large group that took over.

TC: I see, I see. Talking about effluent reminds me of air pollution in the early 1960s, and the Department was hit with some criticism from the Air Quality Management District.

WS: Yes.

TC: It had another name, the Air Pollution Control District.

WS: Yes, we had to give up burning coal when we could get the gas.

TC: Burning oil.

WS: Burning oil, rather, when we could get gas, and tried to contract for more gas so that we didn't have to burn oil in the plants in the city. And then, of course, as we built these plants outside the city, why, we got them to generate and transmitted it into the city so we didn't have to operate the plants in the city.

TC: Well, what was the feeling among the engineers or the people involved in that? The catch-22 seemed to be that your job was to provide electricity for the people of Los Angeles.

WS: Yes.

TC: And then, an entity representing the people of Los Angeles would come in and tell you you can't do that.

WS: Yes.

TC: It must have been terribly frustrating.

WS: Well, yes, but there was always a way.

TC: Yes.

WS: Figure out a way.

TC: Yes, that's the engineering mind, to figure out a way. That oil and gas problem was something. I know that the availability of oil was touch and go, I believe.

WS: Well, we had a tremendous fight when they shut down the oil over in Iran.

TC: In the Middle East, yes.

WS: We had to deal with the individuals who could get their fingers on oil and we had to pay through the nose for it.

TC: Yes. That must have been terribly expensive.

WS: It was expensive, compared to the \$3.00 oil we'd been used to paying for. We paid up to \$30.00 a barrel for oil.

TC: Wow!

WS: And I was involved in that. We got some oil sub rosa, too. That is, we didn't do it, but the guy we bought it from we knew had to do it. He'd go out from a port with a cargo of oil with his paper showing one destination. When he got out to sea, he changed the papers. And it was done that way. He was well paid for that, too, I'm telling you, because we had to have the oil.

TC: Yes. Well, he would then go to the OPEC authorities and show that it was going someplace else and could get the right price?

WS: Yes.

TC: You had Indonesian oil, too, right?

WS: No, I don't think that came from Indonesia. One of the African countries supplied low-sulfur oil. I've forgotten which one now it was.

TC: Well, is gas a better substance to burn than oil, or does it make any difference?

WS: Well, the plants are designed so it doesn't make a whole lot of difference.

TC: Because you can use one or the other.

WS: We use one or the other. The operators were most familiar with oil, but as gas came in and they got enough gas, why, they got familiar with gas and could use gas. The changeover was just occurring when I left, so I don't know much about that.

TC: Well, there was a problem there with getting Scattergood [Unit] 3 up and running, wasn't there?

WS: I think Scattergood 3 was brought up after I left, I think.

TC: Oh, after you left?

WS: I don't remember, but I think we were involved in the design of Scattergood 3 at the time, but I don't recall that we had to bring it up.

TC: I know that there was a fight to get it up and running.

WS: Yes.

TC: Were you involved at all in the plan to pipe gas from the Gulf Pacific Pipeline [Project]? Do you recall that? The Department and Edison, I believe, wanted to pipe in gas, so that they could get it cheaper, actually, if they built the pipeline coming in from Texas.

WS: Oh, yes.

TC: There was going to be something like 2,000 miles.

WS: Yes, I recall something about it, but I wasn't involved in it, no.

TC: I know it got caught up in the courts. The Southern California Gas organization blocked it because they wanted the . . . Their market was going to be affected, they said.

WS: Yes.

TAPE NUMBER: 3, Side A

March 8, 1990

TC: This is March 8, 1990. I'm talking to William Sells in Santee, California. I wanted to first of all hark back to something we were talking about last time.

WS: All right.

TC: You mentioned that your father had been a schoolteacher.

WS: Yes.

TC: And he went into the hardware business after he left schoolteaching. What did he teach?

WS: Oh, he was in the elementary schools. At the last, he was principal of the elementary school at Potter, Kansas. Before that he was at Effingham, Kansas, and before that he was at Huron, Kansas. Then he taught in a country school when he started out.

TC: So did he go to the Normal School there?

WS: No, he went right out of high school. In those days, they just graduated from a teacher's course that was taught in high school and they went to teaching. He went one semester down at KU later on, but that was all that he had.

TC: But at some point, he had had enough of it and went into business.

WS: Yes.

TC: The other thing from that period was that you became a second lieutenant in the Coast Artillery.

WS: That's right.

TC: Well, how did that work? There you were in Kansas and there wasn't much coast out there.

WS: Well, they had a Coast Artillery at Manhattan, at Kansas State College, and all the engineers took Coast Artillery.

TC: Oh, I see. So that would have been the connection, I suppose.

WS: Yes, and everybody else took Infantry. But all the engineers took Coast Artillery.

TC: All right. Well, let me just ask you one last question from the period before you started working for the Department. You were talking about San Diego and the hustle and bustle of San Diego during the wartime. What was the social life like?

WS: Well, everything practically was at the post. The Officer's Club out there had a dance every Saturday night and the women played cards during the week. So that was about all the social life there was, was at the Officers' Club.

TC: Well, I had a couple of technical areas I wanted to get into. I'm talking now about the period of, say, 1960, 1964, 1965, you were at that time Engineer of Overhead Distribution Design, right? And I came across an article that you wrote that got published in Electric Light and Power in 1964. I don't know if you recall the article.

WS: No.

TC: It's called "Distribution Climbs to High Voltage Levels." And reading this, it's pretty technical, but it seems to me to sum up something about the distribution problems that you were facing in the Power System and how you were solving these problems. And I just wanted to maybe refresh your memory on a particular thing you were talking about in this article. It had to do with the 34.5 kv going directly . . .

WS: Our system, when it was established in 1924, I think, by whoever was the Chief Engineer at that time . . .

TC: Scattergood.

WS: Scattergood.

TC: Ezra Scattergood.

WS: They laid out their 34.5 as the subtransmission voltage and 4800 [4.8] was the distribution voltage. But then as the load grew and people got bigger loads, well, we had to take it directly off the 34.5 rather than going through the 4800.

TC: Well, you mentioned in the article that for ten years you'd been trying to change that over.

WS: Yes.

TC: And was it just an extra step that wasn't needed?

WS: Well, it wasn't needed and detracted from the quality of service to the customer to have him off of that lower voltage when he had a big enough load to justify being served directly from 34.5.

TC: I see, yes. Okay. Was this sort of thing happening in other systems, that you knew of?

WS: Yes. Everybody had to raise their distribution voltage as their loads on distribution grew greater. The [Southern California] Edison Company went from 69000 subtransmission to 4150 distribution voltage. So they got in trouble before we did, actually. Their 66000 was a little more difficult to take off directly, because of the increased cost of transformers at that higher voltage.

TC: You mentioned also in the article that there was some problem that you were facing, I guess, with the community residents not wanting distributing stations in their neighborhoods.

WS: Yes, we always had trouble in later years getting locations for the distributing stations, when we stepped from 34.5 to 4800. And so that was a little bit of a problem, to try to select the stations.

TC: How did you get around that kind of problem? Did you have to talk to City Council representatives?

WS: Well, yes, they were in on it and we talked to the individual property owners and tried to get a location that was mutually satisfactory. But we couldn't always; we sometimes just had to force our way in, because they had to have the stations.

TC: Sure, and the residents wanted the electricity, too.

WS: They wanted the electricity, but they didn't want the stations.

TC: They didn't want the stations. But if you have one, you've got to have the other. Well, I guess it's a political dilemma.

WS: We had pretty good relations with City Council. We'd get the local councilman and get him convinced that we had to have a station, and he at least backed off in joining the citizens against us.

TC: How about the relations with the Board members? This is the Board of Water and Power Commissioners.

WS: Yes.

TC: Of course, they're citizens and not engineers.

WS: That's right.

TC: They don't understand the problems, they don't understand the technology.

WS: Yes.

TC: Did they ever get in the way?

WS: No, no. I didn't have any trouble with the Board at all. That was down at the lower levels, because the Chief Engineer always took care of the Board, talked to the Board, convinced the Board. He kept pretty good relations with the Board. In fact, all the Chief Engineers did, so we had no particular problem with the Board.

TC: One more technical question on this distribution of higher voltage. Well, this is actually about undergrounding.

WS: Yes?

TC: There was a matter of heat dissipation that you had to deal with, that you had to solve. And I can picture . . . Well, in overhead, the atmosphere takes care of that.

WS: Yes, that's right.

TC: But what happens with underground?

WS: Well, in the ducts, you have to have room enough for air circulation through the ducts. They have to use a bigger conductor so you generate less heat with the same amount of power, and you dissipate the heat from the ducts to the surrounding soil. So you get the heat taken care of that way. But you always have to use a bigger conductor for the same amount of power, because you generate less heat.

TC: Well, I suppose that accounts for some of the expense, too, involved in undergrounding.

WS: Yes.

TC: So it was in 1966 that you became head of Design and Construction.

WS: Yes.

TC: You're in charge of all the power projects, as head, is that correct?

WS: Yes.

TC: As well as what's going on in the city, just the things that have been set up for routine sort of distribution or whatever. The Nuclear Projects Office came under your office.

WS: Yes, that's right.

TC: What was the first major nuclear project that you had to deal with in that capacity? Would that have been Bolsa Island [Nuclear Power and Desalination Project]?

WS: No. I think we had one before that.

TC: Malibu was before that, yes.

WS: Malibu. I worked with Malibu.

TC: Oh, you did?

WS: Really, the Nuclear Projects Office took care of the details of the nuclear stuff. I kept track of when we had to go beyond the Department with the nuclear projects, in dealing with the surrounding citizens and so forth, and with the nuclear commission in Washington, D. C., where we had to get their approval.

TC: The Atomic Energy Commission.

WS: Yes.

TC: Well, how did you view the whole Malibu [Nuclear] Project? I know that it went on for a number of years, with a lot of red tape, a lot of hearings, eventually to the point of being scrapped. How did you respond to that? Did you see it coming?

WS: Oh, yes. But we had the location up in a canyon there in Malibu, which was a reasonably good location, except for the earthquake fault. As we did investigations of the earthquake fault along the coast there and coming back into the canyons and so forth, we ran into the fault which had moved, as I

remember, within 125,000 years, why, it was considered an active fault. So we were too close to that.

TC: Yes. That's a hard one to respond to, I would think, with the geologists saying, "Oh, no, this is still active." And in practical terms . . .

WS: We just had to move out, find another location. Then we got with Edison, of course, in a joint project at Bolsa.

TC: How did you first hear about the Bolsa Project? Did somebody pass along to you the proposal? I suppose that would have been Floyd Goss' period.

WS: Yes, I suppose it came from the dealings with the Edison Company. I don't know who was General Manager at that time.

TC: Yes, [William R.] Gould I don't think was . . .

WS: Yes, Gould was Chief Engineer at Edison, and we talked with him. Floyd Goss was head of the Power System. But they told us that Edison had discovered the Bolsa Island site, so we went ahead and did the investigation with Edison on that.

TC: Did you think it was feasible?

WS: Oh, originally. But it soon developed that there was a fault offshore there that was going to rule it out.

TC: So the site was a problem and you knew that it was bound to be struck down.

WS: Yes.

TC: Did anyone talk about relocating it?

WS: You mean Bolsa Island?

TC: Yes, putting it somewhere else, as opposed to . . .

WS: Well, yes. When we had to drop Bolsa Island, why, then we dropped the Edison Company, the joint project with them, and started looking on our own. And we went up along the Sierras [Sierra Nevada Mountains], where they found a site where no faults were shown on maps. And then investigation revealed that the reason there weren't any faults showing was nobody had had any occasion to look for them. But after we got up there and found them, why . . .

TC: Well, that was at Porterville.

WS: Porterville site, yes.

TC: Okay. Well, then right after that you went over to Wasco, I believe. It was the San Joaquin [Nuclear] Project, wasn't it?

WS: Yes, and that was about the time I got out of there.

TC: So you were out of Design and Construction at that point.

WS: Yes.

TC: Well, in general, did you maintain an interest in nuclear?

WS: Oh, yes, yes. I was very interested in nuclear, because it looked like, if we could have gotten a plant, it was the solution to our need for additional power. We were building more plants in the Los Angeles Basin.

TC: Did you have any face-to-face dealings with the people who were opposed to nuclear energy?

WS: Oh, yes. We had a meeting in Porterville with the people up there.

TC: Well, up there it would not have been environmentalists, necessarily, that were the ones who were opposed. Is that correct?

WS: No, not particularly. The people just were afraid of the unknown. They didn't know anything about nuclear [power] and they were afraid of it. We had to do some education, which we did. But eventually we went up there and did some excavating, quite a little bit of excavating, and found a fault that apparently had moved within 125,000 years; so that was an active fault and we were out of there.

TC: This is not exactly an historical question, it has to do more with what the future bodes for nuclear power. There was an article a couple of months back in the L. A. Times about power needs for California.

WS: Yes.

TC: And they had a projection of a fair number of nuclear plants to solve the problem that we'll be facing in ten years or more.

WS: Yes. It's very difficult to find a site for a nuclear plant in California. California is just shot through with faults, so it's pretty difficult to find a site where you're free of and far enough away from any fault. You have to pass the Nuclear Regulatory Commission, by certifying that you're far enough away from an active fault. Very difficult to find a site in California.

TC: There's also a California state law, too, where you have to have a guarantee that there is no safety problem there.

WS: Yes.

TC: Well, San Onofre didn't run into any opposition. Was it the location that saved them?

WS: Yes. You see, they found the location on the [Camp] Pendleton site.

TC: The Marine base.

WS: The Marine base. It was up in the northwest corner of the Marine base, didn't particularly bother the Marine base, and they were away from the adjacent civilians, so they got that site approved. They never would have gotten it if the further investigation had been done, because they're not very far from an active fault.

TC: Oh, I didn't know that.

WS: Yes.

TC: In the earthquake we had last week, there was a news item that San Onofre was immediately shut down.

WS: Yes.

TC: But that's doing what it should do in a situation like that.

WS: Right.

TC: There was no problem; it was just a safety measure. One thing I wanted to talk about, I had some specific points and some general points in that period when you were head of Design and Construction. One was a very interesting item I came across.

It was called Report #17. This came out in August of 1969 and it was a report on future distributing stations for the city of Los Angeles. I think the report was done by a committee, I guess, it must have been a Distributing Station Committee. And Floyd Goss considered the conclusions and recommendations of the report--I'm reading this from a note I took---of such significance, that he deferred approving them until he met with the committee, the Distribution Design Committee. And in meeting with this group, a task force was appointed to look into this, and I think you were associated with that task force. What was the issue there of that Report #17? Do you have any recollection?

WS: No.

TC: It was a revamping of distribution methods, I guess, and it's connected to rate of growth.

WS: Yes.

TC: There was a period there where you were promoting energy use.

WS: Yes.

TC: And you got to a point where you switched and started to promote conservation. Now, was that . . .

WS: That was later.

TC: That was later?

WS: Yes, right.

TC: Okay, it was later than 1969?

WS: Oh, yes, yes. We were still promoting energy in 1969.

TC: Okay. What were the circumstances then of the promotion of conservation? That would have been in your period as Assistant Chief [Electrical Engineer]?

WS: Yes, along toward the end of my period as Assistant Chief that we got into conservation.

TC: So the late seventies or mid-seventies.

WS: Mid-seventies, yes.

TC: Okay. Well, talking about your time as Assistant Chief, how were you chosen? That was 1972 that you were promoted?

WS: Well, I was selected by Floyd Goss. I'm trying to remember. Their general history was to take one of the division heads and move him up to Assistant Chief. I was head of Design and Construction and I don't remember who was head of the Operating Division at that time.

TC: Operating Division? I'm not sure, I don't know. I know Howard King was head of System Development, which was the new . . .

WS: Yes, but he was comparatively new. I had had, by that time, five or six years at least as head of Design and Construction. I had by far the most experience, so I was the logical one to be Assistant Chief.

TC: Speaking of System Development, were you involved at all in forming the System Development Division?

WS: Oh, more or less, in recommending various personnel. The decision to form it was made above me, of course.

TC: Yes. Well, they took certain functions of Power Operating and Maintenance and Design and Construction and put them into .

. .

WS: Separate division.

TC: But the division was more about planning, a sort of a long-range planning group.

WS: Yes.

TC: Well, when you were made Assistant Chief, there were two Assistant Chiefs put in place.

WS: Yes.

TC: And one was Howard King, I believe.

WS: Well, no, Burt [Burton] Currie.

TC: Oh, Burt Currie.

WS: Burt Currie was there. Burt had been head of the Operating Division and he moved up a short time before, when . . . Oh, I can't recall the man that preceded Floyd Goss as Chief Electrical Engineer. He had been head of Operating Division and head of the Test Lab before. He came up through and he was Chief Electrical Engineer for several years.

TC: I'm trying to think of who that was. Was that [Edgar L.] Kanouse?

WS: No.

TC: That was after Kanouse?

WS: That was after Kanouse. He lives up in Santa Barbara now.

TC: Blakeslee.

WS: Blakeslee, Ted [T. M.] Blakeslee.

TC: Ted Blakeslee, okay.

WS: So, when he retired, Floyd Goss was moved into the Chief Electrical Engineer's job. And so Burton Currie was brought up from Operating for that job, and then I was brought up.

TC: Well, if there were two of you, how did the duties break down?

WS: Well, for instance, as I remember when I first went up there, I had the responsibility for the Power Design and Construction Division and the General Plant Division and the General Sales Division, as I remember it.

TC: Okay.

WS: And as the Assistant Chiefs changed, why, they shifted the responsibilities for the divisions a little bit between the Assistant Chiefs.

TC: So your job was to oversee what they were doing.

WS: That's right.

TC: And be able to act as a liaison or go-between.

WS: Yes, that's right. To represent their projects before the general managers.

TC: Yes. What was the function of General Plant?

WS: They ran the truck and automobile fleet and everything that had to do with that. And they had the machine shops for the reworking of the transformers and breakers and that sort of thing. They did all of that. It was maintenance.

TC: There was a Nuclear Quality Assurance Office that was established.

WS: That was established as a result of, I think, a regulation of the Atomic Energy Commission that required an Atomic Assurance Officer. So, we appointed one.

TC: Do you remember who that was?

WS: Well, he lives back in North Carolina now, he's retired. I can't think of his name now.

TC: Well, what was his job then?

WS: Well, that was overlooking the nuclear project part of the nuclear thing and to assure himself that everything they did had the quality which would meet the requirements of the Atomic Energy Commission. It wasn't a very large office.

TC: I would think that that job would maybe sometimes face a little conflict with the Nuclear Projects Office, for instance.

WS: Oh, no, not particularly, because the Nuclear Projects Office knew that they had to meet those.

TC: They had to do it anyway.

WS: They had to do it, so this was just really a man that helped them out.

TC: There were some general issues I wanted to raise, too, to see what you recall about some of these things.

WS: Yes.

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TC: In your later days of being Assistant Chief, you were involved in labor relations and contract negotiations.

WS: Yes, I was the Power System's representative on the Labor Relations Committee. We had the Power System and Water System and the Joint Systems. And then the labor relations man, who represented the whole management part, and then opposed, they had the labor relations people, and they had the committee on that.

TC: Did you have to sit in on contract negotiations?

WS: I did, yes.

TC: Were they usually matters of routine sort of establishment or did you have to go at it, as sometimes you do in those situations?

WS: No. We generally started out . . . Labor came in with certain wants and management would talk with the various people in management that were involved, to get their feelings of what we could do to meet those wants of labor.

TC: To meet them?

WS: Yes, to try to come together, as close as we could to them at least and try to get them down to where eventually we compromised. Most of the negotiations, actual talking with labor, was done by the labor man from . . . I've forgotten

what division he was in now, but he represented the Department.

TC: Well, would that have been like Labor Relations or something like that?

WS: Yes, yes.

TC: So that all the legwork would be done there.

WS: Yes.

TC: Did you have any direct dealings with the union, though, other than through negotiation?

WS: Well, yes, I had a lot of direct dealings with the various people. See, in the Department all the supervisors, as well as the labor, belonged to the same union. So all the supervisors that I dealt with, of course, belonged to the union.

TC: That would be the IBEW?

WS: Yes.

TC: The International Brotherhood of Electrical Workers.

WS: Local 18.

TC: Yes, Local 18.

WS: I got along all right with them.

TC: I heard tell that there were times when they won in contract negotiations some very hefty raises that tended to skew the wage rates, regionally, not only just within the department itself.

WS: Yes. I was there when they went on strike.

TC: Oh, yes, when was that? That was in the seventies sometime. Was that a long strike?

WS: No, I think it only lasted a week or ten days. But the head of the Local 18 at that time, the representative or whatever they called him . . .

TC: Yes, the Business Agent.

WS: The Business Agent. I think he just decided on his own that he was going to have a strike and that he was going to get a big advance in wages, in order to settle it. Well, the General Manager at that time was a Water System guy.

TC: Was that Bob [Robert V.] Phillips?

WS: Bob Phillips. And Bob was just stubborn enough that he didn't let him, so they had a strike. But after they'd been out about ten days and it was costing them considerable money in wages, why, they decided they'd come back. They got about a half a percent increase in wages was all, and it cost the business agent his job.

TC: Well, going from labor relations to another kind of labor relations, how was it that . . . Let me ask it this way: Were you involved much in the recruitment of engineers into the Department? This is across all the years, I mean, not just when you were Assistant Chief.

WS: Oh, yes. I got involved on various recruiting committees at various times, dealing with attempting to recruit engineers, because engineers were scarce at one time.

TC: Yes. What was the reason for that, do you suppose?

WS: Well, the Department was behind in wages, for engineers particularly, for awhile, and it made it difficult to compete for engineering talent. We hired second-rate engineers for awhile there because we just couldn't get any first rung engineers.

TC: So was the salary scale upgraded so that you could find them?

WS: Yes, it was brought up eventually.

TC: Where did you go for your recruitment? Was it just through the engineering associations?

WS: Well, we had our own staff of recruiters. We sent about one or two men to the colleges to interview students every spring, every fall.

TC: Oh, yes. But you also had a program, it seems to me now that we're talking about this . . . was it Power Affiliates [Program]? Where student engineers would come and spend an internship?

WS: Well, we had quite a student engineer program at the Department; we had run that for years. We went out and hired student engineers to come in for the summer and worked them with the regular engineers on various projects.

TC: I would say that was probably good training that they got.

WS: That was good training. Some of them came back to the Department after they graduated.

TC: USC, the University of Southern California, I know, had an association for a long time with the Department, in terms of engineers going back to school or a continuing education type of program.

WS: Yes, we had an arrangement with the school there. They had a master's degree program and we had quite a number of our engineers get master's degrees at USC, at night school and so forth.

TC: Did you do much with continuing education? I'm sure you were constantly learning, as engineering is not something you know once and then never have to keep up with.

WS: No. The only formal part of it I did, really, was the engineering management course at UCLA [University of California, Los Angeles]. That was an 18-hour course, I believe. It ran over six semesters, so I finished that.

TC: What sorts of things did they teach in that? Was it cost accounting?

WS: Yes, and probability.

TC: What would that be for? Load forecasting?

WS: Yes, load forecasting and that sort of thing.

TC: And you had teachers from the UCLA Engineering School?

WS: That's right. We had a man who was quite well up in the management part of UCLA who was the head of that particular group.

TC: How about the introduction of computers to the Power System management? Where were computers first introduced?

WS: Well, they were first introduced in the Design and Construction Division and the Transmission Design. And we had a . . . Oh, what do you call it? The opposite of the present computer, anyway. Vacuum tube.

TC: Oh, yes.

WS: We had quite a large computer there. They used to run all the problems on our transmission lines through that, and then they broke it down and ran it through various sections of the system, where they wanted to get work done on faults, how much power would be diverted in case of fault here or fault there.

TC: When you say fault, in terms of transmission systems, what does that mean?

WS: Well, that means where you have trouble. For instance, a transmission line, a lightning bolt hits it and it goes to ground.

TC: I see.

WS: And if the relays or a line is out, which lines pick up the load? And they would read this off of this computer.

TC: So you were involved in seeing the whole development of computerized organization.

WS: Well, that was before I was in Transmission at all. That was while I was still in Overhead Distribution.

TC: In Distribution, okay.

WS: Yes. So, when I got up into Transmission for a short time, as head of the Transmission, we had a man there as head of the Transmission Design who had had that particular subsection for quite awhile and so he ran around and took care of it and I didn't have any particular problem with it. But when I became head of Power Design and Construction, why, by that time, we'd started to work on getting the digital computer in there. But I had left the Department by the time digital computers really got into very much use individually in the Department. See, I retired in 1977.

TC: There were a number of power projects that came along at that time. We talked about Navajo and we talked about IPP [Intermountain Power Project], I think we mentioned that.

WS: Yes.

TC: But there were some smaller projects. Well, Castaic, we talked about how that was connected with the [California] Department of Water Resources.

WS: Yes.

TC: There was a second project that was planned for that Quail Lake, where Quail Lake falls to Pyramid [Lake].

WS: Yes.

TC: I'm trying to remember what the name of that project was. Could it have been called Caswell? Do you remember?

WS: No.

TC: But that project never . . .

WS: That must have been . . . I don't think the Department was ever involved in that, were they?

TC: Yes, the Department was.

WS: It was?

TC: Yes, it was called the Caswell Power Project and it was a pumped-storage deal between Quail Lake and Pyramid Lake. But it was postponed.

WS: Yes. That never developed into very much, as far as I am concerned. I don't remember.

TC: There was also the Foothill Project, which was water off the California Aqueduct, I believe, which also didn't pan out. And there were several smaller hydro projects at that time that didn't go, and I was just curious as to why they didn't go, because I think today small projects like that are looked on very favorably.

WS: I don't know. The Department, as far as I know, never was particularly involved in those smaller projects. The Department of Water Resources wanted to handle those projects to the best of their ability. They let us in on that project at Castaic because that was too big of a project for them. They were never involved with anything that large.

TC: So DWP became Project Manager for Castaic?

WS: Yes, for the Power Project, that's right. Yes, I appointed a Project Manager.

TC: Well, let's see. That would have been . . . Well, Larry Schneider was part of that. He wasn't Project Manager, though, I don't think.

WS: No, he wasn't Project Manager. That was Ken Cartwright.

TC: How about Phil Hoffman?

WS: No.

TC: Oh, okay. What were your relations with the Department of Water Resources over the years? Did you have decent relations with them? I know they sometimes could play a . . . Oh, this is my opinion, of course, but it might have been heavy-handed, where they'd say, "Okay, if the utilities aren't going to help us, we're going to build our own power stations."

WS: Well, there was a little bit of that, but it didn't amount to very much, as far as the Department was concerned. We got along with them, built things that we wanted to build without any trouble from the Department of Water Resources, although they sort of limited us to the Castaic Project. Anything else, they wanted to build it themselves.

TC: By the time you were getting ready to retire, you had a change in General Management. Bob [Robert V.] Phillips went out and Carl Tamaka came in as an interim, very short while, and then Louis Winnard came in as General Manager. And I was just wondering, that was the first time anybody had been brought in from the outside.

WS: That's right. That was because of the Board [of Water and Power Commissioners]. They decided they needed somebody from outside. They were going to go outside, so they picked Louis Winnard from Florida.

TC: Well, was it just that somebody had the idea that they wanted new blood or something?

WS: Yes, yes. I don't know whether the Mayor was involved in it, because he always appointed the Board and had control over the Board, of course. But anyway, the Board decided they were going to have an outside manager. And I think he was the second choice. I think they would rather have had the manager from Memphis [Tennessee]. I believe they were a larger municipal utility than the one at Jacksonville, Florida, but he didn't want to come. And this Winnard just came out of Jacksonville about one step ahead of the sheriff, I understand. He had his troubles down there. So they hired him and he came out to the Department. He was a very unpopular manager with the employees.

TC: And so it was Jim [James L.] Mulloy that followed him, I believe.

WS: Yes.

TC: Of course, you were retired by then.

WS: Yes, I was retired by then.

TC: I'd like to bring up something, sort of in summary of what we've been talking about. We started talking about it last

time I was here, and we weren't on tape at the time, but we were talking about how Edison and San Diego Gas and Electric are merging.

WS: Yes.

TC: And it was noted, maybe twenty years ago, that this trend of fewer and larger private companies was beginning to develop. Is it the case, first of all, that there has been this consolidation going on? Did you witness that while you were in?

WS: Well, not particularly, I didn't. There weren't too many of those.

TC: Would this be Edison and San Diego Gas and Electric? I believe you allowed as how you didn't think that was a particularly good idea.

WS: I don't think so. The Edison Company is quite large and has a tremendous area out there. This area down here [in the San Diego area] would be kind of small hangers-on and probably be run better on their own, as long as they had good management.

TC: Of course, San Diego is investor-owned. That's not publicly owned.

WS: Yes.

TC: Did you find in your dealings through the Intertie Project and some of these other projects through WEST Associates that maybe the publicly owned and municipals weren't that much

different from the privates, as far as what they were trying to accomplish?

WS: Well, yes, as far as service was concerned, the necessity for power and so forth, we were just the same. Edison was attempting to service their customers to sell power, we were servicing our customers, selling power, so that there was very little difference as far as the technical operations of the two companies were concerned. But at the time I got into it, there was. Apparently, in 1924 when Scattergood bought the Edison facility from Los Angeles, they were a little bit different then.

TC: There was a serious animosity then.

WS: Yes, there was. And then up in Owens Valley, when we bought the Southern Sierras Power Company up there and served those cities up there, that was a matter of the Water System wanting us to because Southern Sierras was doing a miserable job of servicing those cities and they wanted the Department up there.

TC: So Owens Valley power is DWP generated?

WS: Yes. Yes, except for West Bishop--that's Edison Company--we serve the old town and the main town of Bishop.

TC: Well, that must be just a little island of Edison in that whole . . .

WS: Well, they serve all the west there. You run into the mountains and you don't have very many people there.

TC: Yes, right. I have a final question. I've run through everything I wanted to talk about, but I had a final question which is one that is on most everybody's mind, it certainly is on my mind. How do you square, how do you, as a power engineer, how do you balance the needs of the environment, say, against the needs of power generation? This is something we're going to be facing more and more as time goes on, and it's become such an emotional, political issue, you know.

WS: Well, engineers have had to change their attitude, and I noticed it during the time I was in there. At first, we paid no attention to the environment. When we had to have power, why, we had to have power and we built the lines. But then as the environmental people got stronger and raised more hell, why, then we'd take them into account. So in planning the projects, we took the environment into account and tried to compromise with the environment as best we could without costing too much money. The whole thing was that the thing cost money and that has to reflect in the rates--that's where your money comes from.

TC: Yes.

WS: So we always worked with that in the back of our minds, even though we were trying to work out environmental concerns so that we could live with them.

TC: As I was driving down Interstate 15, coming here from Los Angeles today, I noticed the development that's going on, the

planned communities that are sprouting up. Where will these people get power? Where will they get water? I mean, at some point, there must be a limit.

WS: Well, there's a limit to the amount of water which they can get because of the Central Arizona Water Project, which will be taking more water from the Colorado [River] all the time and which will limit the amount of water which the Metropolitan Water District can get from the Colorado River. And all these communities down here, with all the increase in the water use, it has to come from the Colorado. The Metropolitan Water District decided that they'd get water somewhere. You know, if they wanted water, they just said, "Okay, come on in," and they sold the water. But there's about an end to that because Arizona has got to take water away from California now, so that there's going to have to be water conservation in order that they can meet the needs of their customers. Power, it's a matter of just building power plants and transmission lines up there, that's all.

TC: Do you see more of these mine-mouth plants, like IPP? There are a couple of other projects that were started, I know, Warner and Allen, that didn't pan out.

WS: Yes. There you go. I think that eventually they're going to have to go to nuclear. That's the only place that I know that we've got fuel that will generate sufficient power. And eventually, we'll just have to convince the people that either

they do without power or they accept nuclear plants. We've got a lot of desert over in Arizona where we could build nuclear plants over there.

TC: I think so, yes. As we were driving last weekend out to Joshua Tree [National Monument], we went through that huge area of the windmills around Palm Springs and we were talking about who owns them and how much they generate. I read recently somewhere, a person who was ill-informed said that there's wind generation in California the equivalent of four large size nuclear plants.

WS: Oh, wind generation is problematical. It depends on wind.

TC: Yes. So you never have the constant, that firm energy being produced. It's always a . . .

WS: When there's wind, you shut down your steam plant and so forth, and take it from the wind. But there's a limited number of those projects. There's one out there in the Banning Pass area, there's one up around . . . east of Bakersfield, up there.

TC: Yes, Tehachapi.

WS: Yes. And I don't know where else, but they're comparatively small.

TC: Well, are they privately-owned concerns then?

WS: Yes, they're privately-owned concerns, a stock company, and a promoter got out and sold enough stocks, so he leased some land and built some windmills. And then he sells the power

to whatever power company has that particular area. And the Public Utilities Commission forced the power companies to pay the price of the generation which is released when they get it.

TC: Yes.

WS: It's more than the power is actually worth to the company.

TC: How do those things work, anyway? Is there a generator right within the rotor itself and just cable wires?

WS: There's a little box back on the back part of it. You have the three-armed propeller there and it feeds the axle that comes back through the top of the tower, and then there's a box there on the back of it which has a small generator in it that generates power.

TC: Yes.

WS: You take the power down the tower and, I guess if you get enough of them together, why, you increase the voltage so you can transmit it.

TC: So they're just hooked up in a series there.

WS: Yes, that's right. Hooked up parallel, actually. Each project has to have a transformer to transform it so it will feed into the power network.

TC: Yes, I see.

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TC: So those windmills are good for maybe surplus energy or peaking or something?

WS: Yes, well, you have to buy it whenever it's available, whether they come in at the peak time or if they come in at the off-times. Anyway, it just replaces whatever energy you would have otherwise.

TC: But it's more expensive this way?

WS: Oh, yes. It costs the companies more money, but it was the determination of the Public Utilities Commission to make it feasible to get some wind energy plants built.

TC: And, of course, then there's the solar plant out there by Barstow.

WS: Yes, but that's the only one.

TC: I saw pictures of this huge acreage of . . .

WS: Reflectors, yes.

TC: Reflectors.

WS: Yes, that's a pretty good . . . 10 megawatts, something like that--it's a big plant. And when the sun is shining, which it does most of the time there, the reflectors reflect onto the water project to heat the water and generate power.

TC: Oh, I see. So it's a steam plant?

WS: It was built as an experimental project; and that's apparently what it is because there never was any more built.

TC: Some of the other ideas that have been tossed around are things like these photovoltaic cells.

WS: Yes.

TC: All these things sound so good on paper, but there's just no way . . .

WS: The photovoltaic cell is a good way to generate power, but they're expensive and their life is limited. You have to replace them so often. It's an expensive way to get power, but you can get power that way.

TC: Well, I'd like to just go back to what we were talking about initially about the shift from load building to conservation. Now, when was that? That was, you said, around the mid-seventies.

WS: Yes.

TC: What was the thinking there? Was it that it wasn't wise to promote load building anymore?

WS: Yes, that was what they believed. And then we were having trouble lining up additional power generating capacity; so it looked like it was expedient both from the needs of the Department and the political set-up to promote conservation of power.

TC: Well, it was successful, too, because a conservation trend has definitely been noticed.

WS: Yes, sure. It has cut down the need for advanced power. But they're coming to the end; they're going to have to build more plants.

TC: But that was said in the 1960s and 1970s, that if X number of plants were not built then in 1980 we would have a serious problem. But that didn't pan out, I think, because of the conservation.

WS: Because of the conservation. Because they cut the load growth, because of conservation.

TC: But even with the conservation, as new people come into the area . . .

WS: Yes, that's a cause for load growth, anyway.

TC: Yes, yes.

WS: But at a slower rate than it would have been otherwise.

TC: Also, in the last fifteen years or so, there's been more of the purchasing or trading of energy from different places.

WS: Well, yes. WEST Associates, for instance, they got together on their power pool arrangements to shift power around between companies as to who had it and so forth.

TC: So that means you're in constant communication with the other companies.

WS: That's right, that's right.

TC: Yes, and you can call up somebody and say, "We need so much and . . ."

WS: Yes, "Where could we get it?"

- TC: And you can go from anywhere up and down the western states, right?
- WS: Yes, that's right. And you can do a little bit onto the eastern part of the network, but the eastern part of the network, the eastern part of the doughnut, as I said, is weak, so only a limited amount of power could be transferred there. In the west, we could transfer practically anything that you need.
- TC: Yes. Can you sum up or recall particularly what the basic relations between the Water System and the Power System were? To my knowledge, they seemed to be almost two very separate organizations.
- WS: Well, they are. Because the Water System was first and they kind of sat there and decided that they ought to have the control of the Department when they combined them. However, Scattergood, as Chief Electrical Engineer, was a pretty smart individual.
- TC: Oh, he sure was.
- WS: (chuckling) And he made the Power System so that it got much larger than the Water System and so that now the Power System, while it doesn't run the Department, it produces most of the revenue for the Department.
- TC: Yes. And now the General Manager is from the Power System, I believe. It's Norman Nichols.

WS: Yes, Norm Nichols came from the Power System. The General Managers have alternated between the Power System and the Water System as long as I've known anything about it.

TC: Yes. So the last one, Paul Lane, would have come from the Water System.

WS: From the Water System, that's right.

TC: Well, that covers what I wanted to talk about.

WS: All right.

TC: Have you got any other comments, opinions or prognostications?

WS: No. I was just in the Power System at the time when Los Angeles had its greatest growth and I was in the Overhead Distribution System when they had . . . we were growing 15 percent a year.

TC: Yes. Did you ever feel panicked? Like, God, how do we do this?

WS: No, no, we always had the engineers and had the people that could build the stuff and we just got it done, that was all.

TC: That was all.

WS: (chuckling) Yes.

TC: Well, I want to thank you for these two sessions.

WS: Well, you're entirely welcome.