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LYALL J. STINSON INTERVIEW

"GROWTH AND DEVELOPMENT OF THE POWER SYSTEM: AN

INTERVIEW WITH LYALL J. STINSON, " MARCH 31 AND MAY 12, 1992

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March 31, 1992

TC: Well, just off tape there we were just summing up what we had spoken about last time, and you said there were a couple of other things perhaps to talk about in terms of the Test Lab.

LS: Yes, during the time I was in charge of the Research Lab, our biggest project was the circuit breaker testing. But during lulls in that while we were moving equipment, we had a couple of other jobs that were quite interesting. One was a lamp testing project, which originated, really, in the City Hall, where they had a central buying agency that bought for all the city departments. I'm not certain that DWP was in on that, but one of the items they had been having a problem with was electric lamps of all types. They bought maybe a hundred different models and had a big contract, because it took care of all the buildings for the whole city.

The thing that really started it off was two agencies that had real problems; one was the Street Lighting and the other was the Traffic Division, both of whom use enormous quantities of very special lamps. They came to us and wanted to know if we could do something about getting some good data on the life of lamps and the amount of light they were putting out, whether they were getting the lumens they were paying for.

The Research Lab undertook this project, and the first thing we had to do was to build a device for measuring the light output of the lamps, and we did that according to standards. We built a sphere for a photometer that was about eight feet in diameter. It had to be a perfect sphere, and then on the inside it had to have a coating that was a certain standard type of titanium paint. I had several meetings with the Carpenter Shop people, and the Carpenter foreman had been doing quite a bit of work in plastics, so he undertook to build us this sphere out of fiberglass. It was very impressive. He made a huge, big wooden frame and then plastered it on the outside with about two inches of plaster, soft plaster. Then he had a screed built up on giant pivots that could be swung over it and would squeeze it right down to within about a sixty-fourth of an inch. He made this into half of the finished sphere. He was going to get two hemispheres using the same form. After putting a good many coatings on it of various chemicals to make the plaster impervious and make it so that the plastic would lift off of it without any binding, we were set to go. Everybody gathered around one day and he started layering up fiberglass and coating it with fiberglass cement. He put about eight layers of fiberglass on it, had to work real fast to get one on before the previous one completely dried. But when he was done, here was this great big hemisphere that was over an eighth of an inch thick, three-sixteenths at least. He gave

that a couple days to dry and then the big project came: lifting that off of the mold. It was very successful. When they finally got it off, there were a couple of places where the mold had stuck and they had to go back and patch the mold up afterwards and then cast the other half. So there he had these two great big hemispheres. They were mounted on tracks, on rollers, so they could be pulled apart and a man could step inside to arrange the instruments and to insert the lamps, and then they were pushed together and the tests were run.

We had lots of instrumentation to measure the lumen output inside the sphere and then electrically measure the power to the lamps. We set that up over in the Test Lab and had hundreds and hundreds of lamps of all sizes and shapes and types. We went through them first and made lumen measurements of every lamp. Then we took them outside on the back of the test lab next to the railroad tracks where we set up a big stand with, I think, about 500 sockets on it for different sorts of lamps. We'd insert them in the sockets and then start cycling them. We used a standard cycling procedure because the on and off operations on a lamp are really the thing that affects it the most in how it wears and the amount of light lost. It was all automatic: they would come on and go for maybe an hour and a half and then go off, and then come on and go for another hour and a half. And did this for weeks and weeks until most of the lamps had failed.

Then we plotted the failures. Lamp life is based on the average number of failures, and they rate lamps as a 750-hour lamp or a 1,000-hour lamp, but that just means that the peak of the failure rate will occur at that time. We worked out our curves for all the different makes and the different models. It was a very labor-intensive thing and it went on for almost a year. Some of them were a real problem because they were especially heavy-duty lamps. The traffic signal lights particularly are specially designed lights to withstand this on and off operation, thousands and thousands of times. They have a very rugged support in there for the filament and very rugged filaments. So they took a lot of time. We had to just keep cycling them forever it seemed. It was a very interesting project and it excited a lot of attention, especially when people would see this giant sphere that we could open up and all of the instruments that were inside of it.

TC: Well, one thing, somebody would step in there and set the light, the lamp, as you wanted it, then step out and the thing would close again?

LS: That's right, close the sphere up.

TC: Then you'd be able to read from the outside what was happening?

LS: We'd read the meters from the outside, yes.

TC: Great.

LS: We turned in a good report on that, and I think they used it from then on in awarding bids, especially for streetlights, which are big lights and very expensive.

Well, then they'd been having some switching trouble on a new line and cable that had been installed from Northridge over to Station K. It was part cable and part overhead transmission line, and the circuit breakers at the Valley end weren't operating properly. This was not an unusual thing. Lines that have lots of capacity in them, such as cable, do have problems in switching and there had been some experiments made with putting resistors in the circuit breakers so that they didn't actually try to drop the cable section all at once. It would partially drop it and then through a resistor it would break the final arc. So we wanted to test these breakers and get some information on what they were doing out at the Northridge end.

We set up instrumentation and moved our test trailer down from San Francisquito Canyon, where we'd been testing breakers, and it was installed at the Northridge end. Then the transition from cable to overhead occurred down in Kenter Canyon. It was just a tower where the overhead lines came in and then dropped in the cable, but there were potential devices there which they could use to take the carrier current that was used for relaying off the lines. We used those to make readings. In our trailer we had oscillographs and other instruments and high-speed cameras.

Then, at the terminal tower, Bradley Cozzens, who was Assistant System Head then and had done high-voltage work up at Stanford, suggested we should get some kind of lightning arresters in there that would operate at a lower voltage to give a little more protection to the cable. They were worried that we'd spike those expensive cables. So we built some homemade lightning arresters out of carbon welding rods, hundreds and hundreds of them. We mounted them on huge, big sheets of plywood that had been given about ten or fifteen coats of good plastic paint to keep any moisture out of the wood. Then we laced these welding rods in zigzagged stacks on these boards and we hung them underneath each conductor and tapped it to the line through a little spark gap. Then we were all set to do our switching arrangements. We had a private telephone circuit set up from there out to Station J.

Well, the first time we dropped that section of line our lightning arresters all blew up. There was a big explosion and it blew these carbon rods all over the place. (chuckling) So we went back and rebuilt them and put a bigger gap in and added more rods to the thing. In subsequent operations it worked out a little better. But several of us that were standing right there in the yard at the terminal tower and it was quite an experience having this thing going off all around you.

TC: They were like projectiles.

LS: Yes. I think probably aside from those little episodes, most of my time in the Research Lab was pretty routine as to jobs that came in pretty regularly and we'd answer questions.

TC: Well, who did you report to in that position?

LS: At that time, a fellow named [C. G.] Mansfield was the Superintendent of the Test Lab. He had come from Underground Design where he had been for years. In fact, the only place he'd ever worked before in the Department was Underground Design. When he came into the Test Lab he only had about two years to go till he retired. He wasn't too anxious, I guess, to get into some of this stuff, so we were pretty much on our own. I had been in the Research Lab about two and a half years when Mansfield retired and then I got his job as the Superintendent.

As the Superintendent I had no direct involvement really in the jobs. I missed that. I liked being out in the field and working with instruments and working on equipment. But we had some nice projects come along. The smog business was getting to be a real important part of the steam plant operations.

The Testing Laboratories included a chemical lab, and because I'd been a chemist once I really took an interest in that and we bought a lot of real fancy equipment. We went around to the steam plants and took samples of stack gas and brought them back to the lab. We bought a gas chromatograph for analysis on these gas samples, which at that time was a

very rare instrument. I guess everybody has one now. The refineries, most of them, had a chromatograph at that time, a few paint companies did, but you didn't see many of them around. We did a lot of our test work on that.

Then we also set up a testing lab for testing paint and coatings. We installed two or maybe three large weatherometers, which is a large tank in which you can create any weather condition with moisture, salt and chemicals. You put your samples in there and you can put ultraviolet lights on them and heat and cold and accelerate normal weathering. After whatever time you want, you take the samples out then and you can check for paint scaling and all the things that can occur.

TC: How did you know what to do in order to set up such a mechanism that would create weather conditions? Did you have some sorts of models to work by or did you just sort of figure, well, this is the kind of thing we want to see, so let's do it this way?

LS: Well, a little bit of each. There are standards in the ASTM, or American Society for Testing Materials. I think it's changed its name now; I don't know what it's called. But we had that to go by and we had the experience of other people. We'd call on paint manufacturers, and plastics were just coming out then and we'd talk to the plastics people about their experiences. Then we just did some experimenting on our own. We'd try different things. The weatherometers could be

purchased as a unit but they had a number of available additions and special items you had to select for the job you were going to use them on.

TC: Well, did people like Bradley Cozzens get into that sort of thing? I know that during the time they were testing for the Boulder Transmission Lines back in the thirties, when he was up at Stanford he had set up these kinds of environments where you could see the effect of fog and . . .

LS: Yes, that was mainly testing insulators and it did not involve coatings. It was just the different kind of finishes on insulators and the configuration and the way they had the ripples and grooves engraved in the porcelain. That was another thing, though, that we did get into while I was in charge of the Test Lab. It was a big program. They were having trouble on the Boulder Lines with the hardware, and the conductors were giving a lot of trouble because they were a hollow tube made up of segments and the segments were originally intended to slide and move along each other and they had graphite lubrication between them. Well, as the years passed, that graphite leached out and hardened and was beginning to give trouble. So they wanted to experiment with that and also the shape of the hardware. They were going to go to a higher voltage, they anticipated, on one of the lines, so we started a program in the high-voltage laboratory of examining exactly those things and sort of repeated Bradley Cozzens' work up at Stanford in looking at different

insulators and their shape and size. Also the hardware. We got samples of all sorts of experimental hardware from all over the world. It was practically all night work. We darkened the high-voltage laboratory until there was no trace of light at all and we'd suspend energized equipment and then open up a camera and maybe take a half-an-hour or a forty-five-minute exposure. That would show the little traces of corona and little sparks on the line and anyplace there was a bad connection between conductor and hardware. On the insulators it would show the places that the insulators were building up stress. Toward the end of the run, we would flash a small flash bulb and that would light up the background and show the actual installation and how the insulators were suspended and what conductor you had. You could see then, on that same picture you'd have a picture of the corona and a picture of the hardware and you could see exactly the points that were failing. So we did a lot of that over about a two-year period there in the high-voltage lab.

Then our breaker testing was continuing and we got involved with Edison on that. They wanted to test 230 kv breakers, so we sort of got together with them and used our trailer up at their Saugus substation and we had a joint test project. Then they began to acquire their own equipment. It got to where we needed the trailer and we couldn't get our dates sometimes, so they started their own build-up of test equipment.

TC: So you would work with their Test Lab people, your counterparts at Edison?

LS: Yes, that's right. Our testers would go along and install the test equipment, and then their people would take the clearances and make up the system connections and so forth.

TC: I don't know if you were privy to how that would have come about. Did they contact the Department to say, "We hear you're doing this"?

LS: Well, I think they contacted our Breaker Test Committee. We had a Circuit Breaker Test Committee that had been organized before we started any breaker testing. They were mostly Design Engineers and Transmission Engineers on that and they decided what breakers they wanted tested and how severe a test they wanted and set up the program, and then the Test Lab would go ahead and do the testing. We had always invited Edison to our tests, as well as the various manufacturers that were involved, and I think during the tests their discussions came to, "Let's get together on some of this."

TC: Interesting. Would that have been part of what was called the Apparatus Committee? I've seen some Apparatus Committee documents written sometime in the fifties.

LS: No, they mainly studied failures, and I was on the Apparatus Committee for several years.

TC: So this is something separate, though, this committee?

LS: Yes, the Breaker Test Committee. It wasn't exactly a subcommittee, and it was different people involved, really,

but they were in operation at the same time and they worked closely together.

TC: Well, how did these committees work? They were composed of, as you said, mainly Design Engineers. But would there be Operating People in there, too?

LS: Yes. When I was on the Apparatus Committee . . . There were two committees I was on that were the same sort of things. The Apparatus Committee consisted of engineers from Operating, General Plant, Design and Construction, I think a man from the Test Lab, from Station Test. They met about once a month and each fellow would bring problems that they'd encountered in their own operations and maintenance work. We'd just discuss these things and maybe they'd appoint an ad hoc committee to pursue the matter a little further, and maybe they'd decide, well, we'll give a project to the Test Lab or to somebody else to work on and bring us back some information.

TC: It seems that that committee system was a good way to get people talking to each other on a regular basis and coordinating things.

LS: It was, yes, very much so. And then the other committee I was on for several years was the Salvage Committee. I represented the Operating Division there and we just decided [about] stuff that was in the warehouse or salvage and what should be done with it.

Another committee that I was on after I became Transmission Engineer was over at the City Hall, the

Subdivision Approval Committee that reviewed all subdivisions. There was a representative there from every branch of the city: fire, police, health, airport, harbor. A lot of them had really no problems. Just occasionally they'd come in when they knew they were involved. But with every subdivision that came up, the maps and drawings would be sent to this committee and, of course, at Water and Power we reviewed the water requirements very carefully, we reviewed the power requirements. The reason I was on it was that the power requirements usually required nothing except to extend either our underground or overhead into the new subdivision. But we were always worried about our rights-of-way, so I represented the Department on rights-of-way and easements.

Well, at the end of my Test Lab tenure I was appointed to the job as Principal Engineer in Charge of Transmission, Communications, and Street Lighting. At that time I went onto this Committee for Subdivisions and we met once a month over there at the City Hall. These people that laid out subdivisions, their engineers and sometimes the owner of the property would come in with sketches and maps of how they wanted to lay out a new subdivision and we'd go over it and argue with them about that. The Transmission System was something new and entirely different to me.

TC: Now, would that have been in Operating?

LS: That was in Operating Division, yes.

TC: So you went really from Design and Construction?

LS: D and C, Test Lab was D and C, and then I went over to the Operating Division.

TC: Well, was that a choice or like an assignment?

LS: Not exactly. (chuckling) I was number one on the Principal Engineer list. [Burton A.] Currie came down to see me at the Test Lab. He was Assistant Division Head of PO&M at that time. I think he felt I wouldn't take the job, and I felt so, too, at first. (chuckling) But we had a couple of long discussions and I said, "It doesn't seem to me that's a very interesting job. It's quite narrow and it's something I don't really know much about. I don't really feel much interested in the Transmission." So then he came back again, and this time he said, "Well, maybe if you'd take it for a year we could then do something else." He was going to be the Division Head very soon, so I finally said, "Well, all right, I'll give it a try." So I went ahead and took the Transmission job. In no time at all I was deeply involved and it was very interesting. I just loved it, really.

TC: Well, it seems to be something that I've heard before--in fact, Mr. Currie talked about it--where people were really encouraged to . . . You know, you've been in Design for a long time. Come on over to Operating and get that kind of larger view of how the whole thing works.

LS: Well, one thing was Operating didn't have very many engineers. I'm just kind of guessing, there might have been about fifty engineers in Design and Construction, and in Operating there

probably weren't more than fifteen. So they had to draw on engineers from the other divisions.

So right away I got into problems about a new subdivision, and I learned in a hurry. (chuckling) Then we were involved in a dozen big lawsuits about people encroaching on easement property on the old gas and electric company transmission line down to Seal Beach. LAG&E had never pushed their easements too hard, and that property had all originally been one giant sugar beet farm, I guess, almost clear to Seal Beach. There were two or three sugar refineries down in the area, so it was a big thing in the early days. People had little plots . . . After they began to break up the sugar beet business and the refineries closed, they subdivided the land to have two- to five-acre plots and many of them backed up to the transmission line. The transmission line was actually their property, but we had easements that said it couldn't be used for anything except low agricultural purposes, no high trees on it and no buildings of any sort. That was our basic easement. In return they got to use the property for the sugar beets, which was what it was used for when the gas company took it over, and also, the gas company paid taxes on it. So we agreed after we took it over that we would pay the taxes on that portion of the property which was within the easement, and we did that.

Well, when I became Transmission Engineer, they were just kind of finishing up some of the major lawsuits, but I went

down there several times and looked it over and talked to the people. It was just covered with buildings, horse stalls and barns and corrals and chicken coops, and it was really a mess. DWP finally won all the lawsuits and moved all that junk out and we had a pretty good-looking transmission line down through there.

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LS: Then we started in cleaning up some of our other lines. Out in the Valley particularly, we had lots of easements where the old original 1916 transmission line was built from the power plants down to Station A. We got into two or three bad situations there in lawsuits, and one of them we lost.

TC: On what grounds would people oppose complying with the original agreement?

LS: There was only one argument: that the property was just sitting there doing nothing and it was going to waste, and it was really their property and why shouldn't they use it? So they'd move in, and if our patrolmen weren't real tough and grab it right away, why, in a couple of months we'd have a building on it or a block wall enclosing it. In one case we had a cactus hedge all around a place. Then the big fight started to get them off. We just finally had to go to court on a lot of it. In later years DWP bought up most of that property. I don't think there's any easement left now.

Where we lost the lawsuit was against a restaurant. The restaurant was next door but they were using the right-of-way as a parking lot. Finally, the owner of the restaurant wanted a change of venue because he claimed he couldn't get a fair trial in the Los Angeles area, so we went up to Ventura. I think of that every time I see this trial on television up

there going on now [Rodney King beating trial]. And a real small courtroom and the judge said right away, "Now, you smart city guys, I want you to realize that this is a small, country town and we do things casually and no big formality around here." It was a kick the way that thing started. But I don't know, I just didn't feel too happy with the way we presented our case, and finally we lost it. The Department appealed it and they lost the appeal, so they gave up. I go by there once in awhile and the restaurant still has the parking lot there.

TC: What restaurant is that?

LS: It was the Carriage House, right across the street from NBC Studios, but it has changed its name now.

TC: In Burbank?

LS: In Burbank, yes. And we had Burbank against us. NBC swung a lot of weight there. They were against us because they had a similar situation; they wanted to get a parking lot under the lines where we went past the studio.

TC: Your point of view, or the Department's point of view, would have been, I suppose . . . You have to get in there in order to do the maintenance or in case there's any sort of trouble or failure.

LS: That's right.

TC: Plus a fallen line . . .

LS: That's right. The people just don't realize but in this area we have to wash insulators regularly. We get all kinds of complaints and suits about the drippings coming off the lines

and getting on cars and so on. Of course, that's along the streets where we wash the 34.5 k on the streets, but the high-voltage transmission lines we wash more frequently. You can't stop the water from shooting all over the place--it's a mess. We do it with the lines energized, and every once in awhile one flashes over and makes a big uproar around the neighborhood and sometimes they call the fire department. The regular maintenance, aside from that, doesn't amount to much.

But the emergency situation is critical if the line is down, and it does happen, contrary to what people think. Maybe once or twice in a five-year period we'll have a line down, and some have been very bad. We had one over right by that Carriage House where a plane taking off from Lockheed had come down and crashed. It wiped out twelve conductors that fell into an Edison line. Things like this do happen, so we must get in there on the right-of-way. And some of these lines can cut off enormous amounts of power, sources that we have to have, and it costs a lot to reroute the power maybe clear down to the bottom of the system and back up again. For instance, if the lines from E south are severed, then we couldn't in those days get power down from the power plants on Owens Gorge or from Valley Steam Plant, and it could be a real bad situation.

So we had good reason, but this judge didn't see it. I thought that's where we failed the case. We didn't make enough of a case as to what could happen during some of these

problems. But I came to like these court appearances. I appeared quite a few times as an expert witness.

We had a big lawsuit against a gravel quarry out in the Antelope Valley. [The quarry] was within an easement and the dust was coming over the transmission line, though he wasn't exactly under it. When they built the Antelope Valley Freeway up through there, the dust was just terrible. Fortunately, after they finished the freeway he abandoned his pit. But we had two or three sessions that always wound up in postponements. I drove down to San Bernardino. It was being tried in San Bernardino Courthouse. It seemed to me like I drove down there a dozen times. I'd get clear down there and all the lawyers would be talking out in the hall and they'd decide to postpone it for awhile.

Let's see, what else? Oh, we had a big church down in the Lakewood district that decided to use us for a parking lot. Finally, we took them to court, and that really turned into a comical situation. (chuckling) We had a lawyer named "Red" [Omar M.] Lloyd. He prided himself on looking like an old gold miner, which he had been up in Alaska. He came into court, and I think he was putting on a pretty good act a lot of the time, he talked like it and he acted like it. He visited the other lawyer in his office one day and they'd had a big discussion. One of the problems was we never used that line or that property for anything. That was the usual thing the lawyer brought up, so they were discussing that. The

lawyer said, "Well, if you put us off of there, what are you going to do with the property?"--and it was in a nice district. Red said, "Well, we might turn it over to Lakewood to make it into a little park or something like that," which we encouraged, let people go in and plant low shrubs, you see, and grass, and if they had picnic tables, keep them back away from under the lines. We have a lot of places like that. So Red said that and this fellow didn't answer to that but he jumped on it in court. In front of the judge he brought this up and he said that he'd had a discussion with the other attorney and the other attorney said all they were going to do was make a city park out of it if they couldn't use it for a parking lot. Oh, Red got mad and he jumped up and he said, "Judge, this guy is a dirty double-crossing fink! This conversation was conducted in his office and it's privileged and he has no right to bring this up." And the judge just about died laughing. There was nobody in the courtroom except me. I was a witness, and then the two lawyers, and then he had one other witness there. Finally, the judge said, "Come back in my chambers." So the two lawyers and the judge went back in the chambers. When they came back the judge announced that they'd settled it and that they were going to get off that property and he'd give them ninety days to find another parking space. (chuckling)

But I enjoyed it. I learned a lot of law, too. Because each time we'd have one of these cases, the lawyers would set

up a mock court up in the Legal Division Library. We'd go up, we'd hold the trial and go through all the testimony. They'd ask all the questions they were going to ask and criticize my answers and suggest that maybe I ought to answer it a little different way and that sort of thing. I liked it.

Then nobody had ever paid much attention to the Transmission people out in the country. We had a crew at Mojave and Bishop and Boulder. I said right off, "I want to get out and see these people." So I'd start out with one or maybe two of the Superintendents, and twice in the year we made a loop around by going up to Bishop and across through Death Valley and down into Boulder. We'd call all the Transmission people together and have a morning session and a little bit of a safety meeting, but mainly just talking about the Department, its problems, so they didn't lose track of the fact they still worked for us, and I'd get to know them by first name, you know.

Then I made another trip. Each year I went once as Transmission Engineer clear up to the Oregon border, going over the right-of-way. That right-of-way is not a freeway, I can tell you. (chuckling) Originally, when they built the line they ran a grader through and graded it to where the trucks could get material in.

TC: Now, what line is this? Is that the Intertie Line?

LS: The Intertie Line. They could get the trucks in to most of the towers but there were some of them they had to have a

helicopter to take them in. Eventually they graded a path to every tower, but it had deteriorated and they couldn't afford to keep this up year after year after the construction was done. So this road was . . . oh, it was a horror. It would take us about four days to get up there, and we'd have to stop and build roads. Every once in awhile we'd come to a washout and we'd have to get out shovels and picks and we'd build a ramp down into the creek bed and back up the other side.

TC: What kind of vehicle did you have?

LS: We had a big, high clearance Carry-All. It's about a ten-passenger thing, and we had the rear seat taken out and we could carry our luggage and tools in there. Then we'd have usually four, maybe five, people. One place we had to cross a railroad track, over the railroad that the Navy had running down to Tonopah or someplace around there where they had a big ammunition dump. This railroad had been built on the roadbed of the old Colorado-California, which was the narrow-gauge line that came to Owens Valley. So we crossed it way up there . . . oh, not too far from Reno, but it was kind of on an embankment and we hadn't been able to get permission from the Southern Pacific to put a legitimate crossing in. They didn't want any crossing that a lot of people would start using. So you had to go up this embankment, and then here were the rails and the ties without any way to cross. We got up there and the Superintendent stopped and he said, "All right, everybody head for that bunch of bushes over there." So we got over

there, and he had about twenty old tires stacked up. We took the tires back and we built a road bed up over the railroad track. We drove over and then we took the tires all back and hid them in the bushes. (chuckling) But those trips were just terrific. At night we'd come to some little place where we could go to a motel room and we'd sit and everybody would tell stories. Those old-time patrolmen, they had a lot of interesting things to say.

TC: Oh, I'll bet they had, yes.

LS: So we'd get to the Oregon border and stay at that little town of Cedarville, just a little tiny village.

TC: Oh, is that Celilo?

LS: No, it was Cedarville, right close to Alturas, just over a mountain from Alturas, and just about ten miles from the Oregon border. The town had one saloon and they served a kind of a dinner, and another one that served breakfast, and that's all there was in town. The same cook and waiter worked in both places. We had a headquarters there which consisted of an old tin building, then the patrolmen had a couple of trucks that they parked in there, and the communications had a corner of this building and they had two men there permanently and we had about four patrolmen there. We'd usually get in town about dark, and we stayed about five miles from town where there had been a gun club at one time. It was a fancy club and they owned a big hunting range, but it had gone broke and the people were trying to make a motel out of it. I

understand it's folded up since. But we'd go over there and get a room, and there were some hot springs and they had a big swimming pool with hot water. Oh, it was so hot at the end where the water came in, you could hardly stand it. They had it piped to the rooms, and it was so hot you couldn't take a shower or a bath unless you let them know; in which case they'd fill up the bathtub along in the early afternoon and let it cool down to where you could use it to bathe in the evening. But it was a real interesting place and we'd all go over there and go swimming and drive back into town to the saloon at night and have supper. The next day we'd come back to L. A. on the highway. We had to make one stop on the highway. It was a day-and-a-half trip back coming on 395. But compared to four days up on that transmission line road, the day and a half back, it was nothing.

TC: But the country you get to see on that, it's country that you just never . . .

LS: Oh, gee, it was way back up in the mountains, and we'd come across an old ghost town in one place. Then there was one spot where there was a canyon and we came up to a cliff which was just a sheer drop, maybe six or seven hundred feet down, and they had carved a road out of this. We worked our way down and then went up the bed of a river for a couple of miles. And every trip we had to do a lot of work to get up this riverbed before we could get back out. We had to do a lot of work to be able to go up there. It would have a

cloudburst and four or five feet of water would come down this thing.

Well, the transmission patrol bought a huge truck and had it rebuilt into a giant line truck with two or three big winches on it and all the equipment to replace a tower up there on that transmission line or put in a temporary tower or pick up conductors, with just a two-man crew, it was really something. To try it out and be sure it could get everywhere, they took it up there over this same road, and it got down to the bottom of this riverbed and broke an axle. They took our grader down in there to stand by--we thought the grader might tow it out if a flood came--and then they came down to Bishop and got a new axle and a couple of automobile mechanics. They went up there and installed a new axle down in the bottom of this riverbed where a cloudburst could come any minute. (chuckling) They got the thing out of there.

But the country was just wild and primitive and there were several places we went over a hundred miles without seeing an automobile or any sign of life. We could talk by radio, that was a good thing. The microwave system more or less parallels the line, and at each microwave station they had a dropout at a repeater so that they could pick up the car radios and tie them onto the microwave line back down to town. So we could talk to the dispatcher and we'd tell him when we entered one of these real horrible spots that if we don't come

out the other end in so many hours, send somebody to look for us.

There was a little town called Lovelock that had been a section house on the Western Pacific Railroad about 120 or 130 miles north of Reno. It was practically abandoned since the railroad went to diesels and they didn't have to take on water, and there had been a couple of big mines there that were abandoned, too. There was nothing left of the town except one little grocery store and it had a gas station. We'd always have to stop there for gas. This car we had had extra gas tanks on it and pumps to pump the gas. We went up such hills that we couldn't get flow to the carburetor. It had the electric pumps to pump the gas up to the carburetor. Well, we always stopped there and had a little lunch in this grocery store. One time [Carl] Osborn was along and he wanted to get a haircut.

TC: Who was that?

LS: Osborn, Carl Osborn. By that time I was a Division Head and he was the Transmission Engineer, but I kept going on those trips. (chuckling) I didn't want to stop those trips up there to the border.

TC: Right, I don't blame you.

LS: So he was going to get a haircut from the guy who owned the store. His wife ran the store and cooked a little bit. She put out little snacks, you could get a sandwich or something like that. So Carl went in the kitchen for the haircut, and

he came back and, oh, his head looked awful. He said, "Gee, he reads the bumps on your head. He gives you a haircut, then he reads the bumps on your head free and he gives you your whole life history." (chuckling) It was kind of an interesting proposition but nobody else wanted to go for a haircut.

The fellows had been complaining about trouble with all of the transportation equipment up there. Driving in that country was bad, they were beating up the tires and so on, and the General Plant Manager, who was in charge of the transportation equipment, wasn't very sympathetic. They took the attitude that the men were just not being careful. So one trip I made up there, we took the Head of the General Plant Division along. We got up onto a plateau which wasn't too far from Reno, south of Reno where the transmission line crossed the main highway that goes from Reno to Salt Lake City. We got up on top, and all of a sudden the front end of the car gave a big thump and it dropped about a foot. We climbed out, and here the front suspension had broken. Well, we decided we had enough to fix it up temporarily because we were at the top of the plateau and it wasn't going to be bad roads from there on over to Lovelock. But we had to get it jacked up. We jacked it up awhile, as far as the jack would go, and then we'd collect rocks and build a pile under there and let it down on the rocks. Then we'd build another pile of rocks to set the jack up. We finally got it high enough so that we

could get in there and work. We voted that when it came to crawling under it, why, the General Plant Manager Joe Brennen was to do that. It was his property, the rest of us weren't going to work on it. (chuckling) So we finally got it up and we got it all wired together and strapped together and drove very slowly and gingerly down. When we got down to Lovelock and the gas station, we put it up on the hoist in their service bay and built some big clamps out of strap iron to put around it. We made a good job. It lasted clear back to Independence then. (chuckling)

Another time we went out to the end of the line, which was fifteen miles from Cedarville, and we had to go up a couple of pretty long hills. We were coming back down and there was a lot of chatter on the radio, just friendly talk, visiting. Well, they kind of hold that down because that blocks the radio. If two cars are talking back and forth, then nobody can get through to Los Angeles. So finally the Superintendent who was driving got real mad about it because it might have caused trouble for some of his Transmission people. These were two communication cars we heard. So finally Fritz said, "I can't make out who that is. We're coasting downhill here and I'm going to turn off this engine and coast along so I can listen to them." So we went on about a hundred yards, and I don't know whether it was an automatic transmission or whether he left it in gear, but anyhow he kept the engine running on compression and sucked a lot of gas in.

I've known people to do this before. He turned the ignition back on and there was a big explosion and it blew everything off from the engine manifold clear back. The muffler and the exhaust pipe and the tailpipe were just completely blown off. We got out and looked at it and here was just this pile of junk laying in the road. (chuckling) Fritz found out who it was that was talking on the radio, that gave him some satisfaction. So we piled all the junk into the car, and here we were running wide-open without any muffler. We went back to town and you could hear us coming. Boy, it was making a racket. So that night Fritz got down to a gas station. He gave up his dinner hour because this little cafe only served meals for about a half an hour in the evening. But he gave up his mealtime and went down there and he and the mechanic at the gas station patched it all up and wrapped a bunch of tin cans around it and then put a wire over it and we got back down to the Independence garage with that thing. (laughter) Oh, those trips were really interesting and just a lot of fun. I enjoyed it.

TC: Oh, yes.

LS: Well, after my year was up, I guess somebody else retired. Oh, it was the Distribution Engineer, a fellow named [J. R.] Kelley retired. When he left, they decided to shuffle everybody around, so I got the Generation job.

TC: I think this would have been about 1964, right?

LS: During the year 1962, I was Transmission Engineer. So, in 1963, I went into Generation and I loved that. Of course, I'd worked in Generation in the Design. I knew all the people and I always said if I could I would stay there till I retired. They wouldn't let me.

TC: They kept kicking you upstairs?

LS: Yes. Anyway, things were pretty routine in the Generation. It was just a question of keeping everything going. (Mr. Stinson reads some notes) Yes, I've covered the Transmission. I left out a couple Test Lab things I wanted to tell you.

TC: Oh, well, we can go back to it.

LS: Do you want to go back now?

TC: Yes, let's go back now.

LS: Okay. A couple more interesting jobs in the Test Lab: one of them was washing machines, testing washing machines. It really started out with dryers. The gas company was making a big push to sell gas dryers. Dryers were just becoming a thing then. The gas company was getting right out and being real active about gas dryers, and our business agents wanted to get out and push electric dryers. So they came to the Test Lab and wanted a program of testing dryers, and before they got through it also included washers.

We set up a big test program, and I didn't know there were standards in what they call the white goods industry for testing these things. In a washing machine you had a standard wash of so many sheets a certain size and so many towels a

certain size and so on, and the right amount of soap, everything was standardized. I think we must have had about thirty washing machines and then about that same number of dryers. We turned our records over to the business agents and I guess they used them to push sales. There were washing machines just all over the place. A lot of these had been sort of on loan from the manufacturer or from maybe Sears and Montgomery Ward and places like that, and they couldn't sell them off the floor afterwards because they'd obviously been used. Well, we had a big sale on washers and dryers. Everybody was buying them at about one-third price, and I got a dryer, which I'm still using. (chuckling) Well, I guess that cleans up the Test Lab. So, back to the Generation.

TC: Yes, back to Generation.

LS: Things went along pretty routine for awhile, and then we got into some problems.

TC: What was the routine in Generation?

LS: Well, routine was to see that the plants were getting scheduled for their overhauls. In case of emergency, deciding whether we should take the unit down or whether we should hold on till the weekend, decisions as to keeping the capacity at what it should be. More problems in the hydro, I think, at the moment than in the steam plants. The hydro plants were getting pretty old and they were having a lot of maintenance work. We went into Power Plant 1 and the buckets on the turbines were badly eroded. We had the General Plant braze

the tips of the buckets with stainless steel and then grind them down. That was a big job. Then we had bearing trouble at Power Plant 2. Those bearings never were big enough for those machines, and when we went to 60 cycles and ran faster, it was hard on the bearings and we had a whole string of bearing failures.

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LS: We finally wound up by putting pressurizing oil pumps on the machines. They would actually lift the machine right off of the bearings while starting, and that helped. They didn't have to start it on what basically is a dry bearing, where overnight maybe the oil had been all squeezed out. Then they could actually run the oil pumps, too, continuously on a bearing that was particularly bad, and that seemed to do a lot of good.

In the steam plants, the first big project that showed up in my tenure was the shaft on Unit 2 at Valley. There had been some stories that the Unit 2 shaft hadn't been properly heat-treated, but that after the heat-treating process, which our inspector objected to at the time the unit was being built, they had re-treated it and everybody decided that they'd give it a try. It began to warp and finally we wound up taking Unit 2 off and had lots of discussions and we tore it down completely and took the shaft out of it. Westinghouse agreed to bear a lot of the expense.

They took the shaft up to Sunnyvale, near San Francisco, where they had a big plant for nautical engines for ship propulsion systems. They couldn't re-heat-treat it, but what they did was survey the shaft and determine how it had warped and they found a dogleg in it. They re-machined the shaft

where the bearings would be, to get two true surfaces that were absolutely perfectly in line. This shifted the shaft over off-center a little, so then they had to go back to the machine and move over the bearings to line up with the new shaft, and got the whole thing back together and it straightened out the problem. After all this the machine was way out of balance, so we had to do a lot of balancing on that machine. I never felt that the shaft work [was] a mistake. It was the real answer. After I left, I heard that it was going bad again. But it wasn't being run as much because it was one of the older units on the system and I think they just kept puttering around with the balancing. But that was a big project, and it was very ingenious the way they actually made the part of the shaft that was the bearing area on a different center line than it had been.

Then someone from, I guess, the Department of Sanitation, the City Engineers, came up with the big idea: Why don't you burn the sewage gas out of Hyperion at Scattergood? They'd had a lot of problems with the people around there. There was a lot of gas that got out of that plant and the odor was pretty bad in El Segundo when the wind was blowing toward the town. So they came to the Department, and economically it did look good. We could get a lot of cheap fuel out of there. They had some diesel engines that they ran on that, but they couldn't use more than a small percentage of it. So finally we agreed to take the surplus and it was pumped over to

Scattergood and we put it into the boilers. We decided we'd put it into the two boilers equally--there were only two units at Scattergood then--and it looked like it was going to work out all right. At very high temperatures it burned up whatever caused the fumes. I see these stories about putting in incinerators to take care of waste now and all the objection, but I think if you could get a real good hot fire, it does a good job. We made a little money out of it and it helped them out.

Well, I hadn't been there too long when one night they wanted to cut the load on one unit down for some reason. I don't know now why, but they cut the load way down on one unit, and they did it by just shutting off gas--they were running on natural gas--and as they did that, that made the ratio of natural gas to sewer gas lower and lower, and pretty soon the fire went out. Then it reignited and there was a bad boiler explosion and the boiler was badly damaged, several million dollars worth. The plant was off the line for awhile, because not only did the explosion damage that boiler but pieces went over and hit the other one. So I set up a committee of the plant engineers and a couple of design engineers that were boiler experts to study this thing and write a report.

Of course, the word of that sort of thing gets all over the country right away, and it just happened that right about

that time Edison had a boiler explosion, too, down at what they call their Alamitos Plant. It wasn't as severe as ours.

So there was a lot of interest in it and people wouldn't stop talking about it, so we had to find out what we could; and, you know, we never found an answer. Finally, we had a big meeting down at Scattergood one day. Goss was there and he was pretty adamant we were going to have an answer, we had to have an answer. Well, after discussing it around and around, I put in my two cents and I told Floyd, "Floyd, you've just got to quit beating these fellows. They're all good people, they're doing what they can, and nobody is trying to cover up anything, and we just can't find the answer." So we gave it up and nobody ever did know exactly what had happened. It's awful when you have a problem and you never get an answer to it. But that was one of the big hassles.

The oil situation was getting kind of tough and we had to move oil around a little bit. Haynes [Steam Plant] came on and we bought this old Mobil Oil Company pipeline that ran from Wilmington across through Long Beach, and it went right along the boundary of the Edison plant, and Edison had tapped into it so they could get oil out of it and extended it over to Haynes. We had a pretty good-sized tank farm in Wilmington and had storage for oil that could come in by ship. We wanted to be able to send our own oil over that pipeline, so we bought the pipeline from Mobil, at least from the point where it passed our Wilmington tank farm, called Olympic Tank Farm.

But we put in some big pumps at Olympic and then we found we had to put a heater in to heat the oil because it was just like heavy tar, number 6, and we had to heat it until it was the viscosity of water--not as thin as gasoline but just not far from it--in order to pump it through this line. So that was a lot of messing around. At times it wouldn't get hot enough. It took quite a while to learn to run that heater. And the heater wasn't enough to get it clear to Haynes, so we also bought a little corner of Mobil's docking facility down in Long Beach Harbor, and they had a heater in there and they were willing to sell the heater, and this pipeline tapped into there, too. So then we had a heater at Olympic and we had a heater over in Long Beach, and we could pump clear to Haynes with that into our tanks, and then our tanks at Haynes had heaters built into the tanks. We also installed a heater down at Harbor and we could pump oil out of the Harbor tanks--we had a good tank farm at Harbor--and so we got in pretty good shape as far as oil went. The gas supplies kept getting lower and lower, and so we really needed that. We could move oil from our tank farm at Harbor up to Olympic, we could move it from Olympic over to Haynes, and then from Haynes they had enough heating facilities to move it around the plant there. So that was one big headache we went through and finally got it all set up and it worked just fine.

We were scared about having a burst pipeline. It went right through the city streets in Long Beach, through the

downtown area of Long Beach almost. So we took to testing it regularly, and after we would have heavy oil running through it we'd start pumping fly spray through it. We bought lots of fly spray, and it was just the right viscosity and it cleaned everything out. We'd push the heavy oil along with the fly spray; and the fly spray would never change its viscosity, it could just sit there all the time. We tested it a couple times. We figured we should test every time we started to pump, so we tested a few times with the fly spray. We had one little rupture, but things weren't too bad, so we got by with that.

But then the question came up of oil spills. We thought we could control that anyplace. We had big dikes around Harbor, we had big dikes around Olympic Tank Farm and dikes around the old Mobil pump heater in Long Beach, and where it went in the Edison property, so we felt pretty good. The one real hazard looked like where we crossed under the San Gabriel River. Now, nobody seemed to ever worry about crossing under the Los Angeles River. I don't know why. You know, I never thought about that till now. Oh, the Los Angeles River crossing was exposed above ground, we could get in there and do something, but where it crossed the San Gabriel River it went way down under the riverbed, about twenty-five feet deep, and we thought if it ever burst in there, why, it would be days before it even came to the surface and then it would be in the river.

So I finally worked out an idea. We could valve this thing off over at Edison, and then at Haynes--and that wasn't very much pipe, that was maybe a quarter mile at the most--and then we'd push all the fly spray out with water and then give it a pressure test with just water, so if it went bad we would not foul the river. We tested it one and a half times its operating pressure. Well, that was a big project. Everybody argued and complained, fighting about whether we could use that pipeline or not, but we finally got that settled.

Let's see, then there was another big problem that I had to face was while I was still Generation Engineer. They decided that we were going to build a nuclear plant. It was all set up for out there by Malibu, and so they announced to me that because I was the Generation Engineer and it would be under the Generation, why, I was going to go to nuclear school and become a nuclear engineer. (chuckling) They had one fellow in the Design Section they wanted to receive this training, too, so he and I went back to Pittsburgh to the Westinghouse Nuclear School.

TC: How long a program was that?

LS: Well, it was a two-week, seven-day-a-week. We had two or three field trips that were very interesting, but we put in an awful lot of hours, including evenings. We worked in a laboratory, a Westinghouse laboratory that was about three miles from their big Pittsburgh plant. We went over to the plant quite a bit and saw what they were doing there in the

way of pumps and heat exchangers. Then in their laboratory they were doing a lot of design work on fuel elements, so we spent days there, and also they were doing design work on pumps in this laboratory. That's where our classroom was, in the laboratory.

One day we went out to a fuel plant about thirty miles from Pittsburgh and we spent the day in the fuel plant. They were making these little pellets out of the enriched uranium and then loading them into the tubes that went into the core and so on.

Another day, we went out to a Pennsylvania Power Company plant called Saxton, that was about forty or fifty miles out of Pittsburgh, and I think it had been abandoned. When the nuclear program came along, Westinghouse asked them if they could revive this old plant and use the electrical machines for load, and put in a little reactor and use it for experimental purposes. They hadn't been going very long and they decided to revive a couple of boilers. They rebuilt the boilers because the nuclear generator was shut down quite a bit, as it was experimental really. It was bigger than that submarine plant that they built at [Shippingport], which was the first nuclear power plant built there in Pennsylvania, and it was abandoned a couple of years ago. Saxton was bigger than that. Well, anyway, at Saxton they put in a reactor that was like the type that they were going to use in their newer plants. It was larger than that submarine reactor. So they

were going to refuel it, and luckily it was right while we were in this program. We went out there for one day during the refueling. They lifted the lid off of the containment vessel and they were fishing these core elements out and sending them down through a tunnel into a storage area. I guess they're still stored there because they've never figured out what to do with any of them at any of these plants yet. Of course, it was all done under water with boric acid in it. I thought about taking my camera in there, and I got to talking to one of the instructors and he said, "Well, why not? If you go in there the camera should be able to stand it." I was just worried about the film. So I took a lot of pictures in there of all this work going on, they were very interesting and turned out well.

We left the reactor and through the end of the rooms where they check you all over, strip all your clothes off and send them to be buried someplace. They had barrels and barrels sitting out in the yard, and this was low-level radiation stuff. They were the clothes that you'd worn and gloves that the men were using. They ground it all up and put it in a big cement mixer and made it into cement and poured it into old oil drums. So here they had these old oil drums full of concrete, which was mildly radioactive, and they didn't know what to do with them either, so they were stored out there all over the place.

Well, then we went over that night to an area that Westinghouse had bought, it had been a gun club. It had been about a square mile or maybe more, and they had bought a bunch of farms that were around it and they'd made it into a small reactor experimental project. They had about a dozen reactors in that place but none of them were the big kind, they were just little one or two megawatts, maybe something like that. We went into those things and climbed all around down inside of them and through them, there weren't any of them running at the time. They had steam cleaned them, and they were all stainless steel and we could just see how they were constructed and how all the pumps were arranged. They had a big old farmhouse right adjacent to this that had been the gun club and they had it really fixed up, a big banquet room in it and all sorts of facilities for showing pictures, a lecture hall and so on. I guess we were there till about midnight and then headed back to Pittsburgh. That was a real interesting experience.

While we were out at Saxton, of course the nuclear reactor was shut down while they were refueling, so the electric company had fired up these two old boilers and they were the most crude old things I have ever seen. The coal was pushed into them with big pushers. A wheelbarrow would dump a load of coal and a big ram operated by steam would shove this down into the boiler. There were two generators and they had great big brass nameplates. They were not Westinghouse

generators. The nameplates said this was 1908 and said, "These are not licensed for use in aircraft." This huge, big, cast-iron turbo generator. (chuckling) And this was just when aircraft were beginning to fly and they were just beginning to worry about people using their turbines in aircraft. I thought that was very interesting.

Well, we went down to the plant one day where our turbines were being constructed for Malibu. We went all over them and inspected them. Then, on one Saturday, Westinghouse had a luncheon for us and then took us to a football game. That was the only time we had off from the classes during all the time we were there. At the luncheon there was a vice president . . . There were two or three vice presidents. They really had the brass show up, and one vice president was named Stinson, so we got real well-acquainted in a hurry, you know. I had talked the night before with one of our fellows who had been down south someplace, in Georgia, I guess, or Alabama, where the reactor vessel was being constructed. I guess we had a kind of lease-sale deal lined up with Bob Hope [one of the Malibu property owners who opposed the plant] on the property, but nothing had been done and all this equipment was under construction. This fellow had come through town the night before and we'd gone out to dinner. He was from the Boiler Group in the Steam Plant Design Section. He came and said, "You know, I called home this afternoon and they dug a ditch through the property and found a fault out there." He

said, "I don't think anybody knows anything about it yet."
(chuckling) So this vice president Stinson got me cornered,
and after a couple of cocktails he said, "Have you heard
anything about a problem at Malibu with an earthquake fault?"
I had to admit that. I said, "Yes, I heard there was some
rumor going around but I don't know whether it's really true
or not." He said, "Well, do you think they would abandon this
plant?" And, of course, they finally did. (chuckling)

TC: They did, yes. Who was it that went back to Pittsburgh with
you? You said somebody from Design and Construction. Can you
remember who that was?

LS: A fellow named Grayman, Marty Grayman.

TC: Grayman, okay. Now, back here there was Gene (Eugen)
Koffmann. His group was the Nuclear Projects Office.

LS: Yes. Now, most of the people in that group had gone into more
the physics of it, and what I went to was a school for people
that were going to be in charge of operating plants and needed
to have a good knowledge of what went into them and basically
how they worked.

TC: Sure, because you were concerned with the generation machinery
as opposed to where the heat is coming from.

LS: Yes. Well, before I went into this job of Generation Engineer
I'd had a lot of experience in design work in the power
plants. I did design for the electrical part of power plants
and learned a lot about the mechanical part there. Then,
while I was in the Navy they offered a lot of excellent

extension courses for people that wanted to help themselves in their own line of work. I didn't take any of the electrical courses, but I took a course on boilers and another one on turbines and another one on power plant auxiliaries. So I had a pretty good knowledge of steam plants all the way through, and the concentration of this course was for nuclear plant managers. You really had a good idea at Saxton where there was one really working and all opened up and taken apart out there.

TC: There were men from other utilities there, too, in this course?

LS: Yes. Edison was just planning their first unit down at San Onofre, and their man that was going to have the same job as I, a fellow named [] Anderson. Then a fellow from San Diego named [] Arfman. Of course, Edison and San Diego were going into partnership for the San Onofre unit. And then the fellow from SMUD [Sacramento Municipal Utility District], who were getting ready to build their first SMUD unit. There were five of us from California. We went out to dinner several times together and got well-acquainted.

TC: When you read some of the trade papers and the promotional literature for nuclear power, it was a very glowing proposition that they were setting up there, where you always see "the power too cheap to meter," and that kind of thing. Did anybody really believe that?

LS: They did.

TC: It just seemed to be a very . . . Too good to be true almost.

LS: Oh, they did. (chuckling) Koffmann came to me a couple times before I went back there and trying to get me started on some training sessions for operators. He was just so sure of that thing. But, you know, when I came home from there I was kind of upset about all this. Several people said, "You're never going to find a place in California that hasn't got an earthquake fault," which I think turned out to be true. But the thing that disturbed me was that all the plants up to then were small, fifty megawatts or less. They used a submarine plant, which had had quite a bit of experience at Shippingport. Then they had built the plant up above San Francisco, a little fifty-megawatt unit at Bodega Bay, and then there were a couple in the East, little fifty-megawatt units. We had a fellow in the class that was from one of those, the Yankee . . . and they were getting ready to build Connecticut Yankee, which was going to be bigger. Now, all the new plants that were going to be built from then on were 500-megawatt plants, ten times larger, and this disturbed me. In the maritime business they had never built a ship that much bigger than the other ships, the railroads never built a locomotive that much bigger, and no engineering project has taken a jump like that in untried technology. And really what caught them and what's caused all the big problems has been the breakdown of the metal, the metallurgy in the radiation,

and that's something they knew nothing about and it's been one of the big headaches.

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LS: Well, of course, the Department never did anything with the nuclear again till they bought into this plant out in Arizona [Palo Verde Nuclear Generating Station], a piece of it, but they sure kept trying. They had five or six designs that they tried to get going. Pete [Peter G.] Lowery was always getting a piece of land someplace for cooling towers or water supply and it never worked out. It's too bad. But the price went up mainly because when they began having problems the safety features became more apparent. They felt sure of these big containment vessels, which have done all right. The problems that have happened in this country, the containment vessels have handled them. And Three Mile Island, it's still bottled up in that big old bottle, but it never did cause a lot of damage to anybody, things worked the way they should, and finally the government gave up, shut down their graphite reactors, which were the same as that Russian thing--they're all down now. England had a big problem with one of their graphite reactors. In this country I think they had so much confidence in that vessel that nobody thought about much else. But they have had lots of trouble in the pipes, in the heat exchangers and other things.

I haven't kept up with it too much after Three Mile Island. I did a lot of reading and I got a lot of information

on that, because that was not too long after I left, but that was caused by training problems. We had a good training group even prior to my going into Generation. It was organized mainly because we had trouble getting operators. We were expanding so fast. We set up training classes to bring the operators from Assistants up to full Operators fast, and they were good classes and they were run by good instructors and I think they were very, very satisfactory.

Then another thing was the procurement of Assistant Operators. Finally, after a lot of talk with Civil Service, we set up a system where we ran our own examinations. We took kids that had had the background, preferably two years of college in science courses, where they'd have physics or chemistry, college math, drafting, and maybe not a degree but at least have that much in pre-engineering. They could apply and they would be given some very lengthy interviews by the people that were the instructors in our training classes. They could then be certified and put on a list, and we hired them off that list. Civil Service agreed to this and they gave them Civil Service status. When our group did the examination, they were considered to be a Civil Service Examining Board. This was really producing some good people. Then we sent them to a cram course we set up out at Valley where they could work right in the plant, and for three or four months, go to school part-time and part-time out in the plant. Anytime something was torn down they could be right in

on it and see what was inside. Gradually they spent more time in the plant and time going around with the Plant Operators, following them around. After their graduation, they were assigned to a plant as a regular Assistant Operator. However, they had to keep up on a lot of correspondence courses and they had to come back periodically for an examination. I guess it was about a year when they were finally given full Civil Service status. They were still on probation, summary dismissal. (chuckling) Finally, after about a year, they got their full status as Assistant Plant Operator.

Both of those programs had just started at the time I took over the Generation, and I believed very strongly in that and I worked to expand them. I worked hard with Civil Service to be sure of that program of hiring. It almost blew up in our faces. One day, I'd been out and I came in and this group was giving examinations in one of the offices there in the Wright and Callendar Building. I was going down the hall and I looked in and I saw they were having a test of one of these fellows. Well, I thought, "I don't know what they're doing in there so I'm going to drop in and see," so I just went in and sat down. I think we had three or maybe four people on the board and Civil Service might have had an observer there. I sat down and I was listening to it. It sounded pretty good to me. They were examining this fellow who kept bringing up the fact that he had a college degree. They asked him what did he have his degree in. Well, it was sociology or something like

that, and he really didn't seem to have any physics or chemistry. So, anyhow, when the list came out he didn't make it. (chuckling) You know, it turned out that, of all the days that I would drop in there on that, he was a plant that CORE [Congress on Racial Equality] had sent in there because they'd had complaints that they thought that the blacks weren't getting a fair shake and this wasn't a real Civil Service exam. Although we were hiring quite a few blacks. In fact, by that time we had several operators and a couple of steam plant foremen who were black.

Well, anyway, what an uproar! It kept going around and around, and finally it got up to a big hearing at Civil Service. By that time [Carl] Tamaki was the Steam Engineer in the Operating Division. The Engineer of Generation had two assistants, one hydro and one steam. Well, by that time, Tamaki had become the Engineer of Steam Generation. He came around and he said, "You know they're going to have that hearing in Civil Service today," and I said, "Okay, let's go." So we went over there. We sat in the back and it got hot and heavy. But the lady who was running Civil Service and had just replaced Joe Hawthorne, handled it well. Hawthorne was hard to get along with. You'd get an argument going with him, why, it would usually blow up because he'd make some statement that would get everybody mad. She was very good, and she had one of her top-level examining specialists there who really knew all about this exam. He'd studied this, he'd discussed

it with everybody, and they killed the protest. The Civil Service Commissioners, after this discussion, just said, "Well, there's no question here at all that this is perfectly all right," and so it continued that way. Boy, we were sure glad to see that.

TC: Well, there were no qualifications there to begin with.

LS: None at all. They made a mistake there. They could have found somebody that was qualified. But that spoiled it right there. They kept bringing that up at the Civil Service hearing to the Civil Service Commissioners, and they saw through this, that he was a college man and they wouldn't pass him because he was black. Well, it wasn't because he was black; his qualifications were just the thing that killed it.

TC: Well, there are other projects going on here. I mean, we're talking about Malibu. Of course, that never got going. You probably followed it.

LS: Oh, not very closely. No, I didn't know much about it. You know, I'd have lunch with these fellows and hear the gossip.

TC: Of course, I know the hearings that were held, it would be Goss who would go to those hearings.

LS: That's right, yes.

TC: It wouldn't really get down to the basic ranks. But there were other things happening, like I think Castaic came along. Well, maybe that was later.

LS: Well, Castaic was pretty well along in the construction. The building was under construction when I left that Generation

job. Of course, during construction there's nothing that the Operating people do. Maybe they call and ask you if you want to look at something once in a while. I'd been out there a couple times and I knew what was going on, but Operating was not involved in that up until right about the time I left, and then I did sit down with the Chief Operator at the Aqueduct plants and we had a long discussion as to what training program to set up and how he was going to handle the plant during its start-up. But none of this was done while I was still there. He and I discussed it one day, and I guess maybe two or three weeks later I was out of that job. They were getting pieces of property lined up here and there, and then they'd drop it and get another one for nuclear plants. Castaic seemed to go right along with no problems at all there, and I talked to [K. O.] Cartwright a lot about that because he and I were real good friends from back in our D&C [Design & Construction] days. He was the Project Engineer on Castaic. A couple of times he picked me up here at home and I went up there and spent a day with him, just looking around, discussing what some of the features were going to be and all. But, no, I didn't get into much system planning.

TC: That was pumped storage and I know there's a couple of other pumped storage facilities in the state, I know just outside of San Francisco . . .

LS: Yes, San Luis Reservoir. I've been there.

TC: Yes, San Luis Reservoir. Was Castaic one of the early ones, do you know?

LS: There weren't too many. There were a couple back East. But the main thing that made that a go was we were supposed to have a lot of nuclear power, and you don't want to shut down the nuclear units at night, so all night long you can pump the water back, and during the day, why, you let it come down, and we wouldn't lose any water, just use it over and over. We were going to deliver some power to the state, as I recall, to make up for the one small unit they were going to put in that would use the flow of the aqueduct, and that was it. So we put all those big units in, and then all the penstocks we paid for, and we were just going to pump with all this nuclear power. Well, the nuclear power has gone down the drain, and I don't know if they've ever used the pumped storage feature up there, because that's the only thing that made it pay.

TC: So, when it does generate, it generates the basic flow of the California Aqueduct?

LS: Yes, but that's so small, but not bad as the water can be held above and then released for peaking. I believe that a couple of times when the aqueduct has been shut down maybe they did run it pumped storage. With the aqueduct flow stopped, they could pump the water back and forth between the two reservoirs and get peaking capacity at night, but that's long after my time. When I left, Castaic was not even along to the point where operating was going to start training people. They were

beginning to set the turbines, I think, the last time I was up there, that's about all. The scroll cases were being set, which is a long way from completion.

Of course, the Generation Engineer is also in charge of the Owens Valley, and I used to go up there quite a bit. We had problems up there with floods washing out the roads, and the aqueduct would get washed out and that hurt the water system and then we didn't have power. So, right after I came on as Generation Engineer, I began pressing real hard for an interchange transformer bank with Cal[ifornia] Electric. There was a small bank down at Haiwee, but it wasn't big enough and Cal Electric was too shaky. The best help would be the [Owens] Gorge plants. The Gorge line went right over the top of our Cottonwood power plants. Owens Valley was building up, also. There were beginning to be a lot of subdivisions and houses going in, so I started pushing and finally got consent to put in a tap on the Owens Gorge Line at Cottonwood. That really fixed the Owens Valley system. Then we also had a 34.5 tap up at the Lower Gorge Plant. So, between those two, we could supply that 34.5 system very well, and that solved most of our problems in the valley.

The little Owens Valley plants started when the aqueduct was being built, and the Water System built them to get power for a big hydraulic dredge that ran up and down from Independence to Haiwee. They promised the towns that they would supply them power. So, after they quit using the dredge

and the aqueduct was built, the Department built a plant at Big Pine and then they replaced the generator at Division Creek with a larger one. Somebody says they think they found that old generator and it's in a museum there in Independence, but no one can prove it. Then they put in a plant at Haiwee, which has long since gone, that was a little tiny plant that was right at the site of where the dam is now. Cottonwood was the main plant. After they quit using the dredge, they began supplying power the length of the valley. The 34.5 line then ran from Division Creek, which is halfway between Independence and Bishop, down to Haiwee and tied all these little plants together. They not only ran the dredges but they built Haiwee Dam.

I don't know who thought it up, but they built two little dikes parallel and maybe a hundred feet apart, and then they had a good hillside nearby and with big pumps driven from these little power plants they'd wash the hillside down, rubble and sand and gravel, and fill up the space between these two dikes. And right in the center they left a place where they filled it in with clay for an impervious core, so that the rubble then was just the weight to hold everything together. Haiwee, and also dams in the Los Angeles area, were built like this and they have all failed, and they just washed torrents of stuff down. You can see the big scars, especially on the hills above Haiwee.

TC: I wonder if that would have been [William] Mulholland's idea.

Well, [Harvey A.] Van Norman, I guess, was the main man.

LS: I have no idea who decided to do that.

TC: And you say those dams failed?

LS: Yes.

TC: They have failed?

LS: All of them.

TC: Well, they didn't fail in the sense of the St. Francis.

LS: No, they were kept in service. No, none of them burst.

TC: But they could see that it was deteriorating.

LS: Yes, they could see. Well, the leakage got to be bad, and after St. Francis they were afraid they were going to go like St. Francis did, which was from leakage around the abutment. At Haiwee they built a new dam which was just a little bit above the old dam. Anyway, the old power plant was no longer in use, and they built another power plant down the canyon a couple of miles, ran a big penstock down to the new Haiwee Power Plant. Then the newer dam took care of the problems with this earth fill thing.

Now, Dry Canyon, I guess I was Generation Engineer when they decided they had to do something about that. It was leaking. The fellow in charge of Structural Engineering in the D&C Section got an idea of forcing interlocking steel piling down into the central core, and because it interlocked it would be almost watertight, and they'd drive this with a giant vibrator. [W. A.] Hunsucker was his name. I went up

there with him one day, and we had been using Dry Canyon in order to be able to cycle the plants up in San Francisquito and use them just for peaking power, which is a good way to use your hydro. If you haven't got enough for a full load all the time, why, it's real nice to be able to use it just over the peak and then store the water. Well, if we ran them wide-open, we got too much water coming down to Dry Canyon, and when we went onto this peaking business we'd fill Dry Canyon up and then we'd have to stop the plants up above. We could carry 1,000 second feet down to Dry Canyon, but only 400 second feet from there on down to Van Norman. Well, we had to stop using Dry Canyon, and they laid a bypass line along the bottom of the reservoir, and we could run the 400 second feet down, which the pipe could carry below Dry Canyon, but we couldn't run any 1,000 second feet through PP1 and 2. That was real bad for the Power System and we were really fighting to get something done, so I was real interested in that.

This vibrator was an immense thing powered by electricity. It hung from a big crane. Then they had another truck with a huge, diesel-driven generator, and this vibrator head would be clamped onto the top of one of these pilings and they'd be interlocked with the next one. Then this vibrator would start and it just went down there like pushing a knife through butter, until it got down into the core. The first fifteen or twenty feet of core they ran into all kinds of trouble. I guess they uncovered a section of it, finally, and

they found that when it was built the rubble they'd washed down there contained old planks and two-by-fours and all kinds of junk. They finally gave up on the piling. I think they found all this trash and rubble and decided there was nothing they could do with it. The thing just sat there empty for a long time, and, of course, we lost a lot of peaking power. But at that time we really didn't need the peaking power so badly as we did other times, we needed base generation.

Then they abandoned Chatsworth. It just got so bad and they didn't know what to do with it. It had an additional problem that it was kind of shallow and it was hard to keep it clean. It would grow algae and stuff in it, and then right at those hills up there back of the reservoir there is an oil field and oil seepage would show up. Once in awhile Chatsworth would get oil film on the surface, so they just abandoned it. It's a wildlife refuge now and they're having a big fight with the councilmen wanting to put water back in it and make a beautiful lake out of it. And the trouble is the dam was no good, you couldn't have water in it.

Then I think Franklin they rebuilt somehow. I don't know exactly what they did to it. They had to do something to all of these dams that had been built by that hydraulic method.

TC: Including Hollywood Dam?

LS: No, Hollywood Dam is a concrete arch type. But everybody got panicky about Hollywood, so they put a landfill on the bottom

side of it to prop it up. But the dam itself I don't think ever had any problems.

Well, the generation business was interesting and it kept developing these problems as we went along. We had a fire down at Haynes. It hadn't been in service very long when they took out a section of oil line and they put blank cover plates over it so that the rest of the line could be used while they were doing work on the boiler. Somehow I guess they took cover plates off at different places on this line and finally wound up with an open oil pipe and pumped a lot of oil under one of the boilers and then it caught on fire. It was down underneath the boiler. It was a big mess and we had to clean it up and do a lot of work on the boiler. It wasn't as bad as the explosion, though, we'd had at Scattergood.

Another time they saw oil going in the harbor--this was about 2:00 A.M. They sent a man once a shift down to inspect the intake structure, which was under one of the docks where the old Catalina Terminal used to be. He came back about 4:00 in the morning and said, "There's oil down in the harbor." So we shut off everything and the plant superintendent got over there right away. We belong to an organization to prevent oil spills in the harbor, and everybody that handles oil around the harbor belongs to it, and it's agreed that any member that discovers oil will take immediate measures to get it cleaned up and to stop it and they'll worry about the cost and whose fault it really was afterwards. So, in that particular case,

a lot of oil went into the harbor. We called out service companies and got booms around it, all before daylight. Well, they called me at home and woke me up before my regular getting up time, maybe five o'clock or something like that. By the time I got down to work everything had been contained, but they still didn't know where it was coming from. But they kept trying to trace it and they finally decided from samples--they'd taken the samples and run gas chromatograph tests on them--that it wasn't any oil that was in any of our tanks or out of Harbor or Olympic Tank Farms. So, at that point, we just announced we weren't having any part in paying for the clean-up, even though we'd ordered it. (chuckling)

TAPE NUMBER: 7, Side A

May 12, 1992

TC: Well, we finished off last time on a conversation about your experience in Generation. I think we are sort of at a period of around 1965, 1966 or so. Where do we go from there? You became Assistant Head of PO&M [Power Operating & Maintenance Division] at that point.

LS: Yes, I finished up my job as Engineer of Generation with a sort of an exciting experience. About a week or two weeks before I was moved into the Assistant Division Head job, they had the big blackout in New York, and that stirred everybody up. The IEEE [Institute of Electrical and Electronics Engineers] established an ad hoc committee, which had a man from Edison on it and a man from DWP, who was Carl Kist, the Assistant Division Head of the Operating Division at that time. They went back East and spent pretty near a month studying the blackout and all of the problems that arose and how it was handled and wrote a very lengthy report. After they finished their report, in the Department we decided we'd better prepare for the same sort of thing, because it was just bound to happen, and, of course, it did. Within the next two years, the New York system had two more blackouts and we had several here. It was just that the systems were getting so big and so interconnected that little minor things would spread very rapidly from one place to another. We set up a

committee in the Department with the Plant Engineer at each plant and the Assistant Superintendent of each plant to make a study of what the Department would do if we got in the same sort of a problem. To do that, we had to know the exact characteristics of each type of steam generator on the system and what it would do under low frequency conditions, which was what broke up the New York system.

TC: Okay, that's my question: What actually happened in the blackout?

LS: Well, the frequency started down. They lost an enormous amount of generation on their tie from Canada. They were in no position to shed load; nobody was in those days, they just hung on to the bitter end. The system started to slow down, and as it did the boiler feed pumps began to lose water pumping capacity, the fans began to lose capacity, as did the coal conveyors, and at all of their plants the machines lost capacity. Of course, that slowed them down further, and then tie lines began to trip out and pretty soon the whole system was just in complete collapse. In the New York system, which is a network system, the various networks were impossible to pick up together because they were all tied in one big solid mass, and the minute they tried to pick one up, why, it would overload the machines in that corner and drop everything else.

So we decided we had to find out what was going to happen with the Department and we started those studies. It's very dangerous running big turbine generators under speed. They

have a characteristic of what's called critical points. If you start at a low speed and you gradually begin to bring them up in speed, there are usually three speed points they pass through where the vibration becomes very critical for just an instant and it can cause considerable damage. So we wanted to find out where the critical points were. The usual approach is to know approximately where it is, and you bring the machine up to just below it and then you just give it everything it's got and you shoot the machine through that point. So we wanted to find out exactly where they were, because if the system is slowing down you don't have that choice of bringing it to the exact point you want and then jumping past it. It slows down gradually, and when it hits the critical it may stay there quite a while. They did this on the Edison system, the Con[solidated] Edison there in New York. They did damage to a couple of their large machines.

So this committee worked out all the procedures and tests that we wanted to make. Then we went to the manufacturers, and at first they just weren't going to have any part of it, no responsibility at all, but then the whole country got so stirred up over this thing that pretty soon people were beginning to cooperate. We had GE and Westinghouse and English Electric, that was all we had on the system then, but they were all willing. If we let them have observers there, why, they were willing to take a chance on it. But they wouldn't take any ultimate responsibility if damage did occur.

They were willing to be there and watch it but they weren't going to replace any damaged machines.

So we started these tests and they ran them for about . . . I'd say about three months. We did one of the small machines at Valley first, and then one of the large machines at Valley, and then we did two machines at Harbor. We were trying to get just one machine of each type. We had no problems, we had no damage at all, and the tests all came through just the way we had planned and hoped, and we just learned an enormous amount from these tests. I was sent down to San Antonio to a big conference at the APPA [American Public Power Association] to give a paper and an evening of discussion on this testing we had done. Well, that was my last duty as Engineer of Generation. I went down there, and when I came back I found that notices had been posted everywhere in the Department saying I was now the Assistant Division Head of PO&M. I objected quite a bit. I'd been asked if I'd take the job first, and refused it point-blank, but when I came back, there I was. (chuckling)

TC: Well, why did you refuse it? Would it sit you at a desk and that's it, or . . . ?

LS: That's right. I felt it was just a desk job and I liked the Generation job. I liked getting out in the plants and seeing the machines being taken apart and doing things like this testing. Well, anyhow, when I got back from that meeting I was Assistant Division Head, and as I suspected, it was

nothing but a little desk work. Glenn [M.] Green had been made Division Head at the same time and [Burton A.] Currie had moved up to Assistant Power Chief. So we were all sitting around and wondering what we were supposed to do. About that time, Green came down with a bad back, which turned into cancer, and he was in and out of the job from then on, never for very long, and then he passed away after about a year. So not only did I become Assistant Division Head, but I was taking care of the division at the same time.

It really turned into quite a hassle because we had all these tests going and then we were short of generation that year. It got to be a regular routine. I'd come home and go to bed and I'd lie there and think about if I lost this machine and I lost that machine, how would we pick up the load in the morning. We were that close to not making it.

TC: What accounted for that shortage of generation, was the demand suddenly larger?

LS: Well, several things had happened. The demand had gone up and we'd gotten into a big hassle about adding another unit and a lot of delay about that.

TC: Was that Scattergood, the Scattergood Steam Plant?

LS: That would have been Scattergood 3, and they finally even gave up on that temporarily and went in on a joint venture with Edison to build the Mohave [Generating Station] plant. We took one unit in that. Then we began to get into oil problems, big oil shortages, and I went to several meetings

where Edison people and San Diego [Gas & Electric] had discussions about what we were going to do about oil and where we could buy it and so on, because that was right when the OPEC [Organization of Petroleum Exporting Countries] started to boycott everybody about selling them oil. Oh, it got to where we could hardly keep up our spinning reserve. We were all committed to a certain amount of spinning reserve under our interchange contracts, and there were days when we'd buy spinning reserve from Idaho and Utah and places like that, but we satisfied the legal requirements anyway and we got by.

Actually, there never was a time that we didn't make it, but there were lots of very hot days that summer and it got so I was running a regular school over in the Load Dispatcher's office almost every day for the TV people and the radio stations. They'd start coming in in the middle of the afternoon, "Are you going to get through the night? Are you going to be able to go tomorrow morning?" And I got well-acquainted with the broadcasters. But every day we'd put on a show for them at the Dispatcher's Office and show them what the meters did and try to explain to them how close we were.

Finally, we got so worried that I worked up a little program and started giving it around town to people who were in critical situations: the hospitals, fire department, police department. We'd have meetings in one of our conference rooms and I'd tell them, "Now, here's the situation. Tomorrow you may have a blackout, and be ready for

it. Be prepared that you may lose your communications, you're going to lose everything." How we got through I don't know, but we did make it.

TC: Well, their response must have been fairly negative, I guess. Was it a negative or an outraged response: "How can you do this? You're our Department of Water and Power, you should be taking care of these things"?

LS: Yes. Well, some of them. The hospitals legally are required to have . . . their operating rooms have to be capable of going through a blackout, and all the big buildings downtown generally have a small emergency generator that could take care of one elevator. The fire department communications at that time was over in Westlake Park . . . I guess it was an island in Westlake Park. They had Kohler sets and emergency generators, but they'd never seemed to have thought of having to use them. The police department was the same way, every police station had a little generator. But we convinced them they had to start testing maybe every week, and they found out in many cases that those generators just weren't ready when needed. They learned in a hurry that they'd better get in and do some maintenance, and I believe that the Department did some maintenance for the hospitals. Then we convinced them they had to do weekly testing; and it was a good thing, because toward the end of that summer we began to have some blackouts.

The Intertie was new and just starting to work. The DC end of it wasn't actually in service, but the AC end was and it had some problems. PG&E, in a big storm, lost about eight or nine towers north of the Bay Area. Then everybody was short of fuel and it just seemed every time we turned around something happened. We got the DC line in and working and then it failed us several times. I can't remember exactly, but I think that toward the end of that summer we must have had three or four blackouts. The worst one was one that started on the Pacific Coast and went down to El Paso and up into Utah and Idaho, Denver, all of Colorado, and just everything was blacked out. We rapidly learned then that it wasn't so much losing the generation, but in the western part of the country, we lost transmission lines. We were tied together pretty solidly and when one or two transmission lines would go out, others would begin to trip. It was a very weak tie across the north, from PG&E, of course, through Pacific Lighting in Reno, and then down through the middle of the country to El Paso and into the Texas area, a very weak tie, so that when the big heavy ties that ran up and down the coast failed, why, then these others just started to pop, one after another.

We started a program then of trying to make it automatic to shed load. First, we tried to get the operators to trip the load off the minute they saw the frequency was starting down. But operators just inherently can't bring themselves to

drop load, I guess, and even then to walk across the room and pull three or four switches would take up too much time, so we put automatic relays in in all the receiving stations and we fixed them so we could change the settings from week to week, depending on what the system was doing and what generators were on around the system, and they worked very well. They'd just shed the load instantly and we'd drop half of our receiving stations maybe right away, and we could come back very quickly because the generators never slowed down. If we could keep the generators up to speed, we could start picking up the load real fast. The system worked just fine. Well, that was my first real job as Assistant Division Head and Division Head both at the same time.

TC: Another trial by fire.

LS: The other thing that was hurting us real badly then was fuel shortage. Kanouse called me one day to come to his office. He had a couple of gentlemen there I'd never met before, although their names were familiar, they were from the gas company. One was the president of the Southern California Gas Company and I guess the other one was San Diego Gas & Electric, and we had a conference of what we were going to do about fuel. We wound up with the decision to work up a contract where we had responsibility for helping each other out in time of shortage. So I was given charge of that for the Department, and we worked for about five or six months on that, I guess.

We drew up the first big fuel contract where everybody was in on it and had responsibilities. We went down to details about how we could get a generator started if it was off the line and we had to start it in a hurry, which we had never been able to do before. Starting a cold generator on oil is just next to impossible. It could be done, and we did do it occasionally, but in this agreement we had it fixed so that everybody would commit enough gas to get a dead generator started, for instance, on one system, and then we'd switch over to oil. So the gas contract was a major project; it just took almost all my time there for several months.

TC: What would be the gas company's needs? I mean, what was their need for gas?

LS: Well, of course, they wanted to sell gas, and they were building a couple of pipelines and were making firm contracts to buy gas in Texas and from up along the Canadian border. They put a couple of pipelines up into Wyoming and Montana and then they built into Texas. So the gas company was just happy to be in a position where they could supply this gas when it was needed. So, for the first year I was in that job, I think the biggest thing was getting our load shedding system set up and getting a firm gas supply.

TC: Was that after or before the plan for the Gulf Pacific Pipeline?

LS: Oh, I am not sure. Yes, the Department actually had no interest in pipelines at that time. It was just to buy so

many cubic feet of gas under certain conditions from the gas company, and in return the gas company started building pipelines and they also developed two or three underground storage basins where they took over old oil fields that were worn out. One of them was a Playa Del Rey field, another was out in Montebello, and they plugged all the wells except maybe a dozen, and half of those they made input wells where they would take gas out of what they called their big doughnut, which was just a giant, circular pipeline that goes around Los Angeles County, basically. They'd take gas out of that, and they built big compressor stations. One is up by Loyola University and another one is out by Montebello. I visited all of them at the time. We had a big party each time they got one running. They'd pump gas down at a very high pressure and store it underground, and then as it was needed they'd bring it up through other wells. They'd have some wells pumping down in some fields, other wells were sucking it out in other fields. The thing worked out very nicely. I think it was a big success for everybody, and we all got well-acquainted and went to the ball game together regularly and it was, as I say, a very successful operation.

Then, during all this time, Green was getting more and more ill. So, after about six or eight months, he didn't come in anymore and he passed away in about a year.

TC: Well, let me go back and just ask you something. As you said, you were reluctant to become the Assistant Division Head. Did somebody twist your arm or . . . ?

LS: No, I just came back from a meeting in San Antonio and there I was. (chuckling)

TC: Okay. Nobody sat you down and said, "Okay, Stinson, this is it for you"?

LS: Well, that was my first knowledge of it.

TC: That was your first knowledge of it? Very interesting.

LS: Let's see, then another thing that we had was an interesting problem, not big but quite interesting. One day a big freighter ran aground out in the West Basin of the harbor. That area had been a big shipyard during the war, and then when we built Harbor Steam Plant, our intake was over at the old Catalina Terminal, which was on Mormon Island. We took water in from there across to the plant and then we discharged it into the West Basin. All the time the plant was running we have traveling screens that the water passes through. Those screens are cleaned out so we only get good, clean water into the condensers. Periodically then we would flush and clean out the tunnels by getting all the oxygen out of them and then the marine growth and the shells and so on would die in the tunnels. Nobody seemed to worry much, I guess, when that system was designed as to what became of it after it died. Anyhow, it was flushed out into the West Basin and built this island of shells out there, and here one day this big

freighter ran aground on our island. So we had to get it out of there, and we paid for dredging the West Basin, cleaning that all up, and then we improved our maintenance in keeping those tunnels clean after that.

I went down in that tunnel at the time it was at its worst and you just couldn't believe it. There must have been six feet of dead shells in the bottom of that tunnel, in those ten-foot tunnels.

TC: That would be like mussel shells?

LS: That's right. So that was one big exciting moment we had. We got in there and scraped all that stuff out and then had the Harbor Department dredge and clean it up, and we kept it clean after that.

Another thing then, when the DC line was finished and in operation, we started having outages. After the first episode that took it out of service and seemed to be quite a mystery for awhile, we found both conductors broken at Vasquez Rock. Vasquez was a famous bandit around here and there's a place called Vasquez Rocks, plural, which is up between Saugus and Palmdale. It's a county park, I believe, now. Then north of Mojave, [California] there's just one big rock sitting out in the middle of the desert called Vasquez Rock. It's not far from Ridgecrest where the Navy has an ordnance test station. Well, the line tripped out one day carrying a full load. That was about the first outage we'd had on that line under full load, and the patrolmen got there and both conductors were

severed in several places, right alongside this Vasquez Rock. There's a road that branches off from the main highway right at Vasquez Rock and goes to Lake Isabella. There's a service station there and the guy said, "You know, yesterday I saw a couple of these Navy airplanes from down here at Ridgecrest flying all around there. One of those guys was diving under the line just to show he could do it." So we followed that up and pretty soon we found a tailpiece off of a plane. The foreman and the superintendent went over there and started talking to the commanding officer. Oh, no, his planes were never allowed to fly there. So, finally, they pulled out the piece of tail section with the plane number on it and that settled that. (chuckling) We never had any more trouble with airplanes going through that line, at least at that point, we have at other places. But that was real interesting. Those guys were trying to show off what they could do to go underneath that line.

TC: So one of the tail pieces caught the line?

LS: Yes, and just sheered it, just like a knife going through it.

TAPE NUMBER: 7, Side B

May 12, 1992

TC: It wasn't intentional sabotage.

LS: No, I don't think so. The pilot risked his life, probably just showing off. Well, then, right about that same time, we had some towers go down up at a little town called Lovelock in Nevada. It was right alongside the Western Pacific Railroad line and east of Reno. We got out there and found five towers down. That DC line had guyed towers. They were not self-supporting. It was just a single tower standing up with four guy wires on it, and a whole string of them had gone down. It was learned very quickly that if one tower went down you lost a lot of them, because the strain would just pass along from one tower to the next. So investigating that, it was found that some of the guy wires had been cut. If you cut one wire, that tower would start to lean and that would pull on the next and down they'd come.

Well, because it was a utility, the FBI [Federal Bureau of Investigation] got in on it and they had a big investigation. Pretty soon they found a hermit living in a cave about five miles from where these towers had gone down, and he had a truck and they traced the tire marks on his truck and they pinned it down to him. But the FBI wouldn't do anything because they've got some rule that you've got to--or at least at that time--you can't prosecute anyone unless you

had three points of guilt or something like that. But they kept an eye on him. About two months later, Danny [D. G.] Greenwood and I went to a big party down on the *Princess Louise* to celebrate the graduation of our class of new linemen, and in the middle of the party, why, a waiter came in, got a hold of Danny, and Danny came over to me and he said, "We've just got a threat that somebody's going to cut down some towers up in that same neighborhood again tonight." So Danny and I took off and we went back up to the Dispatcher's Office. Boy, was everybody there, including the FBI, and they were all sitting around talking about it. (chuckling) It gave me confidence in the FBI. Of course, everybody wanted to know where this hermit was right away. This was within twenty minutes after the threat had come-- that's about how long it took us to get up there from San Pedro--and somebody spoke up and said, "Oh, he's spending the night with his sister over in Hawthorne." They knew right where that fellow was all the time. (chuckling) So, anyhow, nothing came of that, but we did have other threats from time to time to that line.

TC: Now, those kinds of towers, they have very narrow footings, right?

LS: One little pin. They stand on one insulator.

TC: So what holds them up is the . . .

LS: The four guy wires.

TC: The guy wires themselves.

LS: Yes, they're a box about two feet square, a latticework box, and then a guy wire going off from each corner. Occasionally there's one that's stronger. Where it's a bend or an angle tower it's self-supporting, but not many of them are. That line was built to just carry lots of power cheap.

Well, for quite awhile that was a headache, sabotage on that line, and I don't think it's ever really stopped. They still have little problems now and then, but they've never had big sections of line go down again like they did that particular time. It is mostly insulators shot up.

The Department had started running tours up to Owens Valley to take important people or politicians, folks they felt would do them some good. I guess you know it finally got them into a lot of trouble last year, about spending money on those tours.

TC: Oh, yes, it did.

LS: Well, the first ones were run by the Public Affairs people entirely. After two or three tours, they came down to management and said, "We're getting a lot of technical questions and it's surprising how many of these people want to know technical things. Could we have an engineer get in on this?" So they appointed Bradley Cozzens to go and he used to give them the technical information. Well, I think Bradley kind of overdid it. He's extremely technical, or was, and after three or four months, why, Paul [H.] Lane and I got called in and said we were to take over this thing. They

would send along one Public Affairs fellow who would pay the bills, take care of the book work. At the time, Paul Lane was a Division Head of the Water System. It might have been Owens Valley Aqueduct, I don't know. Well, anyway, we worked that program up, and for about three years then, until I retired, we ran several tours a year. We got a lot of literature together, we practically had it all memorized, and we'd take these people up there and really show them the Department and how it works and go through all the power plants and explain how they worked and how the aqueduct operated and so on. That was a lot of fun, and we just enjoyed that and met a lot of nice people. I'd guess we had about twenty of those tours, Paul and I between us, and then I retired and he became General Manager, so we turned it over to other people. But it was very interesting, the questions people would ask and how interested they got in the whole thing.

There was never but one or two tours that fizzled, and one of them was the San Fernando Valley Manufacturers' Association, it was called. I don't know whether it still exists or not.

TC: I think it does, yes.

LS: Well, it was people like the managers of the two breweries and the aircraft plants and so on, and they had this club and so they wanted a tour. (chuckling) Usually we met down at the Department, and a bus would come in and pick everybody up and they parked their cars in the Department garage. Well, this

time it was announced that they were going to park in the parking lot of the brewery out there on Roscoe [Boulevard]. So we got out there and everybody was parked and climbing on the bus, and along came two skiploaders loaded with beer. (chuckling) And they unloaded the beer into the back end of our bus, and that's all that trip was was one giant beer bust from then on and a poker party every night. We started out on our trip and we told them where we were going, and right away it was, "When are we going to get back? How long is this going to be? Why do we have to go so far?" They wanted to get back to the motel right away and get the poker game going. I thought that trip was a horrible waste of time.

Then another one was one that Public Affairs wanted to run for all the newspaper, television, and radio big shots in town. They were good people, for the most part. They were the regular announcers from the stations. There was a fellow named Simons at that time who was a Columbia Broadcasting Network special reporter for environmental affairs, I guess, right at that time they were starting a lot of big campaigning about cleaning up the environment and that sort of thing. Anyhow, he did a lot of that kind of reporting. So he was along on the trip, and the first stop we made was in the yard at Mojave, and the ladies that live there at Mojave Water Yard would always have homemade doughnuts and coffee, and this would be about 9:30 or so in the morning. We stopped, and right behind us pulls up a CBS television van. Then Simons

came around and he wanted to know if it was all right if they came in with us, that they just felt there might be some things of interest that they might want to take some pictures of, so they wanted to have this van follow along, and would it be all right if they came in and had doughnuts, too? So this was all right. So then we stopped in Big Pine, had lunch, but they didn't come in. They didn't try to horn in on anything except the doughnuts. (chuckling) But, after we left Big Pine, we went to the Independence Fish Hatchery. Have you been there?

TC: I've never been there, no.

LS: It's a large fish hatchery.

TC: I've seen the signs for it [off Highway 395].

LS: And the exciting thing about it is the size of the fish. They have these trout about two feet long, special breeding trout. Well, we pulled up and parked and everybody got out of the bus. And then about six pickup trucks full of Indians came up behind us and got out and they were beating drums and yelling and putting on a war dance and they put on a demonstration against the Department. The government had traded some Indian land for Department land up there somewhere and the Indians were fighting it. Anyhow, there was a big demonstration, and, boy, the Columbia Broadcasting Company was out there with their cameras all over the place. Then they immediately took off and Simons went with them. He said, "Oh, this is too big a story to pass up." He said, "I've got to go back to town

and follow this up." So they took off. Well, there's no doubt it had all been planned, you know.

TC: Preplanned, yes.

LS: So, from then on, we changed the whole itinerary and went to different places and tried to hide from them, but the Indians showed up. Everyplace we went, those Indians were there. So I thought that whole thing turned into kind of a miserable failure.

TC: I guess that would have been on the shoulders of the Public Affairs [Division] representative, whoever that was, to handle that.

LS: It was Liz Wimmer, and I always felt she did a fine job, but I don't think they had any idea anything was happening. I think that Simons had just planned this whole thing himself and it came as a big surprise to everyone. But we passed up several things that we usually did. One place we always took these people was down to the Middle Gorge Power Plant, which is a nerve-wracking trip. The gorge walls are absolutely sheer on both sides and it's about a quarter mile deep, and you start down this little narrow road in a big bus. The water tunnel comes out the side of the mountain. It's a pipeline up above and then about three or four hundred yards back from the edge of the cliff it turns and comes down a tunnel at forty-five degrees and comes out at the base of the cliff into the power plant.

There had been a kind of a huge, big rock from the time they started construction that had been in their way. Finally, they got to the place where they were going to dig the main foundation for the turbine and they started taking out this rock, digging around it. And they kept digging and digging, and pretty soon they had about twenty feet of rock coming up out of the ground in a point, and everybody just got scared. Here's this thing towering above the power plant and they didn't know how deep it went and there was nothing bracing it. So they put in giant anchors all around and big guy cables, and as far as I know it's still that way. Well, you take a bunch of people down that road, which is a horror, and then they come out, park under this rock, go visit the power plant, and they come back and here's the rock still standing up above the bus. It's really sensational. That was one place we did take these people because we could get through the gate at the top of the gorge and close the gate and lock it. But for the most part that trip was a miserable failure.

My wife said afterwards, "I couldn't believe it. I was watching Channel 2 that night and all of a sudden here you are getting off the bus and all these Indians banging drums, yelling and screaming and doing a war dance." (chuckling) So we had a couple of interesting episodes there with that.

Well, it was about that time that Green died and I became permanent Division Head. I'd been temporary Division Head all the time he was sick, for about a year, I guess.

TC: Well, let me ask you a couple of things about that period that we haven't covered here, if it's relevant. System Development was established in 1967 or so, and so that would have been during the middle time of your being Assistant Division Head

LS: That was about the time I became Division Head.

TC: Now, they took some of the functions away from PO&M, right?

LS: We had that little group; originally it was called Operating Engineering. Oh, before that even, it had another name; it was called the Research and Records Section.

TC: Research and Records, okay.

LS: And then it became Operating Engineering, and it kept growing and growing and they kept taking on more engineering duties. Now, when it was the Research and Records Section, it was under a fellow [Codel?]

TC: Okay, we can track that down.

LS: Anyway, he was elderly and he had retired. They started building it up and it began to take on engineering functions and changed the name to Operating Engineering, and I'd say it doubled in size in about a couple of years.

Then they began to get into contracts with other people. The first one was the Page [Arizona] plant [Navajo Generating Station]. Well, there was one before that when they got mixed

up with Edison on the Mohave plant. They dashed into that in a hurry because we were desperate for power and Edison was willing to take us on as a partner. Then they decided they'd like to get into some more joint prospects. Currie was Assistant Power System Head then, and so he personally and quite in secret went out and talked to Arizona and Nevada people and got us lined up for Page. Navajo, is it?

TC: Yes, Navajo.

LS: They've built so many plants out there now I've lost track of them. So then it was decided to create that System Development Division, which was right at the time that Currie finished his negotiations for Navajo. They did two things then: he finished that and they created System Development to take on any additional plants--I guess that's when that was done--so that any additional interconnections and so on were then done through the System Development. And then after [Howard R.] King became Assistant Power System Head, why, Lubisich took it over.

TC: [Peter G.] Lowery, right.

LS: Yes, he changed his name to Lowery. He took quite a few people out of PO&M who were doing a lot of that kind of work in the Operating Engineering.

TC: That's right. Was that a smooth transition or a smooth reorganization?

LS: Yes, very much so. Because one thing was King had been Head of Operating Engineering, so he knew what was going on there;

and, secondly, he picked key people to go with him, which made a very smooth transition. They could take some of the work that they were working on right there and just follow along.

TC: Just keep going, sure.

LS: It worked out real well.

TC: Continuity, yes.

LS: Yes.

TC: Okay, so you had been Acting Division Head and then it was made official.

LS: For probably about a year, maybe a little over a year, I was Acting Division Head, and then I became permanent Division Head. (chuckling) Just before I became permanent Division Head I was offered a different Division Head job, but turned it down. (chuckling)

TC: Oh, yes? What was that?

LS: General Plant. I was never one for moving around unless I could feel I was going to enjoy the work.

TC: Well, what was General Plant's function? That's mainly maintenance of our fleet and . . . ?

LS: Well, it was just maintenance. At that time it was strictly Power System, one of the divisions of the Power System, and it did both the mechanical and electrical maintenance. It had the stationary warehouse and automotive maintenance. There might have been something else, I don't remember.

TC: So that would have been really a far cry from what really interested you.

LS: Oh, to me that was nothing. Art [Arthur L.] Williams called me over and asked me if I would take the job. He was the Power System Head at that time. I said, "Art, I don't want any part of that." He looked at me a minute and he said, "You're smarter than I thought you were." (chuckling)

When I was Assistant Division Head, one of the things I did in order to keep track of what was going on around there and to learn something about it was to go to the morning meeting with the Load Dispatcher and the Head of the Generation Section and the Head of the Substation Distribution Section. Every morning we had a meeting and reviewed all the reports from the day before and all the system troubles and what we were going to do to take care of any problems we saw for the day. That became a standard procedure from then on, that we had a morning meeting of that group, and they'd call in others from time to time. But that group was always there, and they made the decision as to how we were going to operate the Power System for the next twenty-four hours.

And then Currie became System Head when Goss retired. I'd been planning on retiring when I was sixty, so I thought, well, this is a good time to do it. Everybody was shifting around anyhow, and there were a lot of new people, so I told Currie I wanted to retire, and he said, "No. Oh, no, you can't retire yet." He had never been in anything except Communications and a little stint of a few months of Overhead. He said, "There's nobody around here that knows the Generation

like you do. I want you to stay. Will you please?" So I stayed on for nine months or something like that. But I just couldn't stand it. We were getting into oil problems and it was just unbelievable the oil problems we had all the time.

TC: Was it getting the oil? Because I know at some time along there, there was a switch to a low sulphur oil.

LS: Well, that was always being talked over from the time I first got into the Operating Division. At that time, Operating Engineering bought the oil, they wrote the contracts. The Operating Engineer reported to the Assistant Division Head, so I got involved in the oil at that time. No, the whole problem was that OPEC was just mad at anybody that traded with Israel or had any relations with Israel. They weren't going to sell them oil and that's just the way it was. We'd buy a little on the spot market out of Rotterdam once in awhile, and Edison also, out of Indonesia.

TC: Indonesia, yes.

LS: But, gee, you just couldn't believe how low we got on oil sometimes.

TC: But you were able to keep everything running.

LS: We made it. Yes, we made it. There was never a time when we were dry. We always had enough so we could run the generators with what little gas we'd get here and there.

TC: This is something I've asked other people. There was a period of time when the overhead lines were being changed to

underground lines for the purpose of beautification of Los Angeles or something.

LS: Well, I never had a hand in that, although I sure knew it was going on. That got started while I was Engineer of Generation. A lot of it was politics by councilmen. People would come to them and, "Why isn't our street pretty?" Finally, the City Council passed an ordinance that said basically that we would put in underground under three conditions. One of them was main thoroughfares in main business districts. One of those I remember particularly was Vermont Avenue, another was Western Avenue, Hollywood Boulevard, places like that that were what you call main thoroughfares. The Department would do it and pay for it. Another one was that where it was required because of surrounding nature of the area, and that was interpreted as meaning around parks. If you had a park like Westlake Park, you didn't put poles on the streets around there, or you took them out. Then the third thing was where a group of citizens wanted to start an underground district and pay for it themselves. I got in on a lot of that after I was Assistant Division Head.

TAPE NUMBER: 8, Side A

May 12, 1992

TC: So the people in the neighborhood themselves would pay for it?
How would that work?

LS: They'd form an assessment district, and there weren't very many of those in old areas of the city, but lots of them in new subdivisions, because the subdivider could declare an assessment district and it would increase the value of the property. They were building a lot then, and the [San Fernando] Valley was just being covered with new subdivisions, so there was a lot of underground went in where there'd been overhead before. But a lot of people complained bitterly that they felt they were entitled to it free of charge.

There was one group that I battled with personally over and over and over up near Griffith Park. They weren't adjacent to the park, they were down on the Los Feliz side of that first row of hills. They were going to sue us, they were going to do everything under the sun, and we had a big meeting at one of their homes one night and they insisted I bring a lawyer, and I wouldn't bring a lawyer. I said, "No, the Department has no lawyers, and I have no authority to speak to one of those city attorneys." I said, "If you can scare up a city attorney that will come, why, all right, but the Department of Water and Power is not going to ask a city attorney to come to your meeting." So, oh, they were just

raving mad. They wanted all of that hill up there put in underground and the Department to pay for it. They were not going to pay for any assessment district.

TC: This would have been at the top end of Vermont [Avenue], along Los Feliz?

LS: Yes, that's right. That's all little narrow roads. If you put underground in there you couldn't get a pump truck in to pump out the manholes. If you opened the manhole you couldn't have a truck there to work and room for a car to pass it. It was just ridiculous. Anyhow, that finally fizzled out, but there was a lot of uproar. But we did do a number of the main streets around town, as I say, Western Avenue and Vermont Avenue and Hollywood Boulevard, I don't know what else, lots of them. I was never in on any of that.

Then we had all those new subdivisions where they tried different things trying to get the costs within reason. Some places they tried armored cables buried in dirt along the back property line. In other places they put the same thing along the front line next to the sidewalk, and then they'd put transformers in the front yards and plant shrubbery around them. If you can find places like that, go down the street and every third house will have a big old transformer sitting out in the middle of the front lawn. Nothing ever was very satisfactory because it was so very expensive. And underground maintenance, you can't make them believe it. I've told these groups time and time again, "Listen, when you've

got overhead and you have an outage, you're going to get it fixed and repaired in forty-five minutes to an hour. If you've got underground, you may go two days before you get service back again."

TC: Sure, because they have to dig, they have to find where the fault is.

LS: That's right. Of course, they all said it would be cheaper and you never have to repair it. Once it's in it stays, you know, and I've listened to these arguments many times. So I don't know an awful lot of the story of that conversion, but that's the way it finally worked out, that the City did pay for it in certain areas.

TC: That's interesting.

LS: Well, after about nine months I told Currie, "I can't do this any longer." I wasn't feeling too well, anyhow, I was having a blood pressure problem. I said, "I'm going to go next month." So I went in a blaze of glory with a \$10 million lawsuit against me. (chuckling) I guess it was Thanksgiving evening . . . Oh, it couldn't have been. That's something else again, because this happened just before I retired, which was in April. Anyway, we'd had a customer out in the Venice area that we'd been having an awful time with for not paying his bill, and we'd plug the meter out and the guy would break into the meter and take the plugs out or short it out. We stand for just a little bit of that and then we go up and take the wires off the pole. So they went to cut him loose from

the pole, and they got the wrong address. It turned out to be some great big politician who normally was up in Sacramento.

TC: What, as a representative in Sacramento?

LS: No, some sort of lobbyist. He came home one night and no power, and he claimed that he had eight turkeys in the refrigerator, and he had a list a mile long, about \$1,000 worth of groceries had spoiled. So he called up the Department and he wanted his electricity turned on. He didn't know why it was off, nobody knew why it was off at that time. It took us about a week to find out all the details of the story. (chuckling)

Well, I can't say exactly how this occurred because everybody clammed up and three people retired soon after and I never really knew what had happened, but I have a feeling that Green and Ross Brown the District Superintendent and the Chief Trouble Dispatcher at District 6 had gotten together and made a decision that they would not go out on trouble calls at night in this area because they'd had rocks thrown at the cars and at a man up on a pole. But nobody knew that this was the policy. It was not written down anywhere, it never was official and management didn't know it.

Anyhow, this all happened at night. The fellow came down from Sacramento and he called and the Chief Trouble Dispatcher at District 6 told him they wouldn't come out till morning. Well, he blew his top. The next day, here are letters to all the Council and the mayor. This kind of stuff happens all the

time when you get into a mess like that, you know. They finally found out that they'd cut the wrong wires and got him back on, but meantime there was just hell to pay. So he sued the Department, a class action suit for \$10 million for everybody that lived in this area. I figured it out one time and it came to about \$10 million total, and there were six of us named in the suit and I was one of them. Boy, that gave me a big urge to get out of there, I can tell you. And it was right after the present City Attorney for Water and Power had taken over.

TC: Is that [Edward C.] Farrell?

LS: Farrell, yes. So here he is, knowing nothing about it, no one else knew anything about it apparently, except these three people that had cooked up the deal, and there was just hell to pay. It made the headlines in all the papers, and, of course, the *Santa Monica Breeze* and another little newspaper out in Venice, they just kept it going day after day after day. The Board [of Water and Power Commissioners] had me in and they just tore me apart. (chuckling) Of course, I had to take it and I couldn't blame anybody else. And poor Currie, I knew he was sitting there sweating it out, but he had no idea that any of this was going on. After about a month it sort of blew over. I think they just got tired of running the Department down, and by then I'd retired. I saw Farrell a couple of times after that down in the cafeteria one day and had lunch with him. I said, "What's going to happen? What's going to

happen? Do I have to put all my holdings in my wife's name?" He said, "It's going to disappear. Another month and nobody will ever know it had happened." And that's the way it turned out. (chuckling)

TC: That's what happened?

LS: Yes, but it sure gave me the urge to get out of that place, I'll tell you. A man came banging on the door one night, about ten o'clock at night, with a subpoena naming me as a defendant. After I got in the house and looked at it, I realized it was made out to my son. They had gotten the name wrong, see? So the next day I took it into Farrell and I said, "What do we do with this? It looks to me like we could cause them a lot of trouble." He said, "Oh, we could cause trouble and we could delay this for awhile. We could make them hire five more lawyers." He said, "They'd get it all straightened out eventually so why bother? We're going to come out of it all right anyhow." So Farrell was very encouraged about it, and he was right, it all blew over after a little while. So that was my last really official episode.

A few months later, they had about thirty bankers from Boston, New York, Chicago, Baltimore out here, and they were going to try and sell them several million dollars worth of bonds. They brought them out here and they arranged a tour all over the system. Currie took care of the tour around town; he took them down to the Haynes Steam Plant. Finally, he got kind of tired of it and he called me one morning and he

said, "Now we're all set to take these people out to Boulder and Page and Owens Valley. You know more about that than anybody around here. Go home and get some clothes and be over at Lockheed and catch the plane at two o'clock." They had a plane chartered. Boy, it was really a plane, too. It had a couple of bars in it and big luxury seats. So we took off, and as soon as we got in the air the pilot said, "There's a terrible storm up by Mojave and we're not going to be able to go directly to Bishop. We're going to have to go up through the San Joaquin Valley to Sacramento and then circle and come down from the north into Bishop." So we got to see the country and it was nice. We went into Bishop and there we had a couple of buses. We spent three days running these folks all over that part of the system, Owens Valley and the aqueduct and so on. Then we got back in our little old plane again with its two bars and we headed out to Page, and we spent two days at Page showing them the plant. It was just going into service and I think the railroad train came in with the first trainload of coal. Then we took them down to Boulder/Las Vegas, and to me that was the thrilling part of the trip. The pilot announced when we got in the air, "It's a beautiful day, there are no problems, and I'm going to give you a special Grand Canyon tour." And he dropped that great big plane right down into the canyon. We were weaving in and out as we followed the river all the way down and came out at Las Vegas. I loved that! I thought that was wonderful.

TC: Oh, boy, I can imagine. Wow!

LS: Some of those people had never been out of the East, some of them had never been to California before, and they were really thrilled. We spent two nights in Las Vegas doing the shows and having a good time. The next weekend, management decided that they wanted to take the Board on a special trip to Castaic [Power Plant]. Castaic was going to start running the first generator that week--just rolling, it wasn't going to generate, but just roll it over. So they sent me up with the Board to show them around Castaic. That was my last weekend.

TC: I had a couple of things that you didn't touch on, and maybe they're not that memorable, but McCullough Switching Station was set up in about 1970. Was that just a normal operation?

LS: Well, it was a place to tie Mohave in to our system. Mohave had two lines going to Edison and we didn't want to transmit over the Edison line. In the first place, they didn't have enough capacity and we wanted to get the power into our own system as soon as possible, so we built McCullough. It was just a switching station and it tapped into two of the Boulder lines, and that's all there was to that at that time. Now, later, I think, but after my time, it was expanded to pick up the load coming down from Page. They built one line up to Page, and then also I guess that new line that they built into Utah and Nevada may come into McCullough or maybe Victorville, I don't know for sure.

TC: Is that the IPP [Intermountain Power Project] line?

LS: Yes. But McCullough wasn't a very big station. I think it only had two circuit breakers originally, but it had dust. They spent more on that station making it dust-proof than the darned station cost, I think. They finally had to put in double walls and double doors and pressurize the building, and all the relays had to be put into special cabinets and so on; just couldn't keep the dust out of the place.

TC: Interesting. The other thing about the same time was that . . . Now, perhaps earlier you were a member--and I have it written here--it's the Task Force on Generation, which was the Western Region Advisory Committee of the FPC [Federal Power Commission] when the FPC came out with its "National Power Survey" in 1970, they had this . . . I know that Sam [Samuel B.] Nelson was the main representative but I don't know how that worked out.

LS: Well, I didn't do anything on that. I think Goss handled that.

TC: A big event of 1971 was the Sylmar earthquake.

LS: Oh, yes, that did happen, didn't it? (chuckling)

TC: Right.

LS: Well, I got shaken awake at 6:01, and threw on a few clothes and took off and couldn't get the garage door open. (chuckling)

TC: Were you here at that time, in this house?

LS: Yes. I finally had to climb up on the roof of the car and disconnect the mechanism. I had a homemade garage door opener

I had built myself out of an old airplane propeller motor. I finally got the door open and took off. I think it took me seven minutes to get down to the Dispatcher's Office once I got going. When I got down there the fellows were beginning to come in, and the first one that showed up was Leroy Hogg, who was Superintendent of Transmission then. The dispatchers and I had been trying to figure out what was going on, but all the telephones were out. They had this new system that they'd put in the new building where the telephone company had all the control of it, and they just pulled the switch. That killed everything, and nobody could talk to anybody anywhere except over our radio cars. So we scattered them around the system. We had cars sitting out here and there and all over the countryside and people running back and forth to the cars carrying messages. But finally we got word that practically every receiving station was down because the lightning arresters had been mounted on top of the transformers and had broken and crashed on top of the transformers, but the transformers couldn't be used till they got that mess all cleaned up. Well, it took several hours to do that at all the stations. In the meantime there was no load and we'd lost about a third of our generation, but that came back pretty fast. We'd lost all of Valley but they got it back on in a few minutes. Boy, they came right back with Valley so fast you wouldn't believe it. We lost Haynes, but that was a different thing.

On the big turbines the low-pressure end operates under a vacuum. The pressure gets lower and lower and lower as you go through a turbine. It starts out at, say, 2,300 pounds on the small end, and the blades are just little tiny things. They keep getting bigger and bigger, and when you get down to the low end you actually have a vacuum there that's created by the condenser. The cold water from the ocean or whatever you have for cooling goes in and hits the condenser tubes, the steam condenses back into water, and when it does that it makes a vacuum. Your big turbine shell, for instance, on a Haynes turbine, would be about the size of this room, and you don't want very much of a vacuum on it or you'll break the shell, so they have big ports with a diaphragm that will break in case you get too much vacuum. They shatter and let air come into the turbine. Well, on those English Electric machines, either they were the wrong size or something, but every one of them broke, and it takes several hours to put new diaphragms in. So we lost all the Haynes machines, bang, just like that. But that's the only place that happened; at Scattergood and Valley they stood up under it. Anyhow, we didn't have any load because nobody went to work, so it was all right, the load could be carried, but we got the machines back on that we could.

Well, anyhow Lee and I got to talking and we heard that the Intertie switching station was badly damaged, and also we had Boulder lines that were out. So I told Lee, "Get us a

helicopter and let's go take a look." (chuckling) He was in charge of helicopters, so he got a helicopter, and it showed up in about five minutes up on the main building roof. We went over there and got on and the first place we went was out to the DC Intertie station, and it was just a pile of trash. Everything in there, the bus work had broken and fallen and all the lighting arresters had fallen. It had thousands of capacitors that were used for power factor corrections, and they'd all tipped over and were lying on the ground. Some of the valves had turned over, and the operators got out because the mercury alarms went off and it's quite poisonous. They all walked down to Rinaldi. Well, Rinaldi was in terrible shape because it had porcelain-clad breakers. Instead of being in steel tanks, they were in big porcelain tanks, and they all broke and cracked, so that whole station was just broken porcelain all over the place. So we took a look at that and we flew back and forth a dozen times over the DC station so I could get a real good feel for it.

Then we went over to what we called Olive then, which was the old Sylmar switching station, dating back to the days when they had a tap on the power plant lines that tied Power Plant 3 into the system. Here several of the transformers were turned over. They were the big transformers for the Owens Gorge line, that's 100,000 kva there--more than 100,000, maybe 130,000--and the transformers for the San Francisquito lines.

They were all turned over and lying scattered all over the ground.

So we landed out in the middle of this big field, and when we landed there was a great big splash and we were in about four inches of oil. (chuckling) All these transformers that went over had dumped all the oil out, and all of this whole area around Olive station was flatter than all get-out, perfectly flat, and here we had about four inches of transformer oil all over the place. But the helicopter came down all right and we took off all right after we'd looked that over.

A couple of Station Maintenance fellows showed up then, one of the foremen and two or three mechanics, so I told them what I wanted to do first. They were just standing there looking at the mess. I said, "I want you guys to do this and this and this and get going at it, and anybody else that shows up, you tell them what we want first is to bypass Rinaldi. We want the lines cut out of Rinaldi and cut straight through so they go down to Northridge." So that way we could tie Haynes directly into Northridge. I said, "I want that done today." (chuckling) God, oh, what a mess! You just couldn't believe what that looked like out there. So they got going on that.

So then we took off down the Third Boulder line and we must have been right over the center of that earthquake, and here were three or four towers that were just hanging on cliff sides. They'd shaken over but they weren't clear down. But,

anyhow, we found out right away where the center of that earthquake was, because it was exactly where the maps later showed it to be. And the big prison, the girls' prison that was right across the street from Olive, it was a shambles, and they had all these kids sitting out on the lawn. We could look over and see the hospitals, the two hospitals that were down. They were just big piles of junk over there. Yes, the earthquake, I'd forgotten all about that.

We had a Department automobile radio in the helicopter that Lee had grabbed up. It was in a sack, a big canvas sack, so we got that put together and working, and when we'd see these things we could call back and get the Dispatcher. So just the two of us in that helicopter were getting more news back to the center of town than anybody else was doing.

TC: So how long did it take in all to get everything back up?

LS: Well, it took over a year to get the DC station back in service. We had all the transformers except those that had fallen over, but all the receiving station transformers we had back that afternoon. They just went up with sledgehammers and they broke those lightning arresters into small pieces and swept the rubble off the top and forgot about it. We ran without lightning arresters for a year or so. But we were way ahead of our load. I'd say for two weeks we had twice as much generation as we needed.

TC: Was that because the demand was so low?

LS: The demand was way down, yes. So many businesses were shut down and people were just not going to work. Yes, that was quite a morning. When we went back, I went in to see Goss and he was beginning to get some of these radio calls by then, but otherwise he didn't know what was going on and couldn't find out. There wasn't a telephone anywhere that worked. Gee, he was fit to be tied.

TC: Well, what was the form that your retirement ceremonies took?

LS: Mine?

TC: Yes, yours. At one point there'd be a big dinner for a person leaving.

LS: Oh, they used to do that, yes.

TC: Then I think Goss . . .

LS: I didn't like that. Goss had left a little before that, and he wouldn't have anything like that. He went over and rented a room in the Statler Hotel and he invited about thirty people, but quite a few others horned in. By the time the thing got going, a lot of people were there. I had two weeks' overtime coming when I left. At that time, you know, they paid you for some overtime and they let you take some off, and some you couldn't use at all, but I had about two weeks that I was eligible for and so on a Friday I went in and said, "Okay, I'm taking two weeks' overtime and I'm not coming back, that's it." [Carl] Osborn was my assistant and he said, "Oh, gee, next Tuesday I've got to go to Flagstaff." His father had died and he said, "I've got to go over to court to settle

up the estate." I said, "Okay, Carl, I'll come in on Tuesday and take care of it." So I came back in on Tuesday and the girls had fixed up a big cake and that kind of stuff. Anyhow, I thought, gee, I'd better call Alice and let her know.

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TC: You called Alice and she came.

LS: Yes, she came down and most of the afternoon we just hung around there, and people came around and said goodbye and that was it.

TC: That was it? Well, in your retirement I guess you've been pretty active. You travel, I know. You were telling me before . . .

LS: We travel an awful lot. Every year we've gone on a big trip someplace and then two or three little trips. I got interested in a couple of things. Just before I retired I saw a little story in the paper one day about a meeting of people that built miniature railroads. They were going to have a big meeting over in Griffith Park and people were invited to go, so I took my grandchildren over there. Gee, I'd never seen anything like that. This was the Live Steam Club and they had thirty or forty engines running around over there. And I got interested in that. I thought, boy, this is something to do. In retirement you can either do it or not, you don't have to, you're not pinned down to anything. So I started building a locomotive, and I've built two of them now.

TC: How big are the locomotives of these?

LS: Well, I'm finishing up one that's about eight feet long and I've got another one that's the first one I built, which is

small, it's six feet long. Then I had to get a truck to carry it and I joined this club. There are about 400 members and about 200 engines in the club. The city gave us a big area of dry river bottom over there and the fellows have spent a lot of money and hard work and they've got it all fixed up, a mile and a half of track running around there. Every Sunday we go over and run trains all over the place, so that's kept me pretty busy. That's been my biggest activity besides travel.

TC: What do you make these things out of? Is it metal, some sort of steel?

LS: You go to the junkyards and you buy a bunch of scrap, a little metal and so on. I'll take you out and show you if you want to see it. Then there are three or four outfits around here that actually build them and sell finished locomotives, but they cost a fortune. But some people do that, and if they want one bad enough they do it. Then for the fellows that build them themselves, they also sell special parts like castings that are hard to get. Then I started going to night school to a place that had a metalworking course and I learned to make castings. My son said I'd have to have a lathe. He said, "I always wanted a lathe, I'll buy the lathe if I can keep it in your garage." So it's out in my garage. We got a lathe that way and I've gradually built up quite a shop out there. I got a book at Sears called *How to Run a Lathe*, and that's the way I learned to do it.

TC: You also travel some of the historic railway routes, don't you?

LS: Well, we belong to three railroad clubs--four, I guess--that are historical clubs. One of them owns a whole group of engines out at the Pomona Fairgrounds and another one owns ten or twelve cars, and they keep them in pretty good shape. They'll hitch up about six or eight of those cars and borrow an engine from Amtrak and take trips all over the country. Maybe two or three times a year we go on one of those trips. We just do things that are fun. If we feel in the mood to do something, off we go. We're lucky that our son and his wife live just a block from us, so when they go on a trip we take care of their place, and when we go they come up and take care of our place.

TC: Well, let me just ask, is there anything that we haven't covered?

LS: I don't think so, that's everything on my list, I guess. Wait a minute. Oh, one other thing I got into was Civil Service Boards. Just before I retired, they got the idea of putting somebody that worked in the Department and had been around awhile on each board. They'd been getting protests about people on the examining board that didn't know what the exam was all about, so I started doing that. I got to be on a Civil Service Board every couple of months, and after I retired I kept that up. I enjoyed that. I think the thing that really sold me was the first one I was on, and the fellow

walked into the room and he stood there for a minute and he said, "My God, I've got to change my whole program." (chuckling) The speech he was going to make, he knew he was caught. But I finally gave that up.

Civil Service had a big lawsuit. I think the fire department got the thing going, and it resulted in what were called the Dennison lists. That was the name of the man that started the lawsuit, and they named these lists after him. They made up two lists. They'd give an exam and then everybody that wasn't Anglo-Saxon was on one list and everybody else was on the other list. They set up quotas. For instance, if the number of Mexican heritage people was low, then they had to hire off the Mexican list until they brought it up. It was the start of affirmative action. Well, I wouldn't go for any part of that. I told the head of the Civil Service examining section, "Listen, to me a Civil Service job is something you earn and I won't be a party to this." Well, they called me for one more exam and they promised me it was not going to be one of these special lists. I got over there and it was, so I said, "Nevermore, don't ever call me again." So that was the end of that. But I must have worked on ten or twenty Civil Service exams.

TC: So you were like an exam overseer?

LS: No, I wasn't an overseer. There'd be three people, for instance, or four on the board. Right at the beginning, I guess, they had a couple exams where the person from DWP was

put in charge. Well, they got complaints about that, so they agreed that they would not do that anymore. So the Civil Service would appoint the chairman of the board. Well, the chairman doesn't do anything except tell the candidate, "How do you do?" and introduce him to the other people. I don't know why they ever made such an issue out of that, but, anyway, it finally wound up that the head of the board was always appointed ahead of time. Sometimes they'd have strictly oral exam and sometimes strictly written and sometimes it would be a combination of the two. On the oral board you'd make up your score and then they'd average the three grades. Anyway, the Dennison lists made me mad! I just felt that's contrary to the whole principle of Civil Service.

TC: Well, I wanted to just say that I've enjoyed these meetings because I think you're a historian in your own right. You remember things as a historian.

LS: (chuckling) Yes, I do, and a lot of the things I got into were worth remembering.

TC: Yes, and I think the technical detail as well as the human detail has been really, really fascinating, because you just don't get that sort of picture when you read the old *Intakes*, you know, or you go through the documents.

LS: That's right. Well, they're too formal and they're afraid to put down some of the things in that happened.

TC: Well, I just want to thank you for this. It's been very instructive, very edifying.

LS: Well, thank you.

END OF INTERVIEW

