Nevada Test Site Oral History Project
University of Nevada, Las Vegas

Interview with Bruce Wilhelm

June 22, 2005
Las Vegas, Nevada

Interview Conducted By
Charlie Deitrich

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The material in the *Nevada Test Site Oral History Project* archive is based upon work supported by the U.S. Dept. of Energy under award number DEFG52-03NV99203 and the U.S. Dept. of Education under award number P116Z040093.

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[00:00:00] Begin Track 2, Disc 1.

Charlie Deitrich: *OK, and we're recording. So if you could say your full name, date of birth, and place of birth.*

Bruce Wilhelm: Bruce Lee Wilhelm. September 13, 1933. Akron, Ohio.

Were you raised in Akron?

I was raised in Akron, yes. I was eighteen years old before I found out that fresh air didn't smell like vulcanizing rubber.

Akron's a fairly small town, right?

It's not as large as this town now, but this town was smaller than Akron when I first moved here, but other than that, it's–They don't manufacture automotive tires there anymore.

When did they stop doing that, do you know?

Well, it was an attrition process. You know it was the rubber capital of the world and so forth, and in proximity to Detroit for automobiles and so forth. But little by little, they went to research and development. But it still is the trucking capital of the world. That's where all their headquarters are, although they don't have quite the freight. They had a lot of small industries like the Pflueger rod and reels for Enterprise Manufacturing Company.

Is that rod and reel like fishing?

Yes. Fishing gear, the Pflueger Company, Pflueger brand, which was Enterprise Manufacturing.

Can you tell me your parents' names?

My father's name was Ellard Lee Wilhelm and he was from Alliance, Ohio. And my mother's, her name was Thelma Catherine Vint, and she was from West Virginia. She was born in a

lumber camp called Wheeler which didn't exist when she grew up. In fact, all of her siblings were born in lumber camps. But my grandfather, although he was an arch Democrat, did not believe in trade unions, and so he would always be one step ahead of the trade unions as they went in and unionized these lumber camps. So all the siblings were born in a different lumber camp, and when they grew up they had trouble proving citizenship with no birth certificate.

I'll bet. So it sounds like a lot of your family has just been from Ohio, right?

Yes. My mother's from West Virginia.

What did your dad do for a living?

He worked for himself. He was a notary public. He sold real estate. Insurance. What he said he did for a living was anything anybody else was too dumb to do for theirselves.

I like that. Brothers and sisters?

I have a half-brother, and I have a half-sister, deceased.

Did you guys all grow up together?

Not really, no. No.

So tell me about growing up in Akron.

It was uneventful. I went to grade school and high school there. The high school no longer exists. It was the only high school in the state that required Speech as a graduation requirement because Lewis C. Turner was the principal and he was also international president of the Toastmasters. And it was in a very poor area. You know we didn't even have a yearbook.

Was Akron as a whole fairly poor, or was it, you know, solidly middle class—?

No, it had all sorts of areas, you know, middle class, lower class, and upper class, and so forth. But where I was primarily raised was midway between the Firestone plants and the Goodrich plants, and a little closer to the Goodrich plants.

Was your family Cleveland Browns fans or—? Like what's Akron closer to, Cincinnati or—?

Cleveland. About forty-five miles from Cleveland. Cleveland Indians fans, the men in the family.

But no Browns? I only ask because I'm a Browns fan.

[00:05:00] A little bit. Little bit. Brown was the coach of the Massillon High School football team, which was *the* football team in Ohio, Massillon.

That was Paul Brown that was coach, right?

Yes, he was the—

Yeah, he was a pretty good coach, that Paul Brown.

Yes, but he coached high school.

I didn't know that.

And then, of course, Jim Thorpe, the Indian athlete, he and some of his cohorts, they played for the Canton Bulldogs, and also for Canton McKinley High School at the same time.

OK. Did you have any hobbies or activities when you were a kid? Play sports or anything like that?

No, not in particular, no. Bicycles and kites and, you know.

Sure. That's what you did for fun?

Yeah, you know, just normal. You play in the dirt, you know. You play "kick the can."

I remember "kick the can."

We would steal ice off the ice truck, and the ice man ran right at us. And I found out years later that he put a block of ice out there for the kids to steal ice off of.

And he would just go through the [motions]—Pretend like he was—

Because I watched him with the little kids, you know, and then they were stealing ice like I had, and then he ran and he'd get back and he'd be laughing when he—

That's funny.

It was a sport with him.

High school. Did you have any sense of like what you wanted to be when you grow up, in high school, if you wanted, you know, did you have any kind of goals?

No. No. I just went to high school. I started working at Firestone when I was sixteen.

Is that right?

Yeah. And I worked there till I was eighteen.

How was that?

It was employment. But I worked in their Accounting Department doing mark sensing using electrographic lead. Instead of punching holes in IBM cards, you'd use electrographic lead and these brushes would come down in a machine and read these. When I was sixteen, I was responsible for the inventory for all the Firestone antique automobile tires, where they were and what they were and how many there were.

That sounds pretty fun.

Well, that was just one little minor thing. Usually it was invoices that you were working on.

Was there any like, you know, a big kind of historical event that happened when you were a kid that kind of sticks out to you?

Well, I saw an American dirigible go overhead more than once. And I saw a German zeppelin go over once.

You're kidding?

That's where the dirigibles were manufactured, and later on the blimps.

Do you have any recollection of World War II?

Oh, yes. Mostly the radio.

Is that where you got most of the information?

Yes, listening to all the news broadcasts.

Amazing. Just as somebody that, you know, that's so interesting to me, what do you recall about it? Like what was your impression at the time of it?

Well, you felt like you were threatened, you know. We were continuously threatened. And everything was rationed. You know, you had a little round coupon, I don't know what the composition of it was, it wasn't cardboard but if you went to buy meat, you had to have those to accompany your money and so forth.

Right. Right.

Yes, [the] same as rationing. They didn't manufacture automobiles.

Everything was just directed towards the war effort. It must've been a very kind of unifying time, you know, everybody kind of felt like they were on the same team.

It's the only thing that took us out of the Depression.

Yeah. That's true.

Because the government policies weren't, you know.

So you graduated in '51.

Fifty-one.

Yeah. And at that point, are you going to go to college? Do you have a sense of, you know, what's next?

Well, I went for less than a semester at the University of Akron and got discouraged, so I just quit.

You went right out of high school to the University of Akron? What discouraged you about it?

Well, when I matriculated, they signed me up for courses that were advanced that I should've had the preliminary courses and things like this, you know. It was just…. But then in the **[00:10:00]** following year after I'd graduated from high school, I started attending Mount Union College in Alliance, Ohio, which it was a much smaller school.

How far from Akron was that?

Oh, Alliance is about twenty-eight miles from Akron.

That's not too bad. Did you keep living in Akron, or did you move to Alliance?

Well, I lived in Alliance during the week, you know, and I'd go home on the weekends.

OK. And this time around, the college experience was better?

Yeah. I attended there for a year, and then when I came out of the service, I attended for a half-year plus a summer, and then I transferred to the University of Arizona.

Did you have a major? Did you have a—?

I graduated from the University of Arizona with a baccalaureate in geological engineering.

OK. What led you to the University of Arizona?

Climate. Climate and just, you know, just "ants in the pants," wanting to go someplace, I guess.

But I mean was there—had you ever been to Arizona prior to that? Was it—?

No, I wanted to see Arizona. When I got there, it was 103 degrees and I thought I was driving into Hell.

I was going to say, what about the desert attracted you? Or did you not know before you got there?

Well, I sort of knew, but you had to experience it to really—

But it's a dry heat.

It's a dry heat, yeah. But Tucson has a more moderate climate than Las Vegas. It's a little higher and it doesn't get quite as hot as–Phoenix has a miserable climate.

Similar to Vegas, right?

Worse. They have a lot of irrigation along there and so you get the humidity and the smog and everything else there.

That's not good. So overall, your college experience at Arizona was good?

Well, it was a college experience.

Yeah. But did you make friends that you kept contact with? I mean—

Oh, somewhat. Not, you know.

Were you the type of student that was really kind of dedicated to your studies, or were you—?

Well, the curriculum kept you rather busy, so—

And it interested you, I'm assuming.

Yeah, it was interesting. Most geologists are in shoe stores selling shoes but that's—

Right along with the historians, right?

Yeah.

So you graduate. What comes next?

Well, I had worked a little bit in various places while I was going to school. I was married in 1957 and after I went to work for Duval Corporation south of Tucson, working in an open-pit mine. They had three ore bodies. They had two ore bodies when I went to work for them, but eventually they had a third which was much larger. There was Esperanza, which means "hope" in Spanish, the West Esperanza, and then there was a Sierrita, and Serrieta was the much larger one. [Esperanza and West Esperanza were discovered by Harrison A. Schmitt, the father of the astronaut, moon walker and later U.S. Senator.]

And "ore body," just as a layman, can you explain what an ore body is?

Well, it's when you have values, you know, in the ground for a certain distance, and so when you explore you drill down holes and you get so much copper in this—these were primarily copper and molybdenum products. Molybdenum was a secondary, but it was an important item, which they use in steel alloys. A lot of it went to Japan. Sometimes it would go to Holland and places like that.

What led you into geology?

Well, when I went to Mount Union College, I had a course in geography from a fellow named William Abbott Rice. And you would think it would be sort of a dry subject, but he made it very interesting. He was a geologist, a petroleum geologist primarily. And so I just, like throwing darts at a board, I thought well, I'll just try that. Geological engineering, that sounds good, you know. And I was mistakenly signed up for metallurgical engineering, which I should've stayed **[00:15:00]** with because that would've been more prosperous, you know, as far as employment and so forth.

So there wasn't some great kind of yearning to be a geologist? You just kind of—?

No. The Dean of the College of Mines, it's part of the Engineering Department now, but the Dean of the College of Mines was a fellow named Thomas Chapman and he was a metallurgist. And they had three in that they had geological, metallurgical, and mining. And he was a metallurgist, and he signed me up for this metallurgical on my first—I don't know whether he was in a hurry or what, or ageing process or what. He's the fellow that developed the cyanide process for extracting gold. Never patented it but he—

Is that heat leach, is that what it's called, heat leach mining, something like that?

No, no, no, no, it's where you take cyanide to capture the gold.

I just thought it was called like leach or heat leach mining. Or is that a different thing altogether?

That's done with water, and we did that also, but that's where you're depending on bacteria to do the mining for you.

OK. And so with the cyanide, the cyanide is doing the mining.

It's a metallurgical process for extracting gold.

I wonder how you come up with, you know, using something so toxic to—

Well, it's still used today.

Yeah. No, you're right. Isn't that the most used right now, considering the big commercial mining and stuff?

Yes, they use cyanide. They've never gotten away from it.

So you worked at—what was the name of the company, Duval?

Duval Corporation, which was a subsidiary of United Gas, and Pennzoil Corporation took control of United Gas. Pennzoil was one-tenth the size of United Gas, but they took control of United Gas, which is sort of fascinating. And, you know, Pennzoil was Zapata. George Herbert Walker Bush, you know, [was] involved with Zapata, Pennzoil and so forth. And two brothers, I don't remember their names, but United Gas never knew what hit them. It was all done in secret. You know they woke up with their mouths open one morning. They'd been absorbed.

And you woke up working for a subsidiary of now Pennzoil.

Yeah. Which means when I came to town, I had a little bit of Pennzoil stock.

And so, I'm sorry, where in Arizona were you working with the mine?

It was south of Tucson in the Pima mining district. And this Duval and their successor Pennzoil, they had the three ore bodies. The larger ore body is where all the copper on your coins comes from, you know, the clad coins and the pennies comes from that mine.

So how long did you do that?

About eight-and-a-half years.

Oh, so you were there for a good chunk of time.

Yes.

Did you do the same thing for eight-and-a-half years or did you kind of move around?

Oh, different things.

What was some of the more interesting stuff, looking back?

Oh, I don't know. I went to West Texas for a while surveying for sulphur claims, you know, like that, and on occasion I'd be sent someplace in the state or, you know, or have to—sometimes I'd go out and evaluate a prospect somebody had. You'd always tell them it was interesting because you were always in their vehicle and you didn't want to walk back, and they'd ask you what you thought about it and you'd say it's interesting, you know.

Right. Because I'm imagining you're going out to some pretty isolated places and that would be a long walk back.

And I did a lot of drafting initially with India ink on linen, you know, then eventually—

That's not very forgiving.

No. Eventually we went to a DuPont plastic called Mylar. This was for permanency, you know, the reason they were using these, and that would just wear out your drafting instruments. It was so abrasive, this plastic, you know. It wasn't as forgiving as the linen was.

Is drafting kind of a natural outgrowth of geology, or is that just something you kind of learned as you went?

Yes, kind of, yes, you have to do a lot of descriptive geometry. You draw a lot of sections, you know, with your—you have drill holes and so forth and sometimes you have inclined drill holes and sometimes you have to rotate these drill holes so they're in the same plane so you see what value they have.

OK. Sounds complicated.

[00:20:00] Yeah, descriptive geometry is using drafting to work mathematical problems instead of, you know, working them out with a formula thing like they do. You rotate things to show them in their true size and so forth. It's called the Busk method. There was an English geologist who worked in Africa that developed this.

OK. And you did this for eight-and-a-half years. Did you enjoy it or was it—?

Oh, plus there's also a course called Descriptive Geometry that you take in an engineering curriculum. So you say, I wonder what good this is? Then you find out.

So every now and then, you take a class in college and it actually applies to real life. So you did this for eight-and-a-half years. Was it enjoyable? Did you like it? Was it just a job?

Oh, it was just a job. Didn't pay well, you know, but I was—

It didn't pay well?

Not really. Not in southern Arizona, you know. You could make a living at it, but you're not going to get wealthy or anything like that. But in the meantime, I had three children, three boys. Well, when I started for Duval, they didn't have any place for me in their Exploration Department or the mine geology right there, so I started working in the mill, and I worked there

for about three or four months, and then I transferred into their Exploration Department. So I was hired as an hourly worker initially.

Right. Did you travel a lot?

Not a whole lot. To Texas once and within the State of Arizona a little bit, you know.

I was just wondering. Because you had three kids, I wonder if you got to be home a lot with them or—

Well, when I came to work up here [Nevada Test Site], I had been looking for something else, other employment, and I submitted an application and they were very slow about replying to my application. I thought I wouldn't even hear from them, you know. And in the meantime, I had quit my employment and accepted employment in Toronto, Canada.

Oh, so you'd quit Duval—?

I quit Duval and I accepted employment in Canada.

Well, talk about an extreme of climate.

Yeah, it was interesting because in Canada I would've gone to work for McPhar Geophysics. I would've been number five on the payroll. And when I went to work out here for REECo, Reynolds Electrical and Engineering Company, I was number 100,769 on the payroll. Now, I mean this is—they give everybody a number. There weren't that many people working there at one time.

I'm kind of curious, how did you find out about the job in Toronto?

A fellow named Jack Frost had been the chief geologist at Duval, and he went to work for—he was in charge of all the non-petroleum exploration at Exxon. And I called him up just to see if he had anything, and he recommended me to this fellow that had this—McPhar, I guess was his name.

And so you were ready to go. You accepted the job. You were ready to move to Canada?

Yes, yes but then when I interviewed up here, I accepted a job for less money, but even though it was remote, at least I would be home on the weekends, if nothing else, and I had those three boys, so that entered into the calculation. And so I had to decline this job that I had already accepted at McPhar.

But what did your family think of the prospect? Was the plan at first, when you accepted the job in Toronto, for everybody to go up there?

No, I would've gone up initially myself and then—but the thing is, my first assignment would've been in Australia. So, you know, that's when I thought, well, with those three boys—

Yeah, the test site [NTS] might be remote but, you know, it's less remote that Australia.

Yeah. Most of the time, I came home at night, you know, most times. Sometimes I'd be out there awake for three days and three nights, you know.

So you accepted the job in Toronto and then in the interim, before you had applied to the Toronto job, you'd applied to REECo, is that right?

[00:25:00] Yes, I sent off a lot of [letters]—never got a reply, but they were rather tardy with their [replies]—they invited me to come up and look at the test site and so forth and interviewed me.

Do you remember in general terms when this was? Like the first time you went out and saw the test site?

This was in October of 1968. And I accepted the job and moved the family to Las Vegas. Lived on the Strip for a while before I bought a house. They put me up on the Strip, and then when they were no longer putting me up on the Strip, then I got a reduced rate. It was free for a while. I'd come home and eat dinner every night in a casino. This was different. The kids enjoyed

Halloween, so in lieu of Halloween, Circus Circus had just opened, so I took them to Circus Circus, which was something then when it first opened, you know. It had trapeze artists and clowns and a circus band marching all over the place playing music. It was—

That was before they had the second floor. Yes, because it was really—it opened in '68, right?

Yes. It was, what's his name, Jay Sarno. He built Caesars Palace and then he built Circus Circus.

Yeah, and that was before they—because now it's the first and second floor, but that was when it was all just one—it was just a big top, right?

Yes.

That's cool. When you first went to the test site that very first time, what was your impression of it? Was there anything that kind of struck you about it?

The first time, I was put on a bus and then picked up in Mercury. And Mercury's about sixty miles from here, you know, from where I was. I bought a house about seven-and-a-half miles from here. And I was picked up at Mercury and then transported to Area 12 where the work was, and that was another forty-five miles. And I was picked up by a fellow named Mike Barr who was administrative assistant to the department manager in Area 12. Mike Barr died on a barstool, Pogo's Tavern on Decatur.

Died on a barstool?

The guy that owns that, he just died last week.

The owner did?

The owner did, yes. And I remember being in there and he's pointing right at the very barstool that Mike died on. He said, `That's where Mikey died,` he said. He was a large man. He'd been a football player *par excellence*. He was from Brownsville, Texas and he went to one of the

Texas universities. I can't remember. But he was a classical practical joker. He didn't harm anybody but just—

Like what kind of stuff would he do?

We had an electrical superintendent named Maxwell Nakamura, and he had been talking for days, maybe weeks, about a trip he was making to California when the weekend came. And it snowed in Area 12. So Mike called up Maxie and told him he'd been appointed the snow control officer for the weekend and he was to measure the snow and report in all weekend. And he had this trip planned. So Maxie starts trying to get other people to take this assignment, and he finally he calls up the division manager, Hack Runnels, in Mercury, and Hack says, `What the hell are you talking about?` But that was one.

Then Mike lived in the Mountain View Apartments on the northeast corner of Cheyenne and Michael Way. And another miner and his wife moved in right across from him. And these apartments had like a picture window, then they had a little strip of earth between the sidewalk **[00:30:00]** and the picture window next to the house. And this fellow and his wife had planted some vegetables in this little tiny plot. So Mike, he's at the supermarket and he sees these humongous zucchinis, so he buys these zucchinis and he brings them home and he sticks them in their garden. And the fellow comes out and sees them and he's waving for his wife to come out. All the time, Mike is looking from behind the curtain of his [window]. He was just a master at the practical joke.

Yeah. Well, you probably, I mean, you know, it's kind of a stressful job, I would imagine, and that stuff probably helps.

Yes.

So when you first go out there, you know what they do, you know what they're doing, right? Did you have any—?

Yeah. Well, I was hired and initially they said they'd give the title of civil engineer. And then they called me up in Tucson and they said, You're not a civil engineer, so we can't give you the title of civil engineer. So they said, How about if we call you a tunneling engineer? I says, Well, OK, there's no such thing but…. So when I got here, I was not a tunneling engineer; I was classified as a tunnel engineer. There's no such thing as a tunnel engineer, either. Which later on they hired a fellow named Kenneth Larkin as a senior tunnel engineer. He was a mining engineer by education and experience. So I was relieved to find out there were two of us in the world, you know.

But you were the first.

I was the first. And these excavations in Rainier Mesa in Area 12 were referred to as tunnels, which they weren't. They were half-a-tunnel, which is called an "adit," A-D-I-T. So I was a tunnel engineer—

What does "half-a-tunnel" mean?

Well, they're open at one end. When you mine and you start in from one direction, it's an adit.

OK. And to be a tunnel, it needs a—

It has to exit. It has to have two entrances instead of one. But all these places only had one.

I never knew that. Because, see, I would look at something like that and think it was a tunnel, but I didn't know that the definition of a tunnel means you need to have an exit. I never knew that.

But I guess what I'm getting at is—

And then if you mine off to the sides, then it's called a drift. And if you connect a drift with another drift, or with the adit, it's called a cross cut. And if you mine down, it's called a winze. If you mine up, it's called a raise.

What's the down one? Winze?

Winze. And from the surface, if you mine down, it's a shaft. You have either a vertical or an inclined shaft. And so that's the other thing. I went there once and I saw a winze and they were calling it a shaft. I says, `Well, first of all, it's not a tunnel.` And they're calling it a shaft but, you know, it's a winze.

But those were initial things. Plus I had been used to seeing tenor where you could see rock, you could see some reason you were mining the rock, you know. But this construction mining they were doing, they didn't have anything of value there.

Oh, right, that would be a different—

Once in a while, they would cross something a little bit but not often.

Yeah, because your experience up to this point is that you're digging a hole because of what you're going to pull out of it, right?

Yes, there you're just excavating for the experiment, you know. They would excavate and then they would put a pipe in with experiment stations in it, chambers, and they would backfill, would stem it, you know, with grouts and concretes and so forth, and then they would evacuate the air from this line-of-sight pipe and create a vacuum. They were simulating outer space, you know. And then they would shoot a nuclear device off. The nuclear device had already been tested. They weren't testing the nuclear device. They were testing the effect of the nuclear device on models, full-scale items, you know. There might be a nose cone for a reentry vehicle or—a myriad of experiments.

[00:35:00] *I guess from my perspective, I mean when you get there in '68, does it strike you that you're part of atomic testing? What kind of impact does that have on you? Or is it just a job?*

Well, you know, you're involved with the actual physical job. You have to excavate and you have various drill holes that are looking for, you know, seeing what the rock is and so forth and seeing where to put an experiment. Because we'd go in with what they called a tunnel but it was really an adit, and then they would drift off and have the various experiments, and initially they would have one experiment at the end of this adit.

So the bigger picture never really kind of—?

Well, it's there. Yeah, it's there. You know what you're doing and why you're doing it. But you're more caught up with—you're on a very tight schedule. I mean they weren't very relaxed jobs. There was a lot of anxiety when you have to have something or you have to advance so far with your mining and you have to, you know, everything else. And then when you get into the event stage when you're staging an event, it gets a little hectic. But it actually gets your adrenalin up then, so you get some excitement.

You get kind of hooked on that feeling?

Yeah, you dread it and look forward to it at the same time. The first fellow I worked for was an interesting gentleman. I don't know whether he's still working for the Department of Energy [DOE] or not, but he was their safety director. He worked for Reynolds when I went to work, and he was a fellow named Larry Skousen. He was born in a Mormon colony in old Mexico, and I believe his father was vice-president of General Motors of Mexico. And their home, I think, was Tempe, Arizona eventually. And so he was bilingual; he spoke English and Spanish. And he had gone to school in Utah, I believe played football, but he graduated with a degree in chemical

engineering. And his uncle, who was the criminologist Dr. Skousen, was the police chief of Salt Lake City.

Wow, that's quite a family.

Yes. And he had initially gone to the test site working for Lawrence Livermore Laboratory, "L cubed." And he and four other employees of Lawrence, in their spare time, living on the test site, had developed a fully assimilated protein. And this was what John Glenn, when he orbited the Earth, this is what he consumed—was their product. And the large food manufactures came to them and wanted to buy their product, and they said no, they developed it themselves. So they put in about a two-million-dollar cannery here in Las Vegas and so forth, and the big manufacturers went ahead and manufactured their products, Metrecal and Sego, and they just went broke. So some of these fellows came to Larry and they had another project and he says, No, I'm not interested, I went broke with you last week, you know. And what they had, they had the Kentucky [Fried] Chicken franchise for I don't know what portion of California, but in California. He didn't go with that. And then another one of the fellows was sort of a charlatan who had gone to oil companies, had a process for getting more oil out of spent oil wells and so forth and that industry. And then he went to the Mormon Church and said that he knew where the golden plates were. And so he took some fellows and mined down in a crevice in southern Utah and killed these two miners that were **[00:40:00]** going down, you know, for lack of air, I guess, and like that, and he ended up in a prison someplace or something else.

But anyways, Larry was an interesting first—he was a tunnel superintendent at G-Tunnel in Area 12, Rainier Mesa, which was where Sandia did their experiments. And his boss was "Bud" [Harvey] Edwards who I worked at different times for over the years. But Larry was interesting. Then later on, when the work got slack, he became an assistant superintendent, which

is called a “walker” or in the jargon, a “walking boss,” when everybody took a step backwards for a while. He went to work for REECo as a miner initially because he could make more money as a miner than he could with a lab.

If you were born in ’33, you were in your twenties in the 1950s when the atmospheric testing was going on, is that right?

Yeah.

You were in Arizona at the time, so did you have some sense of—did you know what was going on? Did it have an impact on you at all?

I moved to Arizona in ’55 and I was cognizant of it but I didn’t think much about it. You know, the stuff in the Pacific and the stuff and the testing and stuff. Knew before that the stuff in New Mexico and so forth.

OK. Well, and it’s interesting because, you know, looking at it from the outside, I think I’m similar to a lot of people in that you think in 1963 when the testing goes underground, that that’s almost the end. It’s kind of like the atmospheric testing kind of has everybody’s attention and then it goes underground. So if you can explain just a little bit about—

Everything was underground when I got there. I mean but there were visible things from the previous—and there were the big-hole drills, you know, drill holes, which I wasn’t part of those. And then the so-called tunnel shots. And then they were still now and then doing some shaft work.

And so how long were you there?

I worked for Reynolds for twenty-five years and two weeks. The last thirteen months, I was associated with the Yucca Mountain repository and worked in the Bank of America building on Convention Center Drive, on the eleventh floor.

How long were you out at the test site?

Well, twenty-four years, but the last year I was—

And then did you do a variety of things?

At the test site?

Yeah.

Oh, well, sometimes I'd get involved with surface construction. I worked with a department called NTS General that did a lot of surface stuff, and I worked for them on two occasions over the years.

"Surface stuff." What does that mean?

Oh, they would pour concrete, construct metabolism stalls at the farm, at the dairy farm, and sometimes there'd be electrical projects or mechanical projects, plumbing and so forth. It was surface construction.

But primarily you were a tunnel engineer?

Well, no, no, the first time they used me as a structural superintendent, and then the second time they had me classified as a project engineer. I would fill in and do different things at different times, you know.

Yeah, what does a project engineer do?

Keeping track of projects and plans and materials and so forth. Planning, you know. Doing planning charts and things. What comes next and what do you need to do this and how many people do you need to do this? That type of thing.

So you were a boss, essentially.

[00:45:00] Well, as a structural superintendent I was and I had all the structural crafts, you know. I was in charge of all the structural crafts as opposed to the mechanical crafts, the sheet

metal and plumbers and pipe fitters, and then the electrical superintendent would have the electricians and so forth. But when I was classified as a project engineer, sometimes I would go out and superintend something or sometimes I'd just make sure people had what they needed to work with.

Like a jack-of-all-trades sort of thing?

Yeah, I was at the beck and call of that department manager and his superintendent.

OK. What was your favorite job of all the things you did out at the test site? What was it that you enjoyed the most?

Oh, I was always more comfortable underground.

Is that right? What years were you doing that the most, I suppose is what I [am asking]—

Well, most of the twenty-four years I was out there. When I got there, they'd been doing those tunnel shots and that's what we continued doing till about 1992, everything sort of dropped off, you know.

And your family was living out here and you would drive home just as much as you could every—?

Oh, yes, I was home most every weekend, most every night, you know. But sometimes you'd get on concrete pours and things, you'd have to stay out, and of course when you were close to an event you'd stay out there sometimes. And sometimes just to get caught up on something, you'd stay out there. But for the most part, I commuted most of the time.

Was it hard on the family to—?

No, we just ate supper a little later than most. You know, we always, the wife and the three kids—it was an interesting town to raise children. When I moved here, the oldest boy was ten and then I had a six-year-old that had just started the first grade, and then a two-year-old. The

two-year-old teaches culinary arts and hotel arts in the vocational high school in Reno. And the one that was six, he's an MRI technician at Desert Radiology over near Viking Road off of Eastern, and he lives about two miles from here, two miles driveway to driveway here in Summerlin. And he's married to a lady that works for Benson, Bertoldo and so forth, lawyers. She's worked for them for a long time. And they have two daughters. One's just graduated from Palo Verde High School and the other one's a student at Palo Verde. And then my oldest son, he's stationed in the Netherlands. He's an Army colonel. He's attached to NATO [North Atlantic Treaty Organization]. He's their support group commander, you know, fixes things and oh, he has other things, like he has all the military police in Afghanistan and things like that for NATO.

That's impressive. You must be proud of your children.

Oh, yes. My youngest son graduated from the Community College [of Southern Nevada] and then he graduated from UNLV [University of Nevada, Las Vegas]. And then the middle one, he graduated from Truckee Community College in Reno, and he started at the University of Nevada, Reno but he did two things in the same year: he flunked out and got a scholarship, all in the same year.

That's quite a feat.

Yeah, he's sort of independent, you know. "Me do it, Daddy," you know. And then my oldest son, he got a degree in mechanical engineering from Reno, then was commissioned into the Army there, regular Army. And then he has a master's in systems management from the Naval Postgraduate School in Monterey [California] and some other master's degree from the Industrial **[00:50:00]** College of the Armed Forces. I don't know what that is. He's only been out of the country three times, the first time to Panama—I went to visit him here—and then South Korea and now he's in the Netherlands, and gets to vacation all sorts of places plus travel on work. He

was just in Spain near Barcelona, they were doing some maneuvers there they were supporting, and now he's going on vacation there. His daughter just graduated from a school there, an international school right there near the base in the Netherlands, and then his son is taking chemical engineering at Texas A&M, College Station.

Wow. It's an impressive family.

Then I have two stepsons. One stepson lives in Reno and he works for Harley Davidson Credit, and his wife has a doctorate in genomics. She's from Portugal. And she works at the Veterans Hospital in Reno. And they're expecting. And then I have another stepson that is self-employed and lives in Pahrump. He likes to sort of work for himself and do construction work. He can do most anything, you know. He has a baccalaureate from Las Cruces, New Mexico State in wildlife and law enforcement but he hasn't applied it. His dad lives in Pahrump. He was quite ill a while back. We almost lost him. He spent nine weeks in the hospital there, in Southern Hills. Thirty-five years old.

But everything's OK now?

He's recuperating. He overdoes it a little bit. He likes to be active, then he has to recuperate some more.

Yeah. That's a very impressive family.

Touch and go with him for a while.

So I guess, you know, you started in '68. Maybe walk me through what a typical shot was, or event I should say.

Oh, if the tunnel or so-called tunnel was existing—

An adit.

Yes, an adit. Everything's sort of lined out for you what's going to happen, and so you first mine it. It was using conventional explosives initially, and then later on they started using a mechanical miner or a continuous miner, a tunnel-boring machine. And these are items made in Austria, the equipment. And you would mine it and then you would put in a—you would have various drifts, ancillary drifts, you know, and alcoves and cross cuts and so forth that would have to be mined to go with this, some of it done conventionally. And you would bring in lots of cable, diagnostic cable, you know, besides power, you'd bring in lots of diagnostic cable. And initially you had holes that went to the top of the mesa, about 1,200 feet up from the so-called tunnel, and you would run all these cables up there, and there'd be trailers up there, you know, diagnostic trailers up there, and a lot of the stuff would be radio-relayed remotely six miles away to Area 6, what they called the control point, CP. And then you'd put in experiment stations, chambers, and then you would have a telescoping pipe that would get larger as it came out from the ground zero. You'd have an event box there, too, for the device. And you may even have a parallel mined area to service all this. Some of them you go just down one, but then some you would have a twin excavation and then you would service this with cross cuts and then you would stem this with grout, sand, concrete, and so forth. And then all the experiments would be installed, hooked up to all these cables, and so forth.

How much time would you have to do all this?

[00:55:00] Some of the events would last eighteen months. Sometimes you'd get one that you had to get done in maybe six, you know.

Those are the ones that [rest unclear – overlapping voices].

Some of them weren't as relaxed as the others, you know, some of them just a shorter time span they had to, you know, there was some reason in Washington, D.C. that they would decide what

had to go when, and sometimes something had to be accomplished before another project could be accomplished.

So your job essentially was to, you know, they wanted to test this—

Yes, well, I progressed. I started as an engineer, classified as an engineer, and then they wanted me to do the work of a walker, but they couldn't promote me to walker because I didn't have the prerequisites.

What's a walker?

Assistant superintendent. I didn't have the—You're running three shifts. You're running graveyard, day shift, and swing shift, so you have different crews and you would have a walking boss with each of these crews, and that's an assistant superintendent, and in construction mining they're called "walkers" or "walking bosses." And so anyways, they had me doing that, but an assistant superintendent was a comparable wage. I was classified as a senior engineer, that's what it was, senior engineer, even though I was working as a walker. And then later on, I became a project engineer and then a tunnel superintendent and then a project manager. And then work got slack and then I went back to being a project engineer again.

OK. So your job was basically just to facilitate the task that the government wanted to do.

Yeah, well depending on what I was doing, you know, which— if you have a lot of drawings, construction drawings that have to be fulfilled, they're on paper but you have to make them real, and you have to order materials. If you're ordering stemming or concrete, you have to estimate how much you're going to need and when you need it. And sometimes some of the stuff was rather difficult to work with.

Like what?

Well, the most difficult I ever worked with was in NRDS [Nuclear Rocket and Development Station] on the surface building concrete casks for spent fuel cells. They did this in other places in the country but this was initially done on the test site. We were using a very hot mix and we were remote from the plants where we were turning out the concrete, so we would start them like at four o'clock in the morning getting ice, just getting ice, and then getting the gravel and the sand and so forth; and then getting the hot mix and the cement; and then turning all this ice and stuff to keep the range for the heat of hydration low, keep it cold, and having to go ten, fifteen miles away and pour this.

That sounds complicated.

Well, initially they tried it—I told them what I wanted to do and they said, `Oh, no, we don't want to do that`, so they spent the next six months trying to chip concrete out of a transit truck, you know, because when they went to dump it, it would [makes plopping sound].

So it took them six months to come to the decision that you were right after all.

It's set up in the transit truck, yeah. The next time, they went with the ice. But they just required that particular [material]—it's the same concrete they would use in nuclear plants, and they just required this particular concrete. That was the most difficult time I ever had with anything. I was working on the surface for the NTS General at that point.

OK. You said before that they weren't really testing to see if the bomb—the bomb itself was just—

[01:00:00] No, those were done in the vertical drill holes. They would test the devices. Any device that we used had already been tested. It was already reliable. They just wanted the effects of it, you know.

And you said one time there was a space capsule they—

Well, that was just an example, like a nose cone on a reentry vehicle or something, you know, but they would have parts of aircraft, they would have parts of other stuff, they would have electronics, everything to see what the effects would be. When you shoot off a nuclear device, you have an electromagnetic wave. In fact, in the Pacific, it turned off the street lights in Honolulu [Hawaii]. It was that far away from the—

Is that right?

Yes, when they were shooting those off in the Pacific. Quite a ways from Hawaii when they did, but it turned off the street lights.

That was the test in Bikini?

The electromagnetic wave from the explosion. You can disrupt an enemy's, all their communications, you know.

I'd never heard that.

Yeah. There's a, what do they call it, "emf" force, [electromotive force] I guess they call it.

Oh, yeah. So if you have whatever it is, the space capsule or whatever, do you just—?

Well, they shot—you know, it's telescoping out and you have these chambers where the experiments are, and they're set off so they get a different part of the shine.

"The shine?"

You can think of it like a flashlight shining, you know, and they're getting this shine from the nuclear device and seeing what the effect—you know, they're exposed, but these chambers would be offset from each other so they would get different parts of the shine on them. And oh, sometimes, it's up in the thousands of experiments that were going on. It's just—

All at the same time?

All taking advantage of this, and you got all these what they called "users," these experimenters, coming in there with them, you know, overseeing all their little pet projects.

Is that kind of how it works? It's like there's going to be an—?

Plus you have to keep track of all these people and make sure they get to work and make sure they get out.

Yeah. Well, so there's going to be an event and then everybody kind of wants to get in on it and have their experiment in there, and your guys's job is to dig out another—?

Well, our customer nominally was the Department of Energy, but the Defense Nuclear Agency [DNA] of the Department of Defense [DoD] was who our *actual* customer was, and they would bring all these experimenters in. They were the big overseers of everything. And they would have some civilians and some military and so forth. But we were the can-do people, you know, "we want this done," you know, "how long, how high, how wide?", and whatever, and they would tell us what they wanted.

I like that, the "can-do people."

And then there would be other engineering corporations that would supply the drawings. We didn't do any of the engineering itself except on site. Sometimes you'd see something that was a gross error and you had to say hey, you can't do this. For instance, once they had a cable that they stretched tight and they were going to have people hanging on this and so forth. And I says, You can't do that. You have to have sag in that cable or else, you know.

What would happen if you didn't?

You'd shear it right in two, the cable, without that sag in it. You have to have sag in a cable or it just [would shear]. But that got by them. They thought, oh, this is real great, we have this cable we're going to be hanging people from and so forth. And I says, You have to have a percentage sag in that cable. You just can't have a cable out there that's

stretched tight. That was just one example. But we didn't do the actual engineering or the drawings ourselves. We had to follow the—they were blue-line copies is what they were, but sometimes black line.

But sometimes you would kind of, if the theoretical plans, I mean you would kind of massage them to make them work?

Yeah. Oh, and there's a lot of text [in them], you know, a lot of text that you have that [in them]. **[01:05:00]** They were quite elaborate. It didn't seem like that to some people that they were that elaborate, but they were.

It sounds complicated. You're trying to make so many different groups happy and to facilitate that.

Once when I had the responsibility of G-Tunnel, we weren't doing nuclear events but we were doing other experiments underground, and a group showed up from Sandia and they had to be serviced before anybody else. Very obnoxious, you know. They're the most important, you know. In three days, they ran out of money.

Maybe that's why they were in such a hurry.

They were gone. Never saw them again.

Maybe that's why they were in such a hurry. They wanted to hurry up and get it done before they—

Well, I don't know. It was strange.

And you never saw them again?

Never saw them again, no. They came in and they wanted to be up front and they didn't care about anybody else. Because Sandia had a lot of different experimenters, and these people showed up, and in just about exactly three days they were broke. That's all the money they had.

So who were the different people that would come to you when an event was planned to kind of get an experiment in the mix?

Oh, they would go through the Department of Defense, and sometimes it would be the engineers from these engineering agencies and so forth that would come in, corporations like Fenix and Scisson or Holmes and Narver, and towards the end it was Raytheon. They did everything. And then you would also have representatives from the Department of Energy. So we'd have all these people coming in. And you'd have meetings all the time, talking about what can be done and what can't be done and so forth. And it was just orchestrating all these people in their experiments and so forth. We were the ones that brought in the cable and the line-of-sight pipe, and we did the excavation, the backfilling, and mining back on experiments after the detonation.

Yeah, I was going to ask you because you dig the hole—I'm a layman, so it's you dig a hole, then you put all the stuff in there, you fill it in, and then eventually you—?

Yes. Where possible that you could mine that, where possible. Sometimes it was such a catastrophe that you really couldn't. The radiation was prohibitive and so forth. Sometimes you'd have to wait for the radiation half-life to come down. You had to suit up and put on supplied air or masks and so forth.

Did you ever have to suit up?

Yeah.

What was that experience like? Scary?

A little claustrophobic.

Yeah, I bet.

You know, you're not breathing outside air. You got supplied air and it's being filtered and so forth. And your mask, when you see out of it, it tends fog up on you and you have to coat stuff in

there to keep it from fogging. And then you have people that are radiation monitors are checking you all the time, plus you're carrying a radiation meter—it looked a like a pencil, almost, in your pocket.

Was this ever during the summer, because I would imagine it would get unbearably hot.

Well, underground, it's more comfortable than on the surface. Underground, it doesn't get too hot and it doesn't get too cold. That's what's nice about underground.

We're coming up to the end of the first CD, so we'll go ahead and stop it and take a little break and then continue.

[01:08:45] End Track 2, Disc 1.

[00:00:00] Begin Track 2, Disc 2.

OK, and we're back. You mentioned in the first disc about that you joined the service and it was the Marines. If you could just tell me about that experience.

Oh, it was uneventful except in late 1953, we had reached the phase in boot camp at Parris Island, South Carolina where we were qualifying on the rifle range. And the powers that be started taking away all of our equipment and issuing us new equipment, a new rifle for an old rifle, et cetera. And we saw these large airplanes that had flown in, and we started seeing master sergeants and gunnery sergeants with a parachute badge on. They were jumpmasters. And unbeknownst to the recruits, we were being groomed, if that's the proper word, to rescue the French at Dien Bien Phu in Indochina. And through the grace of President Dwight Eisenhower, we didn't rescue the French, and they took all of our new equipment away and issued us old again. And we didn't know what was happening because we didn't have access to any media—radio, television, newspaper, magazines, anything.

Cut off from the rest of the world, huh?

We found out historically what had happened after we left boot camp.

So you must like Ike.

Yeah, I like Ike.

Yeah, that's crazy. Tell me about your experience at the test site during the Baneberry event.

Oh, I was on a commuter bus. There were two commuter buses. And we saw Baneberry venting. And we proceeded into Area 12. Well, first we stopped, and one bus did not decline into Area 12. We were on a circumvented route which we wouldn't normally take because of the event of Baneberry. And the one bus refused to go down into Area 12, but the bus we were on went into Area 12 and left us off at our designated stops, and I was let off at the cafeteria, in front of the cafeteria in Area 12. And I went in and got various items from the vending machine, knowing that it might be a while before I had any sustenance again. And the bus came back and picked everybody up that was available to be picked up at all these stops, just routinely. And the dust was rolling up behind the bus as we exited Area 12 up the hill. And I don't remember whether it was Area 18 or 20 where we disembarked, you know, with a lot of pickups and vehicles and so forth. And then we proceeded towards Mercury, and I don't really recall where it was that we were checked for contamination, and many people were decontaminated. I think it was someplace close to Area 6, I believe.

Could you actually see the venting and see the smoke, like it was coming after you?

We saw the plume going up, and then we saw dust later on.

And you knew immediately what it was?

Well, we were suspicious.

Just to clarify, I mean I know that you—

And then going back to work, I was working at the time at E-Tunnel, and then we also had the responsibility for 16-Tunnel, which was in Area 16, E-Tunnel being in Area 12. And during the day we had to go from one to the other, and we would suit up to go into Area 12. Initially in the morning, we would suit up, and then we would unsuit at night, and during the day we would go through the same process because we were going to 16 which wasn't contaminated, and 12 was.

What happened with Baneberry, do you know?

It vented. It wasn't supposed to vent. It was supposed to be contained.

OK. That wasn't the only time that a test had vented, right?

The only one during my tenure. In 12 they'd had some problems earlier on where the blast had come out of the portal of the so-called tunnel. [Des Moines, 6/13/1962]

[00:05:00] *I mean just from the outsider's perspective, did the fact that you were working around such dangerous stuff ever really hit you?*

No. Well, they were trying to make things safe, but a vented shot wasn't intended to vent. They had attempted to contain it, but sometimes the genie gets out of the bottle.

Yeah. But overall, you would say it was pretty safe?

Yeah, yeah. Sometimes the Downwinders and the general public had more problems than we had.

That was primarily during atmospheric testing.

Yes, when they were doing atmospheric testing.

But as far as the underground testing, overall, I mean your perception of things was that it was pretty safe?

Yes. We had some minor venting on some of the events. I can remember there was a—coincident with Chernobyl, I think, they saw some radiation on Mount Charleston and they

attributed it to the Russians, the Ukrainians, whatever, but it was too remote from the Soviet Union, so it was a time when we had some minor venting.

OK. But overall, I mean you were—

You know, some trace amounts they found.

Sure.When you did the test and you had to dig back in to kind of see the effects—

Sometimes.

What were some of the stranger things that they experimented on?

Oh, a lot of things I didn't know what they were, but I did recognize a nose cone, and sometimes they had electronic apparatus and so forth. Sometimes they used models and sometimes they were actually full-scale items.

Didn't they put a submarine in there once?

They did something once. I can't remember what. Something related to a submarine, but I can't recall.

Because I was wondering what that process would be. I mean was it a whole submarine?

Well, they had one that was referred to as a submarine, which it wasn't. It appeared to be, but wasn't. I remember something like that.

OK. Can you tell me the story about the Russian tank and the American tank that you saw?

Oh, there was an area in NRDS referred to as X-Tunnel. There were an X-Tunnel and a Y-Tunnel. And they pledged everybody to secrecy and they brought in a Russian tank for target practice by American armor—spent uranium, as exhibited in Desert Storm. And my eldest son, who was in charge of the shops in Fort Irwin, California, had had to package this tank to ship it to the test site. And we were pledged to secrecy not to tell anybody about this tank. My son wanted to know what the hell we were doing with that tank that he sent us.

So you actually got to see the U.S. tank firing at the—?

No, I wasn't there. I was remote from that area. I had people that were working there that I had responsibility for, but I was never there during the actual—I was there in between episodes and so forth, but I was never there when this transpired. I knew what was happening, but I wouldn't go over there every day. I had some other responsibilities at the time.

Would you say that the safety precautions got better as time went on? Because you were there for twenty-five years.

Oh, yes, as they do in all industry.

I mean you mentioned earlier that maybe—

Ear protection.

Ear protection?

Ear protection, for one thing, it improved.

Because the sound of the event was—?

No, because of the construction.

Oh, construction. Right.

Yes, construction equipment and blasting. It improved as it did in all industries, you know.

[00:10:00] *And kind of as a problem would avail itself, you would address it and, you know, it's kind of a necessity-is-the-mother-of-invention sort of thing?*

Well, safety equipment just keeps improving. Even headgear.

Do you remember, did you ever see the protesters, going out to the site?

Oh, Yes. Yes.

What did you think about that?

They were interesting. A friend of mine was a protester and she was on tour on the test site and she came to the facilities. I had to open up so they could go in. And I thought to myself, they don't know who they've got here on this tour.

But you knew her?

Yes. She lives in Blue Diamond now.

OK. So what was that experience like?

Well, I was just amused. She would usually be outside the gate protesting, but there she was right inside, you know, taking the tour.

Right. When was this, in the eighties?

Maybe the late eighties, or early nineties maybe, I don't know.

OK. I mean was there a sense of the workers, I know you guys were just doing a job, but was there a sense of what they were protesting? I mean did you guys understand why they were out there protesting?

Yes, it was their right to protest, but they don't always know what they're protesting or why.

Somebody had mentioned that they were protesting even after the testing stopped.

Oh, yes. Around Easter time, they always protest. I think they still do. Some celebrities go out there and protest, too, with them.

When was the first time you saw protesters out there?

I don't really recall. They just seemed to be part of the act.

Part of the landscape.

Yes. They'd be lining both sides of the road, and they'd have an encampment and so forth.

Because I've never worked a job where people were protesting, you know. It just seems like that would be an interesting experience.

I remember once a fellow wrote a sign and put it up on the window. We were on a bus at the time. Saw protesters from vehicles, too, other people, you know. And he put up a sign that said, "Show us your tits." And two ladies did.

So on the bus going out to the site with the workers on it, the—oh, that's funny. Well, at least you know the protesters had a sense of humor and a sense of adventure about them, I suppose. I get the feeling there was a lot of camaraderie between you guys working out there.

Well, mischief on the bus. It was a long bus trip.

Yeah. That sign alone tells everything you need to know. I mean did you have a good working relationship with your co-workers and whatnot?

Oh, yes.

Close-knit group?

Pretty close-knit.

You told me once the story about the guy who was the big prankster. Was there other pranksters? Was there other—?

Oh, I remember a carpenter who is deceased now by the name of Tommy Trepasso from Buffalo, New York. He was a carpenter and he would—you had a line-of-sight pipe and you'd see a sign—he would write on the pipe like "1,500 feet to Tom's," you know, or "800 feet to Tom's," then he'd be working someplace there and have an arrow pointing at himself, "Welcome to Tom's," you know. And then this particular event, they had the portal on television at the CP for the event when they were going to shoot, and there's a flag flying up over the portal that said, "Tom's" on it.

Classic.

He was in line with somebody down in Area 12 for the line in the cafeteria or someplace, and he'd been close by this fellow and this guy had a lunch bucket and he had written "Tom" on the guy's lunch bucket. They called him Hardball. He always had candy that he would hand people. He would have outlandish stories he'd tell, and they sounded logical until he got to the punch line. He was active in the test site workers on the weekend. We built the Boys' and Girls' Club at **[00:15:00]** Lindell and Edna in Las Vegas, as volunteers. And my youngest son would like nothing better than to go down there and help, and he liked to tag around Tommy Trepasso, I can remember that. That was the second-largest public building in the city, or the county, rather, and it was built as a volunteer effort, and originally it was built for the Southern Nevada Independent Youth Athletic Association, which was called the Petowski League after John Petowski who headed it up, and became such a white elephant that it was given to the Boys' and Girls' Club. The ground is owned by the city, and it was given to the Boys' and Girls' Club, and they added on to it, I think. When we constructed it, it had four carpeted basketball courts, a handball court, showers and lockers, meeting rooms and so forth.

Did you guys do a lot of that kind of charitable work?

Yeah, we lit up most of the baseball fields in the county.

"Lit up"? Like put the lights—

Put poles up and lights so they could play at night and so forth. We did the one over at, what's that there, Eastern and—that big park. Sunset Park. We did them, and we did a couple or three others on this end of town and different places. We had a lot of linemen and electricians, plus we had the rest of us do the grunt work, you know, digging and putting PVC together and so forth.

Yeah. I mean you guys were a pretty handy group of fellows, right?

Initially when I got there, the first civic thing—at that time, the Boy Scout camp was up in the Spring Mountains and Mount Charleston. Was it Lee Canyon maybe? I don't know. But we went up there and built showers for the Boy Scouts, I remember, the first time we did anything. So every now and then. Which is pretty good, since we commute and have all that time spent and the time out there, you know, then to donate time to—[we were] pretty civic-minded group of people, you know.

Yeah, that's really nice of you guys. I mean you guys did that, yeah, I would imagine you guys were pretty close socially outside of work, too, is that right?

Some people were. I was never too social outside of work.

I guess between the civic stuff and working, there isn't really much time—

Yeah, there's not much time. But I can remember over at Sunset Park a lot of celebrities and movie actors and actresses were fixing us lunch over there one day when we were working over there, that lived in this area, you know.

They were fixing you lunch?

Yeah, they fixed us all a barbequed lunch, a big lunch over there. Some of them I'd seen in movies, you know. And then Bill Boyd, I remember being in his back yard. We didn't do any work that day, but we were invited to his house for a barbeque in the afternoon. He cooked us all hamburgers and everything in his backyard, you know, the guy from Boyd Gaming?

Yeah.

The son, Bill. And oh, I remember going for a big dinner deal in the back yard of Oran Gragson who was the mayor. I remember pulling up in front of the [door]—I was with my first wife. And I had a '64 Plymouth that was leaking something, and they had a circular drive in front of the

house, and Oran's daughter insisted that we park right there in front of the front door on their circular drive with this old car.

It was leaking the whole time?

Yes. I can't remember what was leaking. Something out of it. Usually it didn't leak, but something was leaking from it.

So there's a stain at the mayor's house that comes from your Plymouth.

Yeah. Oh, he's deceased now. Bonnie and Oran. I guess he was from New Mexico, but he was really what they called an Arkie, you know, had roots from Arkansas, just as Governor [Kenny] Guinn has roots from Arkansas but he's from California. Before he was going to run for governor, I told him he was my favorite Arkie.

So you knew him?

Kenny Guinn? Yes. Well, this Sun City area here, he was on Del Webb's board. I won't say anything about the construction defects that we have.

So you rubbed elbows with a pretty high-octane crowd.

Not too much. I've never met Oscar Goodman. I never met Jan, what was her name? Works for **[00:20:00]** Harrah's now. Can't think of her name right now. They own the Chevrolet dealership and so forth.

Yeah, I don't remember.

Jan [Laverty] Jones. Her husband was the son of the guy that started, here and California, the big Chevrolet dealerships. She had a Toyota dealership under these auspices at one time. But I haven't met her. Ron Lurie did live in a house right down at the end of the corner here, on the golf course. He was mayor until there were some snaggings on the intersection of [State Route]

95 and the Summerlin Parkway, that land there. And then William Briare. I knew Bill Briare [Mayor of Las Vegas from 1975 to 1987].

So I forget when the testing stopped, in '92, '93, something like that?

Yeah, I got laid off in '93 from the Bank building. I wasn't always in the Bank building. Sometimes I'd go out to the test site, but not often.

So once the testing stops, so basically is REECo out of the test site?

Well, REECo was, what's the big outfit? REECo was replaced by Bechtel Nevada. They're rather famous for building things. And REECo was replaced by Bechtel. REECo was a subsidiary of EG&G, Edgerton, Germeshausen, and Grier. One of those guys invented the strobe light, but I never remember which one [Harold, "Doc" Edgerton]. They did all the famous photography and milk drops and so forth.

I was wondering just how much, when you guys were working out there in the seventies and eighties during, you know, in many ways the eighties is one of the peaks of the Cold War, how much of a sense of, you know, that you're participating in that, that the larger Cold War picture, was there much sense of that or was it more of a tactical thing, you're just doing your job—?

Well, we know we're part of it but you don't really think about it. You've just got a job to do.

Sure. And you've been retired for like three years now, is that right?

No, I've been retired for about eleven, I guess. Middle of November of '93.

OK. And you've been—

That's a long time not to have a job and still eat.

You've stayed pretty close with your co-workers, though, I mean—

Oh, I go—about that breakfast [REECo retirees breakfast], a fellow named Ira Stockman who's deceased now was sort of the ramrod of it and he encouraged me to come down. Initially they

were eating at Arizona Charlie's, and then for some reason they didn't want their business at Arizona Charlie's. I've never been able to figure that one out. I guess they overloaded their coffee shop or something, I don't know. So then we went down to Denny's across from the Palace Station. And then we went to Skinny Dugan's on Charleston. Food was good but it was always cold. And then they went to the Original Pancake House, and then they just—this [June 2005] was the first time they met at that—

IHOP [International House of Pancakes].

IHOP, yeah.

Well, it's funny because that was the first one I'd been to and it felt more like a reunion of veterans to me than it did guys that had worked for a company.

Yes. I was thinking yesterday, this Leo Flores who worked at the test site, he lives in Fallon, and he came down and he attended a meeting there at the Original Pancake House, and Rocky [Richard] Hardcastle, one of our attendees that was there, and fifteen days later Rocky was dead and we were at his funeral out there on Eastern. Now, Rocky, they have a lot of models of mining equipment and so forth constructed from wood that are in this museum, and Rocky's the one that did that.

In the test site museum [Atomic Testing Museum]?

Yes, test site museum. He was from Utah, as many of the people that worked out there were, a **[00:25:00]** construction miner, and he drove the diversion tunnels for water into Lake Mead, like that. In fact, he set some world records. He was in a tunnel boring machine, continuous miner. And his hobby, woodworking, did him in because he evidently didn't wear a face mask and he got the sawdust in his lungs.

So of all the things that he did, it was his woodworking—?

Yeah, rather than getting silicosis from having worked in mining all that time.

That is crazy!

It was his hobby. I mean there's some stuff in—the Smithsonian has some of his stuff that he's done. They have some of his items, you know, like a locomotive and like that that's all done in wood and things that were there, drill jumbos or something. I don't know. I haven't been over, but I understand they have some of "Rocky's" stuff on display over there.

That is so ironic. Wow.

I always remember—I don't know, have you talked to Henry Peluaga yet or—?

No. Well, I haven't. [Interviewed April 22, 2005]

He's in the book. But anyways, many times there would be a labor disturbance and we'd have to do the manual labor and everything, you know, to keep the events going and whatever. And this one time, it was my first experience with a labor dispute, which lasted quite a while. I hadn't been there too long. And Manuel Fresquez who was a walker and Henry Peluaga, we call him Pollywog, he's a walker, and they were both doing some tasks. They were bent over doing some task. And the rest of us are walking by. And Henry, Hank, who is half-Basque and the other half is mostly Western Shoshone, asked Manuel, who was from New Mexico, he says lend me your knife or let me borrow your knife or something like that, and Manuel says, `I don't have a knife.` And Hank stands up and addresses all of us and he says, `What do you think about that, gang? A Mexican without a knife.` And I'll never forget that.

Funny. I just—one of the things—I don't know, why do you think—?

Manuel's probably the most brilliant of all the people I worked with.

Is that right?

Yes.

I was just wondering, I mean if you guys had worked basically the same job but at a different place, if it wasn't the test site, do you think you'd be getting together once a month for breakfast? Or is it the test site that kind of brings you together? Or is it the mining?

I don't know. This Rocky Hardcastle that died, he says that that's what kept him going, that breakfast.

Is that right?

That's what he said. He made that statement. He come there carrying oxygen containers and all like that. In fact, Hank has one now, too.

Well, a lot of the health problems stem from the experience out at the test site, is that right?

Well, a lot of them do, or a lot of them attribute it there, but almost all these people worked someplace before they got to the test site, and underground with the same exposure, so who knows? When I came here for a physical, it wasn't *nearly* as intense a physical as it was when I went to work in Arizona, underground.

Is that right?

Yeah. I went to work for San Manuel in summer of 1957, and they put me on a table and turned me every which way to X-ray me, you know. Upside down, right side up. They did a little bit of this here with one of our screenings here, but nothing like it is to go to work in Arizona. But this was under Nevada law that they were doing it.

But I mean some of the health problems come from the test site, right? You know what I'm saying?

Things related to radiation and some silicosis, you know, but like I say, everybody's worked someplace else that they might've been exposed to something. When I worked open pit in southern Arizona, we had torbonite which is a radioactive copper mineral. And the molybdenum

was radioactive. I had a Geiger counter once, I was looking at specimens on the shelves, and it went off the scale when I got to these molybdenum samples, so I'd been working around that without any caution, in the mill, in the mine.

Was there no sense—I mean, well, you had the Geiger counter, so there must've been a sense—why wasn't there more safety precautions taken?

Well, they just weren't aware. And I turned to this one fellow who was like a supervisor and I said—Oh, he said, yeah, I forgot that was radioactive.

Forgot that it was radioactive?

It was the Exploration Department, so they had some scintillators and Geiger counters **[00:30:00]** for going out looking for uranium and so forth, you know, and there we were, working right in the middle of the ore, and molybdenite was radioactive.

So they're using the Geiger counters to find—

Yeah. Molybdenite is molybdenum disulfide and it's roasted in the presence of air plus 1,000 degrees Centigrade to make a trioxide, and the trioxide is put in fifty-five-gallon drums and then shipped all over the world. In Japan they take the steel drum and all and charge their furnaces with it to make steel alloys with molybdenum. Some of the stuff we sent to Kobe and Yokohama, and sometimes it would go to Rotterdam and different places like that. Molybdenum disulfide, molybdenite, is slippery as ice because it's like a trillion little ball bearings and if you get a spill and you try to—there's no way you could push a drum through this material because your feet would just slip backwards. That's an aside, you know.

No, it's interesting.

You know, people worked in uranium mining and so forth, and people worked in places where there was a lot of quartzite and feldspars, and they get—some people have come to the test site and worked on the surface and [were] told not to work underground because of their condition.

Is that right?

Yes.

When you were saying there's sometimes where after an event you would not, you know, you couldn't—

Yeah. Sometimes they'd go under. You'd get a little bit of exposure there but—there's been lawsuits and all sorts of things, but what's legitimate, I don't know. I've been screened, oh, once for, what was it, can't think of it now, that they machined out there, and two other screenings, check for lungs and everything. I have some scars in my lungs and so forth. Part of that could be from valley fever. Everybody in the desert gets that.

Yes. I was just wondering, you know, we've been going for a while now, just if you had any general kind of, you know, what your general perceptions was, any last kind of—?

I don't know. I told you about the first person I worked for. There were three individuals, including myself, that were laid off at the same time, and two of them were working on Yucca Mountain as walkers. And Robert Banangas, they called him Bang-Bang, and Clawson W. Ruth who was known as Tuffy, and they're interesting. They crossed paths in grade school. Tuffy's mother was a school teacher at Bumblebee, Arizona, north of Phoenix, and they were both classmates as young men, and there they were, working on the test site, and laid off together. Bob Banangas never lived to cash a retirement check. He died before he could cash the first check. And Tuffy resides in Mesquite where he's lived for a long time. And he was the public works director and he had a little excavation business and iron shop and so forth. He said if you

didn't have a problem, he'd cause one so he could fix it for you. But Tuffy, he was a son of the last Arizona Ranger.

Is that right?

Yes. Sort of a historic perspective there. It was the second batch of kids that that fellow had. Tuffy had a brother that worked on the test site, Lee. And Lee had a ranch up near Battle Mountain. He had his own private aircraft and he would fly to the airfield just outside of Mercury, commute back and forth. And then they had another brother who, I don't know whether he was a mathematician or physicist or what, had a doctorate and so forth, and he a couple times came with some of these experimenters to the test site, I remember.

What would they do?

Well, they would be part of the experimenters. I don't know what experiment he was on, but I remember that. I don't remember that brother's name. I just remember the two that worked—they both worked as walking bosses, and then Lee worked for a lot of years with the drilling department in the big-hole drilling.

How'd you end up out at Yucca? Did you work out at Yucca or did you work—?

[00:35:00] We were assigned to Yucca Mountain. The last thirteen months I was assigned to Yucca Mountain, but I worked in the Bank building where they had all the different agencies, including REECo, down there on the Strip, or Convention Center Drive, the eleventh floor.

And what were you doing?

I worked in the Materials Department there.

OK. And then what were they doing out at Yucca at the time?

They were mining.

They're still mining the—

Mining and—yes. No, they completed their mining, I guess.

I was just wondering when Yucca became a potential site for the waste.

Well, it was in the works for a long time. It's not a very brilliant place to put it because it's not a natural barrier, you know, this rhyolite breathes, it does barometric breathing. It's leaky. So it has to be an engineered barrier. So there were a lot of places, like the West Texas salt domes would've been better. There are a lot of places they could've put it.

You said the rhyolite breathes, is that right?

Breathes. Yeah, it has barometric breathing.

And the salt mines wouldn't?

No, they're sealed. But it's sort of a political thing. That's where it's going to go. They spent so much money already, you know.

Yes. And Nevada's small.

They get mad when you call it a dump. It has to be a repository. Once they had an earthquake in close proximity. That X-Tunnel, in fact, it was right under X-Tunnel they had an earthquake once. I remember going out there and people toured it. They were all looking up for damage, and that's not where the damage is. The damage was there right where the invert meets the rib, you know. You look down.

OK. How big of an earthquake was it?

It wasn't too big. I can't remember what it was. Everything's on the moment [magnitude] scale. They don't use the Richter scale anymore. They're both about the same till they get up around four, and then they diverge. It's an exponential curve. You know, one number can be like a dime and the next one is as big as a football field, you know, with an exponential curve.

And just any last, you know, anything else you wanted to say about your experience out at the test site?

I don't know. That was a long time ago. The variety of miners from all over the country, you know, there were Finlanders from Minnesota, subway tunnelers from Washington, D.C., black fellows, Arizona stope miners, miners from Utah, native Nevada miners. Mary's from the Catskills in New York. And a fellow I worked with, Shack they call him, Seymour Shackelton, he worked on the water diversion from the Catskills for the water to New York City for drinking water, or any water they're going to use. That's where he got his money and experience, you know, after military service. But just people from all over for miners.

Yeah, it sounds like a real diverse group. Maybe that's one of the reasons why you bonded so much? There was so much, you know, to bring all different experiences—

I don't know. The miners are a different breed. Historically, if you tampered with their integrity or anything, they'd just leave. They were tramp miners. They'd go on and find a job someplace else. Some of these fellows were tramp miners that came here and stayed, and some would come and work and then leave and come back multiple times.

It was a good-paying gig, right?

Well, it was steady. It was steady.

That was the important thing was that it was steady, because mining—

Steady, and they were well paid, you know.

Oh, yeah, I suppose that would be true because in mining, you know, you would dig to find something and eventually that something would be gone—

Depleted, yes.

But at the test site—

A lot of them are construction miners, you know, work on tunnels all over the world and so forth.

All right. Anything else?

I don't know of anything else.

All right. Well, I want to thank you for your time.

Oh, you're welcome.

[00:39:45] End Track 2, Disc 2.

[End of interview]