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

Interview with John F. Campbell

July 23, 2004
Las Vegas, Nevada

Interview Conducted By
Robert Nickel

Oral history is a method of collecting historical information through recorded interviews conducted by an interviewer/researcher with an interviewee/narrator who possesses firsthand knowledge of historically significant events. The goal is to create an archive which adds relevant material to the existing historical record. Oral history recordings and transcripts are primary source material and do not represent the final, verified, or complete narrative of the events under discussion. Rather, oral history is a spoken remembrance or dialogue, reflecting the interviewee's memories, points of view and personal opinions about events in response to the interviewer's specific questions. Oral history interviews document each interviewee's personal engagement with the history in question. They are unique records, reflecting the particular meaning the interviewee draws from her/his individual life experience.

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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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Robert Nickel: *OK, if you could start off by just talking a little bit about your background, where you were born, work experience, that sort of thing.*

John Campbell: Well, I was born in La Jolla, California, and I was raised on a cattle ranch in Colorado between Paonia and Hotchkiss, a little community called Midway. And my family's ranch has been in the family since the 1890s, a cattle ranch. I went to high school there, and ten days after I graduated from high school, my father died. So I pursued other avenues, something with my life other than college, because that was my chance to go to college. So I went to work in the uranium mines out of Grand Junction, near Gateway Colorado, up on John Brown Mesa. I worked for Climax Uranium in 1962—let's see, went to work in 1962, August of '62, for Climax Uranium—and I worked there for about, oh, a year and a half, and then went to Jeffrey City, Wyoming, betweens Rawlins and Lander on Highway 287. They had a—it was once called Home on the Range—there was a uranium deposit in Crook's Gap/Green Mountain that I worked for Continental and Uranium. I worked for them for three years, and then one year south of Tucson, Arizona. Finally the test site on, July 18 of '67, just about—quite a few years ago. And, I —actually I went to work with the laborers' local 872 as a miner—joined the union—and I worked as a miner for about fifteen years of the twenty-six years I worked for Reynolds Electric[al] and Engineering [REECo], all in the underground weapons research and development.

Now, how did you get the job with REECo? Was that through the union, or how did you—?

Through the union. Hired on through the Laborers Local # 872 union, and once I was within REECo—because they hired seven, eight thousand people during the early sixties and seventies—they had as a many as four or five hundred miners. I don't know the exact numbers, but I know when I came to work out there during the late sixties they probably had four hundred miners that would come and go, from all over the country. They came from back East, some in the coal mines, some in the uranium mines, some in hard rock here in Nevada, the copper mines up north. And some of them were out of the tunnel transit—rapid transit—back in Washington, D.C. and San Francisco. A lot of them, the water projects near Bakersfield, California. A lot of those guys came here. And Bishop, California, that was another big source of people that came to the test site. Uranium miners out of Grants, New Mexico—we got a lot of those. A lot of the uranium miners went to work out there. And I worked through the union for about fifteen years. I think '84 was when I went into supervision, 1984. I'd have to look in my records on that for sure, but I believe it was September of '84, to the best of my memory.

And like I said, the first job that I went to was U6a. That was the very first job, because they had killed two people up on the Rainer mesa in Area 19, U19g. They killed—two people got hung up in the mining of the cavity. I think it was Parker and Johnson. I didn't get to meet them, but I replaced them. I replaced one of the guys **[00:05:00]** that gave his life there. And it was at the bottom of a 3,800-foot, 48-inch cased hole. It was 3,800 feet straight down, just like a stovepipe. The deepest one I worked at was U19e, and that was five thousand some odd feet deep. I can't remember the code names of them, because I didn't work on the fielding after the mining was done. All we did was mine a cavity out—about a twenty-five by fifty cavity—and then we turned it over to the scientists, and then they loaded a bomb into it, a rack, and then stemmed it and shot it. Well, I got to work in that kind of a situation, because in Arizona I

worked in the shaft. I was a shaft miner, sinking vertical shafts down when I worked there, and in the copper mines in Arizona. So I had a mining background in uranium and copper and some gold and silver, in Telluride, Colorado. I worked in Telluride at the Idorado for a short time.

But after that I came to the test site, then I retired in 1994. June 30 of ’94 was my last day for Reynolds Electric. And I’ve set about since collecting all the information I can to help do an oral history.

That’s great. Well, one thing I wanted to ask you about is—you had all this experience in uranium mining and other types of mining—how did that compare to the mining that you did at the test site? Was it similar, or how much of it was completely new that you had to innovate on your own?

There were all of the above. The scientists were famous for bringing you the impossible and saying, `Let’s do it.` Like trying to put a ten-foot plug, or a ten-foot piece of solid granite—we had to take it, oh, about two thousand feet underground, and the drift that we were taking it up was only ten feet in diameter. So actually what they wanted to take underground was bigger than the drift. But we did it. It took a lot of effort—a lot of manpower—to do that but we did it.

The difference in mining—because it’s underground construction, is what the test site was. Even though you employed a lot of mining equipment and things that they used—continuous miners, Alpine Miners, drilling and blasting with dynamite—we used all of the above at the test site. And as the technology and mining methods improved, then we took that knowledge and put it to work on the test site. And over the twenty-six years that I was out there, it evolved quite a bit. Because it used to be they’d have a crew of—including bull gang—probably thirty-five to forty men per crew. And then you had a crew—it’d run twenty-four hours a day, so you’d have three shifts. And then in the later years, ten years later, you’d probably have

a crew of eighteen. They cut them in half and less, because we got better equipment, newer methods. And it took us usually about eighteen months to do a turnaround from the time you'd get the blueprints and get the OK and funding from the Department of Energy [DOE] through Defense Nuclear Agency [DNA], or one of the laboratories, either Los Alamos or Lawrence Livermore. They would fund the project and it'd take about eighteen months to mine what was in the neighborhood of– how many feet of tunnel? About 4,450 foot of tunnel, to be in one test bed. And it'd take about eighteen months to do the mining, field the experiments for the scientists, **[00:10:00]** and to execute or to detonate the atomic device, and then reenter to recover the information and film and different things that they had in the test bed. Mostly film and recordings and stuff that they were after. But it took about, I think, what, $47 million for Distant Zenith [1991]? And how many man hours? I didn't ever know how many man hours—but fully fielded, when I was superintendent at P-Tunnel, the biggest crew we had, I think I had 350-some craftsmen and support help at one time in P-Tunnel.

Now, since it takes eighteen months to do the test, would there ever be times when you were working on more than one at a time?

Yes. We'd be usually reentering one, fielding one, and developing one, or construction of the mining part. So we'd have one going for the future, one that we were working on now, and then the reentry of one that's been executed. Usually all three of those things went on at the same time, most of the time. And sometimes they would get two and three jobs going underground. N-Tunnel had a big cadre of people. In fact, N-Tunnel was the last underground tunnel shot, Hunters Trophy [1992]. That was the last tunnel event before the moratorium, and I got to work on that and complete the reentry on it, as a mining superintendent.

But I don't know how many jobs I worked on. Somewhere I have that number, but it was close to, I believe, fifty-some different jobs that I worked on. Somewhere in my records—before I left out there, I sat down and wrote down every job that I'd been on, on the test site—and I've got that here in all this information somewhere. I believe it was fifty-two, fifty-three, something like that, different jobs I'd worked on, some of them just a short time and some a long time. I'd go on missile recovery up in Tonopah. They had to have—shoot missiles down into the ground from, oh, thirty thousand feet or something, out of the plane, a powered missile. And they'd shoot it into the earth, and then we'd go down and recover it for them.

And that was up in Tonopah?

Tonopah. Tonopah Test Range.

That's up north, right?

"Up top," they call it. That's where they did the developing of the Stealth, the bomber and the fighter. The bomber was done in Systems, which is Area 51 or whatever you want to call it. Spotted Range. And then they had the ones up, they called "up top," in Tonopah.

And was that a DOE or a DoD [Department of Defense] instead of—?

That was for Sandia, when we'd do the missile recovery. Like REECo managed the test site, Sandia Laboratories managed—with REECo support and help—they managed the Tonopah Test Range. And they did a lot of weapons computer systems, to where they could—like they had a bridge. They could come over here with a gun and shoot a missile with a computer and device in it, oh, sixty, seventy feet into solid rock or concrete, and then talk to it six months later and detonate it. And you couldn't find it. You could smell them, but there's no metal detector that could ever pick up what it was made out of. It looked just like a bullet, like you'd take a bullet out of a gun, big game. And they would shoot those things—they were about four inches in

diameter by about five foot long, probably weighed 130 pounds, maybe. They were fairly heavy and **[00:15:00]** probably about that long and were shaped just like a bullet. And they would shoot them—they had computers in them—they would actually shoot them down into the ground, sometimes to 150 feet, 200 feet. And then they'd talk to them with a radio of some kind, a signal on a computer, and could actually detonate and fire a weapon sometime later.

Now, was this in the eighties or the seventies?

Eighties. Yes. Mid-eighties. Late seventies, mid-eighties. I went up there—probably over the span of five years, I was up there maybe once or twice a year. They'd call us, a certain group of drill hole personnel up there, to do their recovery and stuff. It was fun, gave us a break, and got to go somewhere other than back and forth to the test site.

You already touched on this a little bit, but I was just wondering if you could give sort of a brief overview from start to finish, what would be involved in sort of a typical underground test, from the mining standpoint?

Well, first of all, your cadre of people, you run a three-shift operation. You'd probably hire two hundred, by the time you got all your support people—you know, truck drivers, cement truck drivers, and plumbers, pipe fitters, miners, laborers, bull gang, electricians, operating engineers, carpenters. We had them from all unions. And like I said, it took about eighteen months. Twelve months to do the mining, roughly, then to insert the device and stem it would take probably about seven days, once they actually put the device in, then we would back out of that tunnel and was ready to test. They'd give us about seven days, because they had to have a cure on concrete of so many days before the concrete containment plugs would be hard enough to withstand the blast in case something happened. And it did every once in a while. But here's some of the statistics at Distant Zenith. The grout or concrete that we poured underground was about eleven

thousand yards, cubic yards. The tunneling began in October of ’89 and completed June of ’90 so that was pretty close to eighteen [eight] months. There were 4,450 feet of tunnel. And the overburden—or the cover over ground zero—that part at P-Tunnel, was 880 feet. Ground zero, the distance from portal, was 4,900 feet. The amount of earth removed, 29,496 cubic yards. The line-of-sight pipe was 800 foot long, diameter from six inches to twelve foot. And then they had an event bag in the cavity itself with a volume of 138,300 cubic feet.

What do they mean by “event bag”?

That part of it was classified. I’ve *seen* it—and there was some kind of a gas or a combination of gases in there—and they filled this bag full of gas *right* before the detonation. So it added *to* something. But I did—that was probably one of the things that I don’t—you just go around shaking your head about like, `Yeah, you didn’t get to know.` And there were four hundred miles of cabling with twelve hundred channels. And a budget of $47 million. This was done in September of 1991. And I got this from a Lieutenant Johnson that was a DNA project engineer. He compiled all this stuff. I often wondered how much it was, but until we brought it out—I brought it home because I was there at P-Tunnel, and just a lot of people wouldn’t have any idea. We did enough construction to build one of these hotels down there [on the Las Vegas Strip], and then nobody ever got to see it. It was just [clicks tongue] and then we’d reenter and then cover it up and go on to the next one. Because I don’t know if you’ve ever seen a map of the underground test bed—here’s the plug, and this is the **[00:20:00]** tunnel complex [showing map]. See, this is ground zero, and these are called bypasses. And this is where the line-of-sight pipe starts up here at six inches in diameter, right here, and goes *all* the way down to there, and that’s twelve foot in diameter there. This is the main tunnel coming in. So this would be stemmed first, and all the cabling and everything, then your scientists would come in and do all of their things

inside the pipe. Then we'd pump concrete all on the outside of it, and then they would insert the device, and then we'd retreat and pump all this full of concrete out to right here. That would be the last. All that was solid concrete. And in about seven days. And then you had all the cabling and everything that was there. Here's one at T-Tunnel [showing another map]. This is Mighty Oak. This is the one that got away from them. I worked on that a little bit. That's the one that radiated all of P-Tunnel. It was contaminated. It really became contaminated.

That was, say, '85?

Yes, I believe. Yes. Let's see, this here [sound of papers rattling]. Let me show you where—this is T-Tunnel. That's T-Tunnel. This is P-Tunnel and that—we don't have a picture of that one. [Showing another map] That's A, B, and C-drift at N-Tunnel, at ground zero looking out towards—all this in here was to do with hardening of silos, hardening of structures to withstand a direct hit, so they could put their communications for NORAD [North American Aerospace Defense Command] like over at Colorado Springs. And that's all done underground on big, huge springs and stuff. And this was, I think, Diamond Sculls, was the code name of that. Now, that would've been back in the seventies. I got a book that tells you every event that was done and when it was done. I'm sure you got access to all this.

Yes, we do. It's a great resource. You can look up all the dates and—

Yes, and then code names that would reference when they were—yes. [Showing another map] That was P-Tunnel. This one here, Mission Cyber. That was done at P-Tunnel.

And where on the test site was that area?

Area 12. Most all of the tunnels were Area 12, Area 16, and they had a shaft at Area 15, which was Pile Driver and Hard Hat and Red Hot, those code names were over in Area 15, in granite. And that's what this became later, was the Climax Repository. And I worked on that, I helped

drive all that. And that's in granite— *hard* granite, like the core that I showed you? That came from the Area 15 shaft. Real hard, where the rest of the tunnels are pretty soft. It's a soft medium called Alluvium. But this here is a great reference for what they did underground at P-Tunnel.

And I think every once in a while, I get homesick, but not too homesick. I miss the people. I do that. I do, because I have a great camaraderie with friends even today, at the breakfasts [informal monthly meeting of REECo retirees], and several of them that I've—yes.

Right. I actually wanted to ask you about that. I've met quite a few of the REECo people, and you guys still have the monthly breakfasts and still keep in touch. I mean there's quite a connection there, and I was just wondering, what it was about working there that made it such a special connection.

The underground people were a unique breed of people, kind of different, you know. And, **[00:25:00]** well, you spent more time with your working people than you did your own family. Because you'd get on the bus in Las Vegas and you'd sit beside one of them that you worked with all day long and you'd ride two hours out, change clothes, ride up the hill on a bus, go underground, work for eight, come out, take a shower, come home, and do that five days a week, sometimes seven days a week. A lot of it was seven days a week. Yes, I worked a *lot* of seven days a week.

If that was a busy testing schedule or—?

Once they inserted the device, they were kind of under a preset timetable to get it executed in so many days. Yes, because that was the big picture. The whole world had to be alerted that we were going to do a nuclear weapons test, so Russia had to know, everybody in the world had to know, that we were going to do this on a certain day. Most of them. Not all of them. And sometimes they'd do two and three at once. And that's the way they concealed what they were

doing. They had them simultaneously. *Bam!* You get three of them going. They did some of that. Yes, and some of this stuff that I've collected here, like this—Ernest Campbell—he's no relation of mine, but he came dragging this thing over here not too long ago. And most *every* one of these guys on here are dead. But him, Buc Donovan, he might still be alive. Harry Giesler's dead. Chuck Phillips, he's dead. His son came to the breakfasts, and he and I were real close. We worked partners for years. Carl Lefler. Al Fitzpatrick. Schofield. And Walter Bennett. He was the user, or what they call user, or the test director. They had funny names. Acronyms. We were told later, after the drug culture come about, we could no longer call the scientists "users."

Now, did they have set teams or groups of people? Would you work with the same people all the time, or did that rotate a lot?

It varied, changed, yes. Sometimes supervision had a way of picking the people that *they* wanted to work for them on their job over here, for whatever reasons—you know, politics and all of the above. And some of that went on, but most of the time, you had a work force of—and then you had people that specialized in things, like shaft work and drill hole work. And that's why *I* got to go, because I've been familiar with drill holes, and I had that experience that always could get me to go to Tonopah and do just different stuff, because of the experience that I had before I got to the test site, you see. I was lucky enough to get the experience in calyx holes. They use them for ventilation shafts in copper mines and stuff. You drill a big hole, and then we'd have to go down there and put lining and concrete in them. But we worked out of the work deck cages and stuff, and I got a lot of experience in that. And sinking shafts.

Now, you said you worked as a miner for fifteen years and then you became a supervisor. How did that work? Was that just sort of a regular promotion, you'd been around, had the experience, or—?

Yes, it was a cumulative of all of the above. The experience that I had—and I'd always been a shift boss, even when I was a miner with the union. I was a "shifter," they called it, which you'd answer to supervision, a company, because you had to have a company person telling the union person. That's the way they set it up. One union person couldn't tell another union person what to do, unless you were a shifter. And you had to make more money, so they had that, but then you had to have a company person telling the union person how to do it. It was a way of putting **[00:30:00]** people to work, too, which worked out good. It did. Because the miners had a good labor pool here that they could draw from, and that's what they did. That's what won the Cold War, the people like myself that went—and some of them gave a lot more than I did. I'm still alive. There's so many of them that are not. Some of them younger than I am, too. Quite a bit younger.

But I started out as a miner in the Laborers Local 872, and then after the fifteen years, they needed first level management—what do they call them, tunnel walkers or walking bosses. They were assistant superintendents. And then I became operations mining superintendent over one of the tunnels. And then I did even serve part-time as a project manager. I even got delegation of authority for department manager for a week one time. I mean there was nothing going on out there, but somebody had to have delegation of authority to be responsible for what went on, so I got to sit in the big chair a couple times. Being the mining superintendent, that was a plateful right there. You've got three hundred craftsmen working for you, and they're worse than old women, some of them. Oh! Because they make good money, they make top dollar, but then they get cranky and fussy and they've been there forever and they think that they own the place, and in a way they do because they were *good*, they were some of the best craftsmen you'd ever want to be around that went through that test site.

And I'll bet a lot of the skills are so specialized at the test site that it would be really hard to replace workers just because—

You can't. See, if they had to start today and *really* get back, we couldn't even do business the way we used to. They wouldn't let us. Because with radiation, with training, with the way they have to do business today, I don't know if—it'd take them a *lot* more money and a lot more time to do an event the way we did it. Now, they can reinvent the wheel a little bit, and I'm sure that they always can, to get it faster and better, with money and technology. Because I think they've been tasked by Congress, because the turnaround time was eighteen months. They wanted to cut it in half—they wanted to turn one around in nine months, and even faster than that. I don't know. They might, I'm sure. Where there's a will, there's a way. You get enough people thinking about it and they could come up with something. The only thing I could envision was a huge laser beam that just vaporized the rock. And that's possible, too, but it'd cost so much and so much energy to do something like that right now, I think, that it would probably be cost prohibitive, I bet. But they've got the power to do it. That's what Ledoux was. It was the world's most powerful laser. And that was generated by a high explosive device. The light was generated, and then they refracted it through gases and mirrors, and I don't know how they judged the wattage. I guess megawatts of a laser beam. But I heard Ralphie Papagian, the project scientist from Los Alamos, say at that time it was the world's most powerful laser. That was the one Elmer Sowder, you guys interviewed, he was in charge of that. Yes, he was redoing Ledoux. I was on that. Yes.

Well, you mentioned a little bit sort of the safety issue, and when I think about mining in general—but especially at the test site—I think it must be just really dangerous work. And I was

just wondering, first of all, how dangerous was it, and if you had seen—were there a lot of accidents? I mean obviously there were risks.

[00:35:00] Well, when I first came to the test site, after working in the industry in uranium and the copper and gold and silver industry, I thought to myself, heck, a miner could live forever out here. But in the industry, I think, what, test pilots, oil rig workers, have a higher accident ratio. But on the test site, the miners were second in fatalities, in lost time accidents, and stuff like that, the mining, because of the exposure. The big, heavy drill rigs, their exposure was a little *more* so, so their fatality rate and lost time was higher a little bit. I did ask them questions of Bill Beam the head of safety, at one time, because I thought mining would probably be the most. He said, No, he said, it's on the drill rigs. Because there are so many moving parts, you know, machinery-type. Of course, underground you have that, but that's more specialized, I guess. We did. We lost a few. I never lost anybody on my crews. A broken foot was the worst accident that happened to my crews. Every day you went out there, you were lucky, because we pushed the edge sometimes. And all you have to do is have one thing go bad. It only takes that long [snaps fingers] and *pssshhhooo.* Yes. I walked on the edge. I've seen a lot of close calls, real close. I believe in prayer because I've seen a couple of things. One time at Ledoux, we dropped probably a three-hundred-pound metal plate that had frozen together at night. There were two of them frozen together, and they went to lift it up with the hoist and it broke loose and dropped about 150 feet down the shaft. Well, soon as he brought it up, it broke the tension and one of them [slaps hands together] skidded and fell down the shaft. And my crew was at the bottom of the shaft, getting ready to come up for lunch. And I was standing in the office—because I'd heard the bell ring to call for the cage for them guys to come up—and I knew that the top lander was getting ready to lower this piece of metal. And I'd seen him, and he was safe. He was doing

everything safe, but he didn't understand or realize at the time that they were frozen together, because it was so cold. And soon as that broke that surface tension, that other one [slaps hands together] just scooted out and fell down the shaft. And it went down about one hundred-fifty and hung up. It could've tore that shaft all to—well, it was a piece of metal plate probably an inch-and-a-half thick, inch to inch-and-a-half, three by four, four by five, maybe, weighed at least three hundred pounds. And it'd cut a man in half. But it went down the shaft and hung up. And it's just one of them deals where you react automatic, because my *feet* wanted to run the other way and something grabbed me right here and says, `Only you can take care of this.` So I went over there and got in the cage and had to set the guy down because he was just—he lost it, the top lander, he did. He went bonkers because he had *realized* how close, and it could've cost him his job. It never, because it hung up, and so I went down there underneath the cage and hooked a cable onto it and pulled it up. But we got lucky. That's all it is—luck.

Of course, you had good people that are working, but we were on the edge a lot of times—on the edge. And that was part of what I found that made me come back, because I'm a little bit of an adrenalin junkie and I was getting my fix from being in the tunnel construction, especially when you're handling big equipment and dynamite and stuff. One little mess-up and—and we did. We had a few. We lost a few guys out there. Not really very many, but as far as the industry goes, our safety record out there with the Department of Energy was unequaled. Really, it was. We lost a few, but not like the industry. Because I can relate back to the sixties in **[00:40:00]** Grants, New Mexico, in the uranium mines. They were killing one a week down there. I lost a cousin down there in the uranium mines in Grants, New Mexico. But they'd kill one, two a week—cave-ins. They were making big money. Oh, they were making huge money but, man, there's a lot of them died down in Grants. I don't know what the total was, but during

the mid-sixties they were at least killing one a week, in that Ambrosia Lake mining district. Probably two thousand men working it, but still, it was dangerous. Very dangerous. So I figured, when I came to the test site, shit, you can live forever out here. And kind of could, because they had all the safety equipment you needed. Kind of if you got hurt, in a way it was your own fault—in a way. Kind of a hard way to look at it. Because they provided all the opportunity and safety equipment and safety resources to work with. And so if you *did* get hurt, I kind of indirectly attribute it to your own stupidity and fault. Wrong place, wrong time.

Were they pretty strict about enforcing all the safety rules?

Yes. Yes, there was always an edge where you'd turn the other way, but when the potential for life and limb, no, you got to—because all the rules are written in blood. *Every* one of the OSHA [Occupational Safety and Health Administration] rules is there because somebody paid the price. And until the late eighties, we were under no review from anybody. We had our own review system with safety and safety people. But like OSHA, they weren't allowed to come out there until after they passed some what I want to call the "Tiger Team." Congress mandated that all of the weapons facilities go under inspection. Oh, what a nightmare that was. Because I was the P-Tunnel superintendent then. And we'd been doing business the way we'd been doing it, the way we wanted to, for thirty years, thirty-five years. So they did, they reviewed us—I think I had over 1,500 infractions to abate. Oh, it was—and little things, little things, like a can of diesel fuel unmarked, didn't have the right spout on it, didn't have *da-da-da-da-da*. The big issues we had pretty well covered, but it was the little stuff, the MSDSs [material safety data sheet] and all of this. Yes, it became a—and it was costly. My God, the taxpayer, you know, we were pretty slick at cutting things down and spending all the money that they'd give us, but we got the job done. Then they're sort of throwing all the rules at you, and you can't do business, almost. They'd have

to *rethink* the way they do it in order to do it today. And the cost is prohibitive. Yes. I think it was a loaded man-hour was about $120 an hour when I left ten years ago. That's the loaded cost per man-hour. That's expensive. It is. With the all the training and all the benefits and everything? Yes. I don't know what it is today, but it went up every time they'd bid a new job, it'd go up, the man-costs, it'd have a new factor on it. One, it was one hundred plus dollars an hour, $100 or more an hour—that was ten years ago. Pretty expensive way to do business. But we learned a lot from it, we really did. And they could do it again if they had to.

That's interesting how at first you sort of had a free hand, you know, under your own supervision, you were able to innovate and do things your own way, but I imagine it's like having your hand tied behind your back when you get all these new regulations.

And most of the things that were done were done on swing and graveyard when nobody was there. Because myself even, I'd write out a worksheet: We have to do this, this, and this, and this project here and over there. I got copies of my old worksheets here, some of **[00:45:00]** them. And on day shift, you couldn't do it because of the presence of safety people and this here and all them little things that you have to—well, soon as four o'clock came and all the bosses went home, then they got the job done.

Right. You did what you had to do, nobody looking over your shoulder.

Yes, that's it, and there were a lot of things that were played right—but you can't do anything. No way could you do it. We used to haul the contaminated muck out on graveyard because they didn't want to mess with it. They'd just take it out, dump it and bury it outside because it was low-level. *But* today you couldn't even—*no*, they wouldn't even let you out the portal with it. Because all of those standards have been really reviewed. And I guess it's for a reason, because we never knew what the low levels of radiation will do over time, especially low levels. We

never had any—no records on it, so how would we know? And you don't know today. The stats are coming in, but I was—

Yes, it's still something they don't know a lot about.

Right. That's right. Over a lifetime of a man that's been exposed thirty-five, forty years. Some of them paid a high price, I know. Others, you don't know if their lifestyle added to some of it. I see names here, like Harry Gielser, he died—and there were so many of them died of cancer. I mean one day they'd be not feeling so good and ninety days later they'd be dead. That fast. Once it started,- it seemed like a lot of them old timers. Now, they did work uranium, and a lot of them smoked. I never did ever smoke. That was one of the things *I* always attributed to a lot of my health, because I don't have any problems. And I've been through the screening with Boston University, I think like I was the second person screened—because I helped start that. When Boston University finally got the contract to do the human screening, I had sat down after I left the test site in '94 and compiled a names list of all the guys that I could remember that I worked with and their nicknames. But I think I had about five or six hundred names and addresses, the last *I* had, and I handed that over to Boston University, and they used it for quite a while until they found other ways to get that information through the union. But I had probably the largest roster because I had rosters that I'd brought home from time to time of the crews' names and stuff—just for my own benefit, so I'd remember who they were. And then I sat down on my computer and I entered all this data that I had of where I worked with them, and on what jobs, what time periods, and what their name was, and their nickname. Because most all of them had a nickname. It's weird, or ironic, how if you worked there long enough, you had a nickname. You did something wrong or did something good or something out of line and somebody hung a name on you and it stuck.

But there is a lot of history out there to be told. The *best* way to do it, I see, is to get two or three guys together and you start talking story or telling the stories and recouping of— some of them are my age. Roger Phillips was a good one for me to talk to because we worked partners so much. And we always had fun doing what we did. We cut up. We were in trouble quite a bit with our boss. He kind of would shake his head. He'd just, `Aw, shit, here are you guys again.` But we'd always do it in a good day's work, I mean, but we'd give him a pretty bad time. Now he's dead. And this one's dad, this kid's [Roger's] dad, and I worked for his dad for years, Chuck Phillips, he was one of the better bosses I ever had, a real caring guy. And he taught me a lot—how to stay alive. And I always took some of them—I had some real good mentors and teachers that taught me the right things, the things you *don't* do. The things you just don't do. I had some good teachers.

[00:50:00] *Yes, since you got there a little later, there was a generation before you of the first guys who had cut their teeth and already improvised and learned.*

And they are the ones that paid the highest price—especially during reentry—because they went back in and were exposed, without protection, to some things that they shouldn't have been. But they didn't *know* that either. It was just all in completing the mission, getting the job done, at the high cost.

The reentry, that was probably the most dangerous part of the whole process?

Exposure. And, well, part of it, but in the environmental exposure—because once you went underground, you were subjected to diesel smoke, blasting smoke, dust, radiation. For instance, N-Tunnel, the track had been laid there thirty-some years, and they'd hauled out a lot of muck or dirt on the mining cars. And they'd hit [slaps hands together] the brakes and some of it'd fall off, and it's in the tunnel. The whole length of it is low-level radiation. So who's to say that you'd

breathe all these things over a long period of time, does it add to? I think so. In fact, that's what the University of [California at] San Francisco *and* Boston had to do, and I helped construct a lot of it to help them. I said `Well, we're working with a different type of deal`—because no other place in the industry can you be exposed to so many different concentrations of not only gas underground from the diesel smoke, because we had a lot of engines and chemicals, and epoxies. The scientists had the weirdest things in the world to work with, and a lot them—this silicone. We even painted the *whole* inside of a drift with silicone. You know, you'd suit up, and of course they had the safety equipment, but you still breathed a lot of it. And then a lot of guys smoked, too, and that didn't help a dang bit. But there were some of the things that we were environmentally exposed to, the combinations of them, see, those are the things I worried about, because we had asbestos, they had all these things that you, you know, welding. The ventilation wasn't really good. Gunite, you know, and then they'd put them exotic chemical hardeners in the gunnite, so as soon as it hit the [slams hand against the table] wall of the tunnel, it was hard. [Slaps hands together] But we'd do that *hours* and days. In fact, old Marv Swena, he used to tell one, he said, `It was so god-danged dusty in there, you had to pick your nose with a nail.` And it's true. That old concrete dust, it'd cake it up in your nose and you know you'd do that days and days and months on the end, some of them, because you're always pouring concrete, you're always mining, the dust, the diesel smoke. It's a wonder that, even though it was a test site and you lived longer out there than anywhere, you were still exposed to so many different chemicals and by-products of—the epoxies, some of the epoxies that we used kind of bothered me. And big batteries, banks of batteries—and you could smell them, the ozone and stuff—and if you're exposed to that a day or two, it probably wouldn't be bad, but when you're in there every day for years, the cumulative dosage is—well, I think you see it in your obituary

column. I do. Some of the old timers, they did—maybe not directly killed but it added to it. It worsened their condition. I believe that's why Reynolds Electric and Engineering is no more, because of the liability. They had 125,000 people work for them in the forty years that they were doing weapons testing, and you know dang good and well that—well, I feel that that's why Reynolds Electric went away and Bechtel reviewed and got on. Tore the old records up and—because that went on. A lot of records were destroyed. I know of a bunch of **[00:55:00]** them that got destroyed and a friend of mine got to *see* it, where all the records in Area 12—and some of them you're required by law to carry from cradle to grave. Blasting dynamite and stuff like that. But all the records of that stuff, they loaded them up and took them to an old bomb crater where it cratered—they had a dump down there—and they dumped all their things that they didn't want in those craters out there and covered them up. And that's where they went, a lot of the records that, God, we spent *years* generating. And that's against the law.

But in an environment like that, I guess nobody's really looking over their shoulder—

It's after the fact, you know, it's, `Oh, son of a gun.` And would somebody review it? Oh, they put them on the carpet about it, but so what? That was kind of the attitude that I think that went with that Cold War era was, `So what?` That *macho* thing. It's still in the DOE here now today. And they're slowly getting away from it, but when they had like William Clark [sp.], when he was the head of the DOE, you know, he ruled with an iron fist and he got his way. They just did what they wanted to. In a way, you had to. Yes, in a way, you had to. That's what won the war. But some paid a high price for it. But I think over all and all, it was probably one of the safest places in the industry that you could work, and for that kind of money.

Here's a picture. This is the drill hole on Amchitka Island, Alaska.

Were you there?

No. There's my cousin. He's dead. Right there, that's my cousin [pointing on photograph]. Larry McDaniel. He and I were mining together. We mined in Jefferson City, Wyoming, Arizona, and on the test site. And he went to work up on Amchitka. That is, that's down, and that's almost seven thousand feet. Yes. Hank Peluaga worked there. I know probably three guys: Larry McDaniel—I got to give these back to Hank, too—Hank Peluaga, Harry Gielser, Frank Solaegui, Carl Lefler, who else? [Showing another photograph] That's Amchitka. That's coming up with what they call a "sweep." They run a mandrel up the drill hole—it's a forty-eight-inch drill hole—and that's all the debris and rubble they caught with as they come up out of the—[showing another photograph] there's Frank Solaegui. And that's underground Amchitka. And that's Carl Lefler there. I don't know that guy there. And it was hot there. Oh my God, was it hot. It was about 110 degrees and about 99.9 humidity. Yes. Well, you can just see in that, they're just—[showing another photograph] there's Wally Beaman. He's dead. He was probably one of the better miners on the test site that was in supervision. He died of cirrhosis of the liver and lung cancer; he was from Northern Nevada. Probably one of the better miners they had out there. And that's Frank Solaegui there [showing another photograph]. You can see him sweat? They're just wringing wet with sweat.

I imagine that had to be really hot down there.

It was, yes. It was almost seven thousand feet below sea level, because they were on the Amchitka Island. Cannikin was the code name of it.

Do you remember about when that was?

[Sound of papers rattling] Cannikin. Well—

I'm sure we could look it up.

Yes, I know it's in that thing there.

[01:00:00] They had three events there. It had to have been in the seventies. Let's see, Cannikin was the code name. Because they asked me if I wanted to go up there. And I was married at the time, and my wife was about to have a baby, and they advised me that I'd better stick around because she might lose it.

So was REECo in charge of the mining up there also?

No. Centennial Construction had the prime contract and *they* went up there and got in trouble with doing some things, and so they come to the test site and took up our best supervision, about eight of them, to go up and turn that job around and get it back where it was running. But yes. It had to have been in the seventies, I believe. Where was I at? [Sound of papers rattling] Cannikin. '71. 11/06/71. It was less than five megaton, the bomb. Shaft. Weapons related. Cannikin. Yes. 11/6/71.

And Frank Solaegui, I've heard his name come up a lot. Was he another supervisor?

He was a department—he was in charge of all the drill rigs. And when I first went to the test site in '67, he was operations mining project manager at N-Tunnel. He was a mining project manager, and then he was out of the mining department and he was the head of all the drill rigs, the big hole rigs. REECo had a way with their supervision that if you were supervision quality, they could put you anywhere and you'd make it. I don't care whether if you were a miner, they'd put you in the drill rigs. And yes, there's two native Nevadans, too. They are native Nevadans. Frank, he's a good man. And it's people like him—well, Bill Flangas hired him, see, that's how this pecking order—and they got some good ones, they really did. Yes, they got some of the people that *mentally*, they could get the job done. They were good underground workers, you'd call them, I guess.

[Looking through photographs] Yes, this is quite a—I'll have to remember to give these to, that was my cousin. He's dead. In fact, he had diabetes here about two years ago and they removed both of his legs, but he and I worked in the uranium together. And that's Troy Browning. He just died here a while back. He was an F &S inspector. There's Wally Beaman. Most of these guys, I don't know because they came from Alaska. They hired most of the miners out of the Alaskan Juneau-Anchorage labor union hall, but the **[01:05:00]** supervision they had came from here. Gil Dobbs, where—there he is, there's Gil Dobbs. These are the only three I know—Wally Beaman, Gil Dobbs, and my cousin Larry McDaniel. And my cousin's buried in Alaska. They cremated him, flew him out of Anchorage, it's about a six-hour four-wheeler ride out of Anchorage, in an old mine out there. As you go in the portal of an old gold mine, his ashes are hung up on the wall. That was his desire, that his son take him up. It's not very far from that little old town called Sourdough. He's not very far from there. A little old gold mine that's abandoned, and it was still preserved perfect. And his son took his ashes and put him in that gold mine. He had to go all the way out of—he said it was about a four-and-a-half-hour four-wheeler back in the interior of Alaska.

[Looking through photographs] [Reading] "Have been down in North America's deepest continuous lift shaft. Ua1, Amchitka, Alaska." But it doesn't say how deep it was. It was around seven thousand feet, though. It was over a mile.

And the deepest at the test site was about five or six thousand?

The deepest we ever put men in, I think, was Area 20, and that was right around five thousand. In fact, I think in the union pay scale, you got another seventy-five cents an hour—this was back in the sixties—if you went a mile down, then they upped your pay.

Yes, I'll have to get them to Hank. I know that he's been looking for them, and I didn't even know I had them. Have you interviewed Hank Peluaga yet?

I'm not sure if we have, no.

He's wearing oxygen right now, but he's a great big guy. He's a Basque from Northern Nevada. And so's Frank; he's a Basque from Northern Nevada. I'll have to get them to him. I know he would want them. But like I said, there's twenty-six years of stuff here that— [Looking at photographs] Here's the forerunner of Yucca Mountain project, the Climax operation. Spent fuel, Nevada Test Site. It was called Climax. It's over in Area 15. That's this one in here. I worked on that from the beginning to the end. Spent fuel tests, Climax. And that was in the late seventies. But I think it's abandoned now because the upkeep of the shaft was so dang costly—that ancient, old shaft there was kind of dangerous because it had been through two nuclear weapons shots that just tore that shaft all to heck, and **[01:10:00]** then it was just the upkeep of it was just so much that I think they opted to go somewhere else and finish the tests at Yucca Mountain. That's where they're doing it now is Yucca Mountain. [Looking through photographs] Hell, we could spend another three days talking about this.

Well, this disc is almost over, so I think I'll stop it for right now.

[01:10:31] End Track 2, Disc 1.

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

Well, another thing I wanted to ask you about was the security atmosphere at the test site, because a lot of the work that you guys were doing was classified and was sensitive. I'm just curious, what kinds of rules were in place and what kind of clearances you guys had to have as miners and as REECo employees.

I think I had a Q-clearance, and that would let you into, oh, certain areas. When you first hired out, they'd give you what they called a "love" clearance—a red badge or a "love" clearance. They change in colors every so often; they update their security. And as long as you were escorted, you could be around most sensitive places, other than to go inside the line-of-sight pipe, in the ground zero A-box. Then you had to have "a need to know" or "a need to be there" to even be in there. But most of your Q-clearances would put you anywhere in the tunnel, even if you have to be escorted or signed in to a sensitive area or back out. Q-clearance was required for most of the work we did. And then with the need to know, they assessed if you had the need to be like in the war room or go into your arming and firing red shacks and stuff like that, then you had to have the need to be there. But they did a—well, they went clear back to the third grade on me. The FBI or Office of Human Resources, something, I don't—

It's the OMB, I think it was. Office of Management and Budget?

Yes, I believe so. Right. Personnel. They actually went back to Colorado to where I was in the third grade and asked family and stuff, `Was he here? Did he live in that house?` Mostly they're just checking for if you didn't lie to them. That'd probably be the *only* thing that would ever—they'd burn you. Because I know of a guy that committed—he didn't get a Q-clearance but he worked out there—that had committed murder. He was working at this job right here.

So if you're up front about things, they were more likely to take you than if you had lied about it.

A lot them, they lied on their PSQ, Personal Security Clearance [Questionnaire]. They'd lied, and they'd come out and pick you up, you're gone and you didn't work out there again. But if you told them everything you did, where you'd been, who you'd done it to, and whatever, then that was not a problem with them. They didn't seem to be, anyway. But if you lied and said you were here and you weren't or were there and you weren't or didn't or something, then they'd

escort you off, if you lied on any of your PSQs. And they did check you out. Yes, all your ex-wives, everything, they'd dig all the dirt up on you. But yes, we had to wear a badge every day, in and out, and wear it on the job. I've got a couple, three of them over there, old badges.

Yes, you showed that to me last time. So they were pretty strict about enforcing where you were at given times and where you needed to be?

[00:05:00] Right. Right. You had to need to be there to be there. Especially during fielding, after that device come up on the project or up on the site, until they got it in underground and in place, and then they'd secure the portal. But when they left Area 2 or 6 with the device, they had quite an escort. And they usually had the Navy standing by, or Air Force, one of them, to fly cover for them. They were pretty serious about it, and that was before September the eleventh. Now I imagine what it would be today if they did something like that.

Now, when you went from being a miner to being a supervisor and kind of went up a level, was there more of a clearance involved? Did they do another investigation?

No, didn't do another investigation. They pretty well knew everything about you. They'd do an update every five years. Then if you needed to be in different places, they'd put different numbers on your badge, clearance numbers, where you could get in to like the red shack, if you had to be in there. You had people in there—

And the red shack was where they had the—?

Where they did the arming, to arm it. How they did that, they had a tumbler affair, I think with ten numbers on it, like a lock. They'd take a key, put it in, and open it. There was only one key. You'd go into the red shack, open that up, and you'd dial ten numbers. Then you'd take that key out and go up to what they call the war room at CP, control point. And you'd take that key—same key—stick it in the lock and dial the same numbers in, and then open the key, and then it

would link the red shack on the project to the war room. Somewhere in one of the newspapers, I've got a picture of the war room. I've been there twice and seen them actually execute, and countdown, and how they monitored the wind conditions, and everybody in the world checks in, kind of, that we're all ready to go. The president's been told, everybody's OK, then you got a window to shoot it in.

Who was actually responsible for sort of, you know, pushing the button for doing the firing? Was that the test director or—?

Usually, like the captain of a ship, he stood out and directed traffic and if they had this or that or go ahead. But the arming and firing tech, device engineers, they would do that part of it, dial the number. Larry Crooks for Lawrence Livermore, I remember it was his name that—because I watched him do it.

I actually interviewed him a couple days ago, and he talked about all the designing of the device and everything.

Yes, because I got to see him when we did Esrom [1976]. That was the one with the broken arming and firing cables. They invited us to come up into the war room and they give us VIP treatment, kind of, to see what really went on.

I was curious also, you know, you guys who worked with all this sensitive information, it was sort of a really tight knit group, and then you go home at night, and I was just wondering, did that pose any kind of problems when you'd come home and what you worked on all day you weren't allowed to talk about to anybody. Was that ever difficult, or is that just part of the job?

It's part of the job, and usually your family didn't care anyway. They didn't know what a tunnel was or a this or a that. And you'd learn what to not say and what you could say. And a lot of the lingo that you talked, nobody, unless they understood what you were talking about, they would

have no idea. You know, if I was talking about a FAC [fast acting closure] or a GSAC [gas seal auxiliary closure] or a MAC [modified auxiliary closure] or something, most people wouldn't know it unless they were familiar with all the acronyms that we had.

[00:10:00] But you just learned to leave it on the job. Now, I know some people who work out in Systems, and they're *really* fussy about their clearances out there and security. I couldn't get- Navor Valdez- I said, `Where do you work?` He said, `Up top,` or, `Out in Systems.` And that's all he would say. He wouldn't say no more, even though I knew him and whatever and kind of knew what they were doing a little bit, but he wouldn't talk about the job.

Did you ever hear of any instance where somebody leaked something that they weren't supposed to or talked to the wrong person or anything like that?

I was down at the portal of P-Tunnel one day, though, when the protesters walked the thirty-some miles across the desert and they showed up right at the P-Tunnel portal. And walked right up to the security guard, Wackenhut; they were dumbfounded that they made it that far. And they walked right up to the portal. And they secured them up and took them somewhere. To Nye County Jail, or over to Pahrump, probably. But no, I don't think there were *any* instances where there was anything like that ever went on. They had a pretty loyal bunch of guys. They did. They knew what they were doing, and most of it that we knew on the lower levels of mining, that wasn't classified anyway.

Right, and I imagine, like you said, most of it was sort of its own language, that, you know, if you're sitting there in a bar and you say something to the bartender, he won't know what you're talking about anyhow.

No. Unless he happened to know exactly who you were and what you were doing, nobody would know. Because when I sit down to tell somebody how we did it, it takes a while to explain how

you'd go about mining a tunnel and doing rock bolt hardening and why, and it's quite involved. And that's how they figure the breach of security is that if everybody told them one little thing, they could put the puzzle together, one little thing at a time. So they were *really* good about paperwork. *All* their paperwork went into a shredder and then was burned. They recycled it for a while, and then they started burning it, the real sensitive stuff, or shipping it down to that bomb crater and then covering it over. Yes, that's where a lot of it ended up.

You mentioned the protesters. Was that ever a problem? I mean I've heard that they had these big protests right outside of the gate and every time you'd drive in—was that ever a problem or just kind of something they put out there?

Oh, they'd lay down in front of the [vehicles]—it never did interfere very much or delay or anything. They'd chain themselves together and walk across the highway, and they'd load them up and put them in what they call a pigpen out there. If you've ever been to the site—

Yes, they showed us kind of the holding area.

Yes, the two pens. Pigpen. They'd put them in there and hold them. There was a lot of the big names, movie stars, that would go out there and lead the protests, that's what makes America great, that they can voice their concerns. I wish they knew the truth before they do some of this, or did their homework. But there were times that even *I* had reservations about developing a weapon of mass destruction and you think of—on your conscience. I never did ever quit because of that because my kids needed [to be] fed and I had to make a house payment or two.

Right. Well, that's another interesting point. All these people working at the test site, and a lot of the people that I've talked with said, We were just so in to what we were doing, we didn't even think about the bigger picture because we had a job to do and it needed to be done. But was that ever anything that was talked about when you **[00:15:00]**

were working there, you know, some of the bigger issues of realizing that you're working on weapons?

I never heard it discussed. As far as a moral issue? No. *I* had reservations about it sometimes, you know, a little bit. I'd give it some pause or some thought to just wonder if it *did* and I *knew* that it did, how would I feel if they ever had to take it to war or *use* it? You know, you'd wonder. Yes. But it didn't really interfere with anything I did, because I always thought, well, to rationalize it, I'd always do it in the sake of knowledge. Whether we *use* it or not is another deal. But at least we have the knowledge *to* do and use it. So that's how I kind of appeased my conscience or something a little bit, that it was for the sake of knowledge and hope we never had to use it. And I still believe that today. Of course, in most cases it would be fast, but those that got radiation sickness, that'd be just like crawling inside a microwave for five minutes. It would be the same thing. You'd just start to boil from the inside. It'd have to be a horrible, painful death for a while. Have to be. Unless you were just to be there close enough where you were vaporized, the radiation sickness would be horrible. That would be the worst of it that I could think of, would be watching somebody, your loved one or something, die of radiation sickness. And I think that a couple people have had it that was affected. Bud Coy was affected by it, I think, because he went so fast. As healthy as he was one day and then just gone the next, almost. Within thirty days he was consumed totally by cancer. And he was reasonably healthy, you know, thirty days before then. I think it was six weeks from the time that he first complained of being sick till he was gone. Just that fast. So you *know* that in some cases, not all cases but in some cases, the environment and the exposure that they had *did add to it*. I'm not going to say it caused it, but I believe it added to it, the overall health picture. You know, it's the *quality* of health that we were looking at.

[Looking through pictures] Here's your war room. Nick Aquilina. But that's what the war room looks like. They got all kinds of weather monitors and they got cameras at the portal, cameras here, cameras there, and then once they're in there and they start the countdown. It's done—somebody's always T-minus-5, 4, and this, but the sequencing is all done electronically, because once you initiate that key and they start everything on line, then it's pretty much automatic.

OK. And the war room, was that at the control point?

Yes. CP-6. Yes, and I got to go there one, two, three—three times I was in the war room. It was just that I had to go over there to see it one time. The only thing that they were going to do to me is if something happened, they're going to turn around and say, `All right, go unbutton it and get back in there because we got to fix this and this.` And there were a couple times when that bag that was I telling you about—that one bag—when it didn't deploy right, because they were supposed to do it remote and I don't know, some commander was on the air valve switch and he give it too much and I thought we was going to have to go back in there. And I'd already been there on feet for about a day and a half, two days, no sleep. I was just a walking zombie, and I thought, oh, my God, if we have to go back in there. And we didn't, but I thought we were going to. And it'd taken us another six hours to go back in, unbutton it, because we got big generators underground because they shut all of the power off. **[00:20:00]**

Now, when you had a test, would you stick around to watch the test or—?

If I was responsible for the button-up, yes, I had to be there. That was one of my job requirements. If there was anybody underground mining or we did anything underground, then I had to be there. As far as the responsibility I had to be. If they were pouring concrete, anything past the regular—didn't matter how long, I had to stay there. I'd go out and stay sometimes two

or three days before I could get home. Other times I'd drive home and drive back out the next morning. You'd get home just in time to get about an hour's sleep, take a shower, and go back out, because it's about a two-hour drive, hour and a half. Hundred and five miles.

To Area 12, right?

To Area 12, yes.

Is that where you would watch a test from, from Area 12 or the control point?

The control point. CP. CP-6. Again, I didn't have a clearance to get in there. I'd have to be what they called VO, visual authority—anyway, they got to see you to sign you in and be in person. You have to be a live body and somebody has to take responsibility for you to be in there. And they'd turn your name in two or three days ahead of time, and then if you showed up for the test, then—it's the same way here. If you go into Bechtel, if you don't have a badge or a clearance, you got to get visual authority to get in there. Or somebody's got to call and have you go down there, whereas before you used to be able to walk anywhere you wanted to down there, but not anymore. They keep a pretty good eye on you anymore around a government project. Which they have to. Understood.

What kinds of people would show up for the test as far as, would there be military people there? Would people from the labs be there?

Your test directors and your head people of the labs, yes, they would all be there. And your arming and firing team—the ones that did all the arming and firing and their techs and stuff—they'd be there in support. And then REECo would have quite a group of the button-up crew, which consists of eight or ten miners and pipe fitters and electricians and specialized people that knew like the rupt systems, the interrupted power systems. You'd have to have electricians and craftsmen standing by—because they're electric and diesel. Some are diesel. They would keep

support people. Whatever it took. They didn't spare the money when it came to that phase of the project. They just wanted it done, no matter what it took.

I imagine you'd probably rack up a fair amount of overtime a week or so before the test?

I think I was in supervision, how long? Twelve, fifteen, let's say around fifteen years, and when I left I had three and a half months of comp time coming to me—and sick leave and stuff—but I never took that. Three and a half whole months. But yes, of course, when you're salaried, it didn't matter. You got so much whether you're there or not. Now if you're a miner paid by the hour, yes, they did real good. Yes, a lot of the craftsmen made *real* good money during [**00:25:00]** button-up times.

For the craftsmen and the miners at the test site, how were they paid in relation to people just in private industry, like a uranium miner or a coal miner versus *at the test site? I mean I imagine it depends who you worked for.*

Yes, because the test site was all union, whereas most of your other metal mines and stuff are not union, or United Mine Workers. Your coal miners, they're union, but there is quite a difference in pay. Yes, the benefits and everything that you get through the union is real good. Yes, I forget what I was making. Somewhere in one of these books, I've got a pay breakdown of all the crafts—the foreman, general foreman, and the workers of all the crafts—somewhere back in the eighties. I know in one of those books I've got an updated pay roster that shows you the—somewhere between $19 and $22 an hour, ten years ago.

Yes, that's pretty good. I imagine it was kind of more dependable work.

Yes, I think out of all the twenty-six years that I worked there, I was off one time for three months, and part of that was during Baneberry when it radiated and they had to send a lot of us home. They'd send you home for two weeks at a time, and you could draw unemployment, but

they'd send you home and then call you back. In all the time I was out there, I think I was off about three months cumulative of all that time. So in construction, that's not bad at all.

I was going to say, yes, that's great for construction or mining.

They'd lay you off every once in a while, according to the budget; you'd go through them ups and downs of the budget, but most of the time there was a money pipeline from the Pentagon right to NTS. Yes, they were good about it because they knew that miners were hard to come by once they got them trained, so they would keep them around.

Yes. They had an investment in you.

They'd invent things for you to do to keep you there.

Right. Between that and the clearance they'd spend a lot of money just to get you out there.

Yes. I forget what they cost, what one of them cost, a clearance costs. I heard it one time. Anywhere from ten to fifty thousand to do a clearance, according to how many jobs you had and how much you moved around and if you'd been foreign and went somewhere foreign, and then they have to send investigators to double-check, you know. And sometimes it'd take eight, nine months to get a clearance through. Most of the time they could do it in three months, but there were cases that took eight, nine months. Because some of them old miners, two or three weeks and they'd have a new job because jobs were that easy to get. You could just go wherever you wanted to and go to work, but it's not that way anymore. There's not very much mining going on, really. It's all foreign.

Well, you talked about Baneberry. Did you work on Baneberry at all, or were you there?

I *seen* it vent. I was riding to work with Wally Beaman. In fact, we were carpooling that morning. And about 7:30 we come over Control Point Hill, Area 6—and I was dozing in the back seat—and Wally said, `My God, looky there.` And I looked up just in time to see the

desert floor just kind of bubble up and then *pshooo*. We were probably five miles from ground zero. Quite a ways away yet, but you could see things flying through the air and it just kept going and going and going and going. I said, Whoa! Yes.

[00:30:00] *Now, right after Baneberry, I know they stopped testing for a few months, I think.*

Yes, they'd had to review all their containment policies. We went through quite a review, and it took quite a while to clean that up, because the cloud drifted over Area 12 where all of the guys were. And a lot of them had cars with all their Christmas presents in the back end of it, because I think it was December 18, right before Christmas. Because I know a lot of the guys from New Mexico that would go home on weekends, they had all their Christmas presents bought for their family, and they got contaminated, I guess, until they got it released. Yes, there were several cars that were quarantined, and they had to buy, because the radiation got into the fabric and stuff and they couldn't get rid of it.

Did you notice, did they make any big changes that affected your job as far as, like safety regulations after Baneberry?

Because of Baneberry? Well, it actually made our job better because it brought more work because they had to guarantee to another level that the containment procedures—before they could ever shoot it, they had to review the containment by a panel of experts.

The CEP, right? The Containment Evaluation Panel?

Yes. They had six, eight, ten, I don't know how many people were on it, but you always had to have that reviewed before you could do anything. You had to have it reviewed, and they'd either give you a blessing or no, back to the—do more grouting. And DNA's policy was that it's always better to be safe, so they would always overdo everything. Where we might cut a corner

here and there, they didn't do it. They couldn't afford to, really. And they would always overkill anyway. Well, they were getting the money and the budget for it to do it, so why not? Yes.

So the containment aspect and presenting to the panel, was that part of your job?

No. No, they would tell us what the criteria that they had that they wanted us to follow, and they had plenty of inspectors to make sure that we did everything. Every hole that we drilled, every move that we made to do with the integrity of the tunnel was recorded and documented and, yes, make sure that it was done what they wanted.

Well, another thing I wanted to ask you about is you're involved in the Boston University, the compensation program?

The screening and medical surveillance?

The screening, that's right. Yes, I was just curious how you got involved in that and what kinds of things you've done.

Dr. Lewis Pepper well, he hired Sandie Medina, Sandra Medina. She's the representative for the labor unions here, and she was our staff assistant at P-Tunnel and N-Tunnel for *many* years. And they hired her, and she knew that I was doing this thing on the names and I had all these records and pictures. So Dr. Lou Pepper, he's the principal investigator of it, and the other gentleman from the University of San Francisco—Dr. Bob Harrison, he's one of the principal investigators—but it's actually two hospitals, Boston University and San **[00:35:00]** Francisco, University of San Francisco. They're in kind of together on it. But Lou Pepper, I think, he's the head of it, I'm sure, he or Les Bowden. Lou Pepper and Les Bowden. They're with the Boston University, yes, both of them are. And the one from the University of San Francisco, the doctor there, is Dr. Leslie— I'll have to dig through my paperwork to find her name. I'm not too good on names unless I worked with them day in and day out for years. But I had that database set up,

and then I helped them go to the test site, N-tunnel, and actually introduced them to what a tunnel was and the environment that you were going to be in, some of the health concerns and the chemicals and all that. The same records that you're looking at here, they looked at and went through them to get a better picture, because they started off with kind of like nothing, didn't have anything but government funding. So with what I had, they got in and got their feet wet, and they've done a pretty reasonable job so far about screening, because several of the people have been compensated from the Department of Labor. And a lot of the uranium miners, they got compensated where they had problems, lung cancer and stuff.

And the compensation, that's for cancer, but it's also for things like silicosis and—

Environmental diseases that you might have. Asbestosis, silicosis, those two there. It's according to how the B-reader reads the X-ray. That's a lot of it. Because we're having some problems with some of them. You know, the shoe fits for one but it don't fit for the other and they both got the same problem. There's always one or two that they're going to throw out and you have to fight to get it, and we have to do some of that. But all in all, they've done pretty well.

Have a lot of people come forward and tried to get in on this program?

Yes, especially since there's been compensation. Most of the people are not going to do it unless there's something in it for them—unless they're sick. And there was a lot of concern because a lot of them were getting sick and that'll eat a life savings up in no time at all, if you develop cancer or something. I think there have been about fifteen or twenty as of date from NTS that got compensated. And the best part of that is the compensation *and* the medical; they'll take care of your medical for life. That's the neat thing there. They will take care of your medical problems related to that for life. And we haven't seemed to have that much trouble with funding.

OK, so how does that work if somebody wanted to try to get compensated? What's the process they have to go through to do that?

You have to meet the criteria that's set forth by the Department of Labor—that you have to have silicosis or lung damage, the B-reader has to agree that your X-ray is of a certain number, over ten, before **[00:40:00]** they'll award the compensation. If you have certain types, and they were going to re-review that, certain types of cancer—if you had lymphoma, certain types of *known* related disease, then they would award it. But they're having a little more trouble with the radiation part instead of the environmental part, because there's a question on, did it really cause the disease?

Exactly, because there's no definite way to prove—

No, no way to prove, whereas we know that asbestos is going to have a problem with their lungs in time. Beryllium—berylliosis, they know *pretty* well how to handle that and screen for it. At first, they didn't screen for beryllium because they didn't think we had it. They told them we did, and we did. We had beryllium in several places there. And they finally tracked it down and said, You *did* have beryllium exposure, and they finally 'fessed up and said, Yes.

Now, when you were working at the test site, were these things that were sort of accepted parts of the job? I mean were you aware of these dangers, or are these things that sort of came to light later?

Kind of, yes. The more education you got and more knowledge that did come out—especially about beryllium and asbestos—yes, then they changed the way they did business. But yes, we broke every rule in the book. And I say that with not an axe to grind, but we did. We pushed it to the limit with different things, and I know *I* did myself. I'm just lucky that I don't have any

problems. Very fortunate. And I know that some probably did pay a higher price, because they were exposed to a lot more than I was.

Oh, I think you're right, from some of the people I've talked to and what I've heard is that people were willing to take those risks, to make those sacrifices, because they believed in what they were doing.

Yes, that was part of it. And you couldn't taste it, you couldn't—you know. Other than you went home dirty every day, the radiation you couldn't see or taste or whatever. And I think if you'd have seen several people start dying at once *en masse* or something like that, then that would've created panic, but there's just one here and one there. But it was always cancer and [snaps fingers] they're gone. I mean one day he's sick, the next day he's gone. And that's still going on. Still going on. There's a lot of them that are younger than I am, and some older, that they didn't last. And I've been in the same places they've been, for about the same length of time. I heard one of the doctors say, I think it was in Bethesda, the NIOSH group, that he'd done some study on the Navajos in the uranium mines and the Indians' exposure, and he said, `It's like HIV. Fully 10 percent of the people that are *exposed* won't catch it.` Their immune system knows something that it'll ward it off. But there's a certain percentage that it will affect. They know that it will affect a certain amount of the human cells or it will do something to it that they alter it. And I believe that, because you can see a marked difference, especially in the Navajos, in the uranium district when they were exposed to all the mining dumps and stuff. And I think, well, who are we going to know, in time like—I know several uranium miners that when they were kids, they were raised on the tailings pond for Union Carbide, they owned a mill at, oh, it was up by Nucla in Colorado. Union Carbide had a big **[00:45:00]** uranium mill. It's on the

Dolores River between Nucla and Gateway, and today they've reclaimed that whole mountain. You can't even tell that there were homes there.

Yes, it seems that this is the sort of thing that—at the time you're doing it—doesn't really seem to have an effect, so it's not something immediately on your mind. But then now as you get twenty, thirty years down the line, you start to see the effects of—

It becomes a concern, right. I've seen, even at the [REECo retirees] breakfasts, some of the guys, where they never used to be concerned about different things, they are today. And some of the things they took, well, hell, you know, it's an issue. And part of it, I believe that the DOE and the scientists *knew* there were going to be effects, and we were misled. They didn't tell us. They admitted to that. They didn't tell everything that they knew. They did that on purpose. They did accept that responsibility, that there were some things they didn't make everybody aware. Well, that's where the foul is because they didn't make—not that it would have made any difference. I think 90 percent of the guys would've still went to work and did whatever that they were going to do anyway. But it would've been better to have a choice.

Right. What did they tell you about the risks at the time? I mean was it something that they took very seriously, that was strictly enforced, or was it just sort of—? I mean I know they didn't know as much then *as they do now, but they had to be aware of* some *of the risks.*

They were, and I think the not knowing what the long-term effects would be, that they dismissed a lot of it. It was, `We'll see.` I do. I believe that mindset went on. But I still believe that if they'd have said, `All right, a certain amount of you, there's a good chance that you're going to catch cancer, or *could* catch cancer, in the next ten years because of what we're doing today,` I doubt if anybody would've said, `Hell with you, I'm going to move.` Might've been a couple, few, that wanted to go anyway. They might've used that as a driving excuse. But I don't think it would've altered your employment very much,

or on the mission and then the things that we had to do, they were still going to do. I believe that. That was the quality of people that we had. The best of the best. I didn't think that at first. But after the years of working with them and then distancing myself a little bit from them, now I know dang good and well that we had some of the best there was. And like Wally Beaman and Frank Solaegui, some of them old early pioneers that were willing to take the risk. And to them, it wasn't a risk. It was probably the best safety in the industry. It was the best in the industry. So you're not going to question it. It's like my attitude when I first came here, I knew that, hell, I could live forever in these kind of conditions because when I worked in the uranium mines- **[00:50:00]** well, we kind of knew that in the uranium industry, that there was a good chance that you were going to get sick. And I don't think it slowed any of them down.

I think that it takes a certain mentality to be a miner, just doing that kind of work—whether it's uranium mining or coal mining or at the test site. You sort of accept a certain level of risk, so it was different than somebody else who wasn't, you know, it's sort of ingrained in being a miner, I think.

They would have to kiss the face of death a little closer to walk away from it. And I can understand that. Oh, I've lost friends in the mining industry, and it never deterred me from going out. I took it with a little bit of reverence. I'd say, `All right, well, let's be safe,` or, `Yes, let's learn from that`. Yes, I did that. It made me more aware and more responsible, especially being a supervisor, that yes, I took that serious[ly] about their welfare. Because I never wanted it on my conscience that, you know, here I've got to go tell some family that their dad or husband was killed—and I was part to blame. Didn't want that. And it never happened, so I guess I—be careful what you pray for. Yes, I don't think it deterred very few of them. Maybe

two out of a hundred. Maybe. And they wanted to go anyway. They wanted a vacation or they wanted to quit and go somewhere anyway, so I don't think it would've mattered.

Well, there's one more thing I wanted to bring up, and what we've been talking about sort of touches on this, but when you worked there, it was during the Cold War, and I was just wondering how much of that Cold War mentality affected your work. I mean did you see what you were doing as patriotic or part of national defense?

Even though we were misled somewhat. Because who can hate somebody's grandmother in Russia? But we were told that all Russians were, quote, "the same." That was that mentality back in the fifties, sixties, and seventies anyway, because it was the Cold War mentality that, Yes, we're doing the right thing. But yes, I ask the question today of people, I say, `Well, how can you hate somebody in Russia's grandmother? She's not doing nothing to harm us.` And the same with the al Qaeda or the terrorists. Their great-grandmother's not to blame for the actions that these people do, and we shouldn't hold them accountable for it. But it's hard not to, especially if you've lost a buddy, you know. In Vietnam I had several friends that didn't come home. Yes, it kind of affects your attitude a *little* bit, that they're all to blame, till you take a step back and realize that even today when they have the get-together at Normandy, and you got both sides of them shaking hands, so they buried the past, which is—that's human nature, I guess—it *should* be, anyway—to forgive. Not always you can't *forget*, but you can go on. Go forward.

I imagine it must've been really strange during the JVE [Joint Verification Experiment] when the Russians were at *the test site. You know, here are these people that you've been working so hard to keep things from, and then now they bring these scientists to the test site.*

[Laughter] We're going to give it to them. Well, we did that back in the days of Eisenhower. When they did the first nuclear weapon, as soon as they got all the information down there, they had a moratorium. I believe it was during the Eisenhower days, they'd give all that information

away, so what do they have to do? Have another arms race. So we hurried up [**00:55:00]** and let them catch up so we can have another arms race. In the name of technology or jobs? The technology we did went out. That's the best part of it, because I see the spin-off today in our lives of what we did on the test site. Like with fiber optics and stuff like that. We were working with fiber optic cables ten years before they really got into the industry. But now it's commonplace. On the back of your television, they got fiber optics now. And I remember when they first brought the first roll of fiber optic cable and they told me if we damaged it, what it cost to repair one fiber optic cable, to splice it. Something like five, six thousand dollars.

Wow. And that was back then.

That was back then, yes. And that's one of the things that fiber optic had to be, was continuous. So they really protected cables. They were kind of our payday—our life's blood was the diagnostic cables—so we were more or less brainwashed to take care of them at all costs. And if you find one that's been damaged, report it so we can take care of it. But I remember the very first ones—and that was back in the seventies, they had the first fiber optic cable underground. And they said it would—ten thousand times the information, I believe. Where they used to have the coax[ial] cables, they had the fiber optic. They'd have a bundle like that of coax [3 feet in diameter one-hundred plus cables] and one little wire about that big [a lead pencil] in orange. They were all orange when they first come out. And all the way from the control point [CP-6] to Area 12 is one continuous fiber optic line. And that's got to be fifteen miles. And there were several fiber optics buried all the way through there.

I was curious also if you sort of try to keep up on what's going on at the test site today. I know it's difficult, you're not going out there all the time, but—

I do. I know some of the people that are out there, and in the paper you can read bits and pieces when they do something like U1-A complex. I kind of know what they're doing. The subcritical thing. I don't know *exactly,* but I know about enough that I keep abreast of it. And then when you go up into Area 16, they got those fly-by tunnels where they were strategically placed at a certain area, so when them jets come up off the desert floor, they'd paint the portal with a laser beam and then there'd be another plane fire a missile and actually go up that tunnel. They can fly one up a tunnel now. That's some of the latest information they're doing out there. They're these bombs that suck all the oxygen out of the air, so they can go underground after the al Qaeda. Bunker busters, I guess they call them. But that's what they're doing. And I suspect that's what they're doing today—to do with that technology. And I think that they're playing a lot of games up there now with teaching the armed services about underground, how to handle yourself underground, how to do this, how to handle a few things, so when they *do* go underground, because they know what they're—they're dug in over in Iraq and Iran. But they'll go after them. And that's the technology that we get from that. **[01:00:00]** That's the blessing part of it. Oh, if I wanted to, I could find out, but I don't care to. It isn't a big issue with me—other than if they were doing some kind of different mining, I'd like to be in on that. But as far as the classified stuff, I know it's probably—I wouldn't believe it if I heard it. That's how exotic it could be. Because I knew what we were doing when we *did* it back in the 70s and 80s, and I can imagine with the computers what—our knowledge doubles every year or every two years, something like that. So I can imagine where they're at with a lot of this stuff. And I believe that they're—well, they haven't started up with any major projects—just little jobs for this new DNA [DTRA, Defense Threat Reduction Agency], they're still doing little projects for them, but it's nothing big, not like driving a tunnel for a weapons test, even though they have one ready that they could

field and execute in probably three months, because the mining's all done. Some of the concrete work is done. But I'm sure they could be ready for insertion within three months. And they got enough people that know enough about what they're doing that they could do one. But to set up and start production of doing a shot every nine months—unless they're a lot smaller and more easy to contain than what we worked with. It'd have to be *real* small. Because we're just lucky in P-Tunnel that we didn't lose some of them. Because all they'd have to do is get in one of those fissures or a crack and away it goes, especially if there's water. But I see one day here, probably in the next five years, that you'll see them doing something of that nature.

Yes, I think they're moving in that direction, without saying as much, but—

Right. Right. Because Congress has tasked the laboratories to cut their turnaround time in half, and that's considerable. Just to do that task right there, they're going to have to have something going for them there. Like I said, that laser beam or something. Because with the mining methods that we have right today, we couldn't do it. Unless they made them a lot smaller and somehow got away from doing quite so much tunnel work. By the time you drive four thousand feet of tunnel? That's pretty slow, especially when you've got to harden it so it won't cave in on itself because of the G-force of the nuclear weapon. Yes, it shakes and rattles and rolls pretty good. It's *amazing* what that amount of force can do to concrete and to steel and stuff. That's amazing. I've seen a concrete-reinforced telephone bunker at 15 shaft that was crushed. It was perfectly round at one time, and it was crushed to almost—like in half. And I defy anybody to find a crack in that concrete. *How* can you compress and twist concrete without cracking? I mean there was rebar on—I think, six-inch, eight-inch centers, half-inch rebar, inch rebar—tied into these things. And hit with a nuclear weapon [slaps hands together] probably a thousand feet away. And it squashed it, collapsed the concrete structure, but the concrete never cracked. And I

looked at that and I said, `How in the world could that do that?` And they say it flows like water under that extreme pressure. That's what the scientists say. And they might be right. I just have a hard time seeing concrete turn back to being runny after it's **[01:05:00]** gotten hard. But it does, somehow. There's quite a story to be told about it. Where we been and where we are going, yes.

All right, well, I think we can stop there unless there's anything else you wanted to—

Not right at the moment. I'm sure there will be. But I'll do some of that stuff on camera when I get it, and then I'll share that part with you. Then tell Mary [Palevsky] that when I get some of this stuff done and copied, that I'm willing to share with them.

Great. Yes, we'd appreciate to take a look at—I mean you have some great stuff, so we'd love to have a chance to take a look at that.

And I got probably more than anybody other than the DOE themselves. Well, I knew I was going to do this someday. I wanted to. I couldn't let the romance go, not telling the story, because there was so much romance in it.

Right. Well, it's such a great story, and if it weren't for people like you, it just wouldn't get told because this stuff isn't around, so that's great.

We were just a very select few of people that did it. It wasn't like everybody in the world went out there and took a swing at it. No. Just a very select cadre of people, did we do it. And some of the guys, like Roger Phillips, that are *real* sharp yet with their stories and storytelling and stuff, there's quite a few of them that can recount the story from back in the seventies when we were at our peak. And that's the romance part of it, because now all these guys come together from all over the country and accomplish the project, and we didn't have any more fatalities and are not sicker than we are. There is a blessing. And there really is a blessing in that, because some of

them were exposed to a lot of it. Like Hank. Hank Peluaga. I know he was exposed to a radiation source when he was in Amchitka. Most all the guys on Amchitka that worked in that cavity, because they had a radiation source they put in there about six weeks before they put the rack in. Most all the miners were exposed to that radiation source that hung off the cavity. Yes. And none of the miners knew that it was there. We found out later that, yes, they did. Livermore did hang a source of some kind in there first, and they probably shouldn't have. And they exposed a lot of men *to* that source.

OK, great. Thanks. That's fine.

[01:08:29] End Track 2, Disc 2.

[End of interview]