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

Interview with Layton O'Neill

July 2, 2004 Las Vegas, Nevada

Interview Conducted By Suzanne Becker

© 2007 by UNLV Libraries

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.

Produced by:

The Nevada Test Site Oral History Project Departments of History and Sociology University of Nevada, Las Vegas, 89154-5020

Director and Editor Mary Palevsky

Principal Investigators

Robert Futrell, Dept. of Sociology Andrew Kirk, Dept. of History

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.

Any opinions, findings, and conclusions or recommendations expressed in these recordings and transcripts are those of project participants—oral history interviewees and/or oral history interviewers—and do not necessarily reflect the views of the U.S. Department of Energy or the U.S. Department of Education.

Interview with Layton O'Neill

July 2, 2004 Conducted by Suzanne Becker

Table of Contents

Introduction: birth and childhood in Montana, military service (U.S. Army Medical	1
Corps), education (B.A., Chemistry; B.S., Sanitary Science, University of	
Washington), marriage (1952).	
Work for Kittitas County Health Department, WA.	3
AEC Fellowship Program, University of Washington (radiological safety) and	4
work at Hanford Site, WA.	
Work as Offsite Fallout Monitor for USPHS, Las Vegas, NV (1958).	5
Impressions of above-ground testing.	8
Work for National Reactor Testing Station, Idaho [NRTS] and description of	9
reactor accident (1961).	
Transfers to Nevada Operations Office [NVOO] (1966), works for NTS	14
Radiological Safety Branch.	
Resistance of agencies towards required health physics work (inspections,	16
recommendations, etc.).	
Work with Emergency Radiological Assistance Team (later HAZMAT).	20
Involvement of health physicists as advisors during test events.	28
Job changes: Acting Chief and Chief of Radiological and Waste Management	29
Operations Branch (986-1987), Chief of Defense Waste Branch (1990), Director of	
Waste Management Division, and evolution of waste management at the NTS.	
Thoughts on waste management and storage at NTS and Yucca Mountain.	32
Work at NTS and in Pacific testing.	36
Details work as sanitarian with radiation fallout in Kittitas County, WA.	42
Radiation exposure education work with Enewetak islanders.	45
Thoughts on radiation exposure of Downwinders.	46
Details of helicopter accident during NTS overflight (1971).	47
Conclusion: discussion of his "brain book" and a wrap-up of career.	51

Interview with Layton O'Neill

July 2, 2004 in Las Vegas, NV Conducted by Suzanne Becker

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

Suzanne Becker: So I guess I just want to begin by—if you could talk about your background a little bit and, you know, your family and where you're from.

Layton O'Neill: Well, I was born in Glendive, Montana and lived most of my early life in Livingston, Montana. And then I was drafted into the Army for the Korean Conflict. I was older than most draftees. I was drafted for World War II but I was 4-F due to my eyesight. And my mother didn't expect them to take me for Korea, but they changed their rules and said, we'll take everybody. And they froze me to stateside duty. So I didn't have to go to Korea but I ended up as a cadre for training troops for basic training. And I also went from there to a Leadership School. I became an instructor in a leadership school for about a year, and then the last of my tour I went back to cadre again, basic training, because they did away with the Leadership School; they didn't need it anymore.

What did they do at Leadership School?

At Leadership School? Taught leadership and the philosophy of leaders. And they needed NCOs, [noncommissioned officers], in Korea. In fact, the guys with the red cross on their helmets were targets of the enemy, and so we lost a lot of them and we had to supply a lot of NCOs that could take charge of medical operations, field operations.

Oh, I was in the Army for two years only and then was released to a five-year reserve. And upon getting out of the military, I went to school. I actually had been in school at the University of Montana. It was called Montana State College at the time I went in the service. And so I was going into my junior year when I got drafted. And because I was sort of undecided when I went into school, I didn't get a deferment. My younger brother was also in school at the same time and he got a deferment because he was a chemist, and I was kind of floating in a nondescriptive. I hadn't picked a real objective by that time. And then I had started going into pre-medical. Found out I really liked the medical stuff and the biology and all that. And so I had started to major, just before being drafted, as Pre-med. So when I went into the service, that's why I got selected for the medical corps. And I was in the Army Medical Corps.

When I came out of the Army, I went back to school at the University of Washington in Seattle. And I also got married just as I got out. Practically the day I got out back East. I brought my new wife with me to Seattle and we started a family.

What year did you guys get married?

Oh, my goodness. Well, I was in the service from '50 to '52, and it was in 1952 that I got married. Because I married her back East just as I was headed for Montana, and I'd been dating her for some time and I asked her if she wanted to go back to Washington with me.

And she agreed with that, huh?

[00:05:00] She did. Unfortunately, she didn't stay. Yeah, we were married in September of '52 as a matter of fact. I have my little brain book here.

So anyway, I started back into Pre-med, and after two years there I got a degree, just by accumulation, in chemistry, a B.A. in chemistry, and I got an invitation to come for an interview at the medical school there, but I didn't get in. My grades weren't satisfactory for them. I'd had quite a bit of trouble with grades when I first got out of the service. I jumped into it maybe too fast. New marriage, new school, new environment, you know, and I just wasn't able to cut it for some reason.

And so I had a GI Bill and I so started using the GI Bill. Earlier I paid for my own schooling. I was saving my GI Bill for the medical school if I had got in. And since I had a B.A. degree, the Veteran's Administration wrote me a letter and said that I'd only used one year of my GI Bill before I got the degree, so they terminated my GI Bill on me. And so I got out the crying towel and knocked on their door. And I was a new experience for them. They had never had a person going to college with a degree on the GI Bill that had previous college work before he was in the Service. And I told them that the only thing I could become—and by that time I had three children—the only thing I could do was be a lab technician, with the B.A. in chemistry degree, and it wasn't going to pay for what I had in mind. And so they finally decided they would give me another year, and with my earlier poor grades—and I had to pick something that I could get a degree in, in one year. And all of that sort of made me buckle down and I became a much more proficient student. Started getting better grades. I was older. So all that added up to a B.S. in Sanitary Science. So I have two degrees, Chemistry and Sanitary Science. That qualified me to be a Sanitarian in a county health department. Or a teacher, if I went back and took some more courses.

So anyway, I started working in Kittitas County Health Department in the state of Washington. And that turned out to be my first encounter—well, not my first, because I had some courses in radiological materials and radiation while I was going to my schooling. And then I was responsible when I was in Kittitas County for the civil defense instruments that the county had. And I became responsible because—

And this is in Washington?

Yes, in Washington state. My boss asked me if I knew anything and I said, Yeah, a little bit, you know. So he put me in charge of all the instruments for Kittitas County for civil defense.

Wow! What kind of stuff was that, if you don't mind me asking?

Well, the instruments were just straight monitoring instruments for nuclear war that the Civil Defense provided all the county health departments across the nation. And some of them weren't working, and I went through them very carefully and found out it was just small electrical shorts and all kinds of things were wrong with them.

And then I went back to visit my school on some free time to get some more information. I had a professor that worked in the radiological safety area. And he asked me if I'd like to go back to school. And he said that the Atomic Energy Commission [AEC] was offering a fellowship program, a two-year program with a possible master's degree. But I didn't get the master's. So I put in an **[00:10:00]** application and I did get selected for the fellowship program, Atomic Energy Commission Fellowship Program, at the University of Washington. That entailed a full year of classes in Radiological Safety, which is what they were starting to call it at that time. I was among the first groups to be doing that.

Yeah, I was going to ask—that's a fairly new field.

Yeah, it was real new at the time. I had just missed by about three months or four months, when I got done, at being grandfathered into being a certified Health Physicist.

Oh, wow, that would've been nice, huh?

Yeah. To get myself a shingle. So anyway, the entire year included schooling and work at one of the laboratories in the nation, and I was selected to go to Hanford. So I spent the whole summer at Hanford, following the two semesters at the university. And I was able to increase my salary by two thousand dollars a year, just by changing my title. And so when I filled out forms, I said I was a Health Physicist. And another unfortunate thing occurred. I was going to go to work for General Electric, but the day we graduated from the course—they had us all lined up; the only thing we hadn't talked about was salary. And they came in and announced that the Atomic Energy Commission had frozen all hiring and they would not be able to hire any of us. Here I had three kids and nowhere to go, basically, because I hadn't put out any feelers or anything because I just hadn't gone down that road.

And so I called a guy by the name of Cy Kinsman. He was an individual in the United States Public Health Service who was touring the country, teaching health departments about radiation. And I had become personally acquainted with him. I also had taken out a position in the United States Public Health Service Reserve as a Sanitarian. And so I had this rank, military rank, and by that time I had got an increase in grade with them. I think I was a First Lieutenant in rank.

And so I called up Mr. Kinsman and said, I have this problem. Can you use me somewhere in the Public Health Service?

And he said, You want to go to Las Vegas?

And I said, Sure! I'll go anywhere.

So I sent my family to Montana with my mother, and I headed down here to Las Vegas on the next plane, the next day.

When was this?

This was in 1958, in September of '58. And I came down here and worked with the United States Public Health Service as [USPHS] an Offsite Fallout Monitor underneath Oliver Placak. Anyway, the organization had their office out at the test site. When I came here, I reported to the little AEC office that was on Main Street first, and they sent me out to the test site to Warehouse 6 in Mercury. And I became an USPHS Offsite Fallout Monitor, using the field monitoring instruments and working in the laboratory. And that only lasted about four months. The President of the United States [Eisenhower] at that time decided that he was going to have a moratorium on testing, and we were all turned loose.

Well, in the meantime, I had been visited by a gentleman from Idaho. His name was John Horan [Director of Health and Safety Division, Idaho Department Office] and he had come to the test site to visit and I got acquainted with him. And I had **[00:15:00]** attended an industrial hygiene conference in Seattle and met him there, actually, when I was still a Sanitarian. And I reacquainted my relationship with him when he came here to the test site to visit. And I told him I was going to be looking for a job because we sort of knew this was coming, that moratorium.

And so I called him up the day it happened and he said, Send me an application. And I said, Well, fortunately for me, you've already got one in your file. [And he said] What?

I told him when they froze the hiring I was at Hanford. The Atomic Energy Commission as a stroke of friendship had made multiple copies of the applications on each individual in the class and sent them out to each of the operations offices. So I surmised I had one up there, and he called me back in about four hours and said, Yeah, you got one here. I was as surprised as he was. So what happened then, I went to the Mercury Medical Facility here, right across from where the mess hall is, and got my physical for the Atomic Energy Commission, while I was still in the U.S. Public Health Service. And what I did was go back into the USPHS reserve, instead of being active duty, and I have been in the reserve until just recently. I, just about two years, ago finally dropped my Public Health Service ties. But anyway, John had recommended that I stay down here and get as much nuclear testing education as I could, and experience, which turned out to be very good. And what we did was chase radioactive clouds in those days, and we were to find the edge of the cloud and the hot line in the cloud, which could be anywhere within the cloud path, and then find the other edge, and then turn around and do it again. And at that time, we wore nothing but civies. And we got into contaminated fallout quite often. And I had a couple of experiences of high readings. We had the instruments in the vehicle—one day we were headed for the North Gate of the test site, and they had just had a couple of tests out there on Yucca Flats, and we were proceeding through the test site. Another guy was driving and I was watching the instruments, and I figured he knew where he was going because he was more experienced than I was. He'd been here for quite a while. And so I related to him, I said, You know, we just went on the second scale of this instrument, which was the second higher ranged instrument. I had started with the GM monitoring in the car, when I started monitoring, and it went up and pegged that instrument, and so I went to the next instrument.

Now, did you guys ever worry about being exposed?

I never did.

And did they ever say anything to you about the potential of exposure?

Oh, yes, we were fully informed in my schooling and from the PHS leaders and con-monitors. In fact, when we'd come in, in the evening, if we didn't wear a hat, our hair was contaminated if we were out in the fallout, and we'd have to decontaminate and they'd check us all over when we come in, in the vehicles. If the vehicles were highly contaminated, we had to take them up to the vehicle decon area.

But you know, it was a great experience. And we traveled all over, clear down into Death Valley, California, in the heat down there in the summertime, and we went clear up into Utah. And they had systems to notify the citizenry if there was clouds coming in and for them to get in their homes and stay in their houses.

Did you have to do a lot of notifications?

Yeah, whenever a cloud went over a populated area.

And so you guys would basically follow this cloud.

[00:20:00] Yeah, that's what we did. We were tracking the clouds. At the Control Room they knew exactly where we were, and they were plotting the data back here at the Nevada Test Site. We'd radio. We had shortwave radio, and they were plotting all our data as we got it. In fact, they would even, if we'd go through a cloud and we'd still be getting these readings, they would call us and say, We think that that's an erroneous reading because you should be out of the cloud. Would you stop your vehicle, get out, check the ground, clean up the monitoring instrument, and determine what the situation is? And most of the time, they were right, that we were out of the cloud and it was contaminated, the probe was contaminated. And so we had to start over again and go back up and find the edge of the cloud again.

Right. That's interesting. Sounds like it could be time-consuming?

Yeah. Well, we were out in the field all day. We left early in the morning, before sunup, because they always shot the events real early in the morning so that we had all day to monitor. And then we'd be out until late. Then we'd head back in, late in the evening.

So I guess you saw the shots and the clouds.

Oh, yeah, I got to witness about five or six of them.

Wow! What'd you think about that? What was that like?

They were beautiful. They were outstanding—you know, they were very fascinating. I was close enough one time to encounter the shock wave. It was like somebody slugging you in the shoulder. It rocked the car. I was standing beside the car. But the radiation exposure was zero at those points, where we were, so there was no exposure from that, and we were always upwind. But when we were out monitoring, we were downwind, purposely. We didn't monitor on the test site. Reynolds Electric and Engineering Company [REECo] monitored onsite, and they were out in the clouds, at higher levels of radiation than we were. We were out where the cloud was starting to be hard to find.

And so when I got done with that and called John and he got my application, he called me back and I went to work for the Atomic Energy Commission in Idaho. It was called the Site Survey group—well, first I ended up first in John's office, and then he decided I needed to get additional training, and so he farmed me out to all the different groups that he had at the National Reactor Testing Station (NRTS) [now called Idaho National Engineering Laboratory (INEL)], the whole body counter group, where I worked with the whole body counter for quite a while, about six months, and then went to another group for six months. Dosimetry, I worked in Dosimetry, and I worked in the Chem Lab a little bit. Well, the whole body counter was part of the chem lab, but I had affiliation with the chem lab. And then I finally ended up in what was called Site Survey. And there was another group, an environmental group. I don't remember their name.

But anyway, he'd farmed me out into each of his organizations, so I got three to six months in each group. I ended up in what was called Site Survey, and that seemed to be my best forte, was monitoring downwind. So we did that kind of monitoring for reactor releases, and we were a part of the Emergency Response Team, and every time a reactor had a release, we monitored those releases. And we never, ever, that I can recall, had—well, we carried respirators but we never had any release bad enough that we wore the respirator.

And you were never worried about exposure?

No, never was. And the state of the art was not as sensitive as it is today. And I'm still a basic believer that a little bit of radiation is good for you. And I was never really worried about it, except if the level was high enough I took precautions when I thought they were appropriate.

[00:25:00] And in 1961, up there in Idaho, that was, let's see here, there was a reactor accident at Idaho called the Stationary Low Power Number One Reactor. It was an electrical producing reactor, and it was supposed to be used for the DEW [Defense Early Warning] line, which was the defense line that was going to go across the Arctic and Canada to give early warning of incoming Russian bombers or missiles. And the idea was to make it out of available products that they could get locally, such as corrugated metal silos for the walls of the building, gravel—river gravel was put into the areas inside of the building between the reactor and the outside wall as shielding. And it was a water cooled reactor, and they had large steel vessels in the center of them, maybe, oh, five to ten feet in diameter. And then the building was pretty large. I don't know what the diameter was.

But anyway, let me look up a date here because I can't remember what it was. Nineteen sixty-one. I was right. Yeah. On September 3, 1961, that reactor was shut down for some time and was being reassembled, and there was an accident [that] occurred, which the three military guys—and these were all run by military, overseen by a civilian group. And the HP [health physicist] who was my friend and also a person that I had reviewed his program a couple of times—this is something else that I want to tell you, so don't let me forget.

One of the things that I became involved in, and this was true the rest of my career almost, was that the Atomic Energy Commission early on did not have health physicists, and I was among one of the first groups to be AEC or DOE [Department of Energy] health physics people. And they started us on new programs with new documents, coming out of Washington, on doing appraisals of the health physics programs. So I *was* the first person to enter four or five of the reactors up in Idaho, underneath the AEC's new program, to do an appraisal of the health physics program that was being conducted by my friend.

So you were basically evaluating the program and the work that they were doing.

Evaluating their program per the specifications sent to us from Washington. And so we ran into a lot of opposition from the people running the facilities, primarily management.

From other health physicists or—?

No.

Or from—OK.

Well, yeah, kind of, a little bit, other physicists. They didn't like the government looking over their shoulder. And the engineers, scientists and the other people who had, you know, maybe six or seven years of experience by the time I got there, they didn't look too highly at a fresh graduate from an AEC program. And I ran into that when I came to Nevada, also, heavily. And in fact, my career was many times in a room like this where I was the sole person telling them what was wrong with their program. And some of them didn't take it very well. Some of them did, you know.

Did they ever implement any of your recommendations?

Oh, yes.

They had to, huh?

Yeah. And I had two or three people, you know, our supervisor that we were working for, Don Hendricks and another guy, Art Whitman, that we worked for out at the test site, they were good help and they reviewed all our documents and our cohorts reviewed them also. So we thought they were truthful, you know, and we went back and always showed them in draft to the people we looked [00:30:00] at, to ask, Is what I said here the truth? They didn't like some of it, but we only changed it if they said it wasn't true. Most of the time, it was true. I didn't have any trouble. They'd say, yep, that's right. That's right.

But going back to the accident back in Idaho, that night I ended up in the second wave of the initial response group by the Atomic Energy Commission. And on the day after the accident, I made an entry into the reactor room to see how the third person could be held up on the rafter. And when I stepped through the door of the reactor room, the instrument I had, which was a Radector, which was the highest reading instrument that was available at the time, it went up to 500 R per hour. And when I went through the doorway into the reactor to do what I was supposed to do, the instrument pegged. And so I was there briefly, and there was a gentleman's body hanging from the ceiling. He'd been bayoneted up there by part of the apparatus from the reactor, the control rod extension.

Wow! How was that, walking into that?

Well, what happened was, it was later proven that this center control rod, which had more worth in terms of its worth on controlling the reactor—and they called it "worth." They actually used a dollar sign—and it was able to make the reactor go critical by that one single rod. And after this accident, they tore down the two reactors in the nation—the one we were at and another one back in Ft. Belvoir—they got rid of the one control rod capability. But the GI was lifting on that rod at the time of the accident, and at home there was also a family squabble going on, believed by me, at least, and a number of others, but not by the health physicist who was there, that the GI had deliberately pulled the rod up to where it was supposed to have went critical and vaporized the water around the reactor core and created a moving column of water sixteen feet deep, moving at high velocity up through the reactor vessel that hit the top and shot out the control rod extensions. They were putting the control rod extensions in, and it shot those into the air, and the GI got bayoneted to the ceiling. And it also opened up part of the reactor flooring and shot out a whole bunch of metal punchings that had been used for shielding. And the other two guys were carrying rod extensions, and we could see that by the pattern on their bodies, that the debris was fired at them like buckshot, in such velocity that one of the guys had his head caved in by a piece of steel about two inches in diameter and an inch or a half-inch thick.

Wow. Everybody in this accident die?

All three of them died, yeah. And they died before we could talk to any of them. One of them lived long enough for—well, my boss and this company HP I been talking about were called out and they made the initial entry, and they found this one person living and brought him out, but he'd died by the time they got him down to the intersection of the access road with the main highway, in the ambulance. And he would've died anyway from the radiation exposure. He had had tremendous radiation exposure, because the reactor became bare and the reactor building and the whole facility was quite radioactive. Thousands of R/hour.

So what did you think, walking into all of this?

Well, I didn't have any problems, you know. When I walked into it—I don't know how to explain it to you, but I just was not afraid. The first job I had was to go up with another guy by

the name of Sergeant O'Neal out of the Army and retrieve all the recording instrument records that were in the **[00:35:00]** operating control room, and it was reading like 200 R/h in the control room at the time we went in there. And then when I went back up and made that entry I just spoke to you about, the readings actually later on were determined to be over 1,000 R per hour. But I was in there twice, only briefly, and out and I only got, according to my dosimeter, I only got 2.8 rem dose for those three entries, which was less than the quarterly amount that they were shooting at for people in the work. See, at that time, you were allowed to get twelve rem a year and three rem a quarter [rem stands for roentgen equivalent man].

Has that changed?

Yes, that's changed considerably. First in the early '50s the maximum permissible limits were 0.3 rem per week which totaled 12-15 rem per year. After 1958 exposure becomes dependent upon age. It's down to point-zero—it's unbelievably down. And the environmentalists and the geneticists are the ones that caused that to go down. But I've experienced all that changing and going down. So anyway, I'm laboring on this too long.

No, it's interesting.

Yeah. So I worked at the SL-I reentry for two weeks straight. I ended up in the Decon Trailer, which was the trailer we set up to handle contaminated people coming out of the operation, and getting them back into their clean clothes and making sure they weren't carrying any radiation with them. No radioactive materials, really; I shouldn't say radiation.

So after that, George Mapes, who's a friend of mine, yet today, was there working, and he came down to Nevada when they opened up this office. I think it was 1962, approximately that date, they started the Nevada Operations Office [NVOO] and they were looking for people and he called Idaho and talked to one of my bosses and asked if I would like to come down to the NTS, and I said, Yeah. So I came down and went to work for the Atomic Energy Commission here. And I started out at the test site in the Radiological Safety Branch part of the NTS Support Office.

So, if you don't mind me asking, I'm curious as to what your initial thoughts—I mean, had you been familiar with the test site prior to coming out here and—?

Well, I had been here in '58, so I was familiar.

Right. Yeah. Right, but before that. I mean, what were your impressions of it when you got out here? Seems like it was, you know, fairly—

Well, my impressions of it were that things seemed to be running quite satisfactory. I didn't see any things that were done wrong. At that time, the exposure limit of radiation exposure was higher than it later became, and the people were allowed to get those levels. And *I* received, you know, almost three rem in Idaho. And the interesting thing is that later when I tried to get my exposure record from Nevada, and the Public Health Service, they couldn't find them. So I don't know what my real total is.

Really. When was that, that you tried to do that?

Oh, after I'd been here a short time, in '67. And so I don't have what it is, but I haven't had any things as a result of it, that I know of. I had a heart attack a year ago, and I'm seventy-seven this November.

Really? Well, you look fantastic.

Well, I jokingly say that radiation's why I'm so young looking.

[00:40:00] It's helping to preserve. I would have never guessed seventy-seven.

Yeah. I haven't had any problems that I can lay on the radiation.

Do you know people that have?

Yes, I've had friends, a couple guys that got large exposures early here, working at the test site, that much later died of leukemia. And there's been people that have got eye problems, cataracts in their eyes, due to radiation. My experience has been quite interesting because I've gone to bat for some of those people, you know, and tried to get them compensation and get operations to take care of their injuries. And we had a very difficult time. I had a lawyer ask me if I was a medical doctor.

And I said, No, I'm not a medical doctor. I'm a health physicist.

And he says, Well, what gives you the right and the authority to talk about the damage due to radiation?

I said, Well, that just happens to be my field.

And we had a tough time selling ourself when we got down here. They were again slow at accepting health physics people. We cost them more money.

The test site or the—?

The test site, yeah. Nevada. And we ran into that with our own people. I ran into problems. I went to Johnston Atoll with another guy from REECo—I'm jumping around now, but I was the first individual at Johnston Atoll to carry an instrument called a FIDLER, which was stands for Field Instrument for the Detection of Low Energy Radiation that comes off of the daughter product of plutonium. Americium is the name of the element, and americium gives off a gamma which has very low energy, and if you have plutonium, you almost always have americium and viceversa. So with this instrument, we could walk across the field, holding this instrument about a foot off the ground, and we built a carrier on wheels and hand-carried them. But we were the first ones to take that instrument to Johnston Atoll, where there had been a plutonium incident, because they had destroyed a weapon on board a rocket that caught fire and they wanted it destroyed, and they contaminated the area. And we went out there 10-15 years later and

determined with this instrument that there was still quite a bit of plutonium laying around at various locations. Hot spots. Chunks of it. That was quite a while afterwards, too. And some of the top people in NVOO, not the managers but the engineers and people, and my own boss, accused me of wanting to stay on the island because it was good fishing. Well, a matter of fact, that's pretty far from the facts because I got sicker than a dog on the boat and didn't *go* fishing. No, I couldn't stand the waves. But we were accused of falsifying data, you know, and so we had to stand up. And there was a lot of that went on. I had the same problem with the Los Alamos National Laboratory here. People wouldn't—not the health physicist. In fact, he joined me when I got in the meeting that I was telling you about, one of the meetings, he took my side. He said everything that I had said was true.

But we also had to institute new programs, like shipping regulations with the Department of Transportation, DOT regulations, which the test site wasn't following. They had established their own shipping regulations and so—

And so for something like that, do you have to call the test site on that and say you need to—? Well, we went out there in person. We were *at* the test site at that time, working out of Mercury. And Oliver Lynch, who was the other health physicist, and he's now in Washington, D.C. [00:45:00] He retired, I think, just recently. He went to Washington, D.C., and returned as part of an inspection team that came back to inspect *us*. But he and I instituted the Department of Transportation shipping regulations to everybody on the test site. And it was a massive program to restructure how people went about shipping things and paperwork and all the things we had to do. It was no simple chore.

So, you know, it was tough to do those things with people who had been here, some of them maybe ten years.

Right. Right. Forcing them to change their habits.

And we were out there shaking up their boat.

So, did you experience—well, I think you mentioned before that sometimes they really resented you guys and that you had conflict.

Yeah. It just made the job hard, you know. It brought a lot of stress on board. So it was very interesting, though, and I got in trouble a lot.

Yeah? How so?

Well, just because I was an instigator of doing what I thought was right, you know.

Shaking things up. Yeah. Yeah.

Well, one of the incidents, one of the things we had done was, the RADSAFE people had built and hired an individual to handle what they called the Respiratory Equipment Shop. And we were sort of building a kingdom, they were, and I was in favor of it because we needed some control over respiratory equipment and its maintenance and reliable control. And after we had established that for most all the equipment, the person who was running that shop talked to me one day when I was doing my appraisals on my visits, because I just constantly visited and appraised. That's what I did. And he said there was another group of respirators up by the tunnels that had never been in his shop, and they refused to let him look at them because they were run by a different program. And he said, They're in terrible shape. And I said, Let's go up there and look. So we went up there, and there was a building about the size of this room and it was full of—well, first of all, it had a door on it that was locked, had a little window about four to five inches square, and a little sign on the outside that said, "Break window for access in emergencies."

Wow. One story building? Two story building?

Yeah, one story.

Sort of flat? Long?

Just a little one story building up at Area 12, in the camp there. And so I said, Well, I'm not going back after a key. And I picked up a rock and broke out the window.

Yeah. That's what it said to do.

And went on in there and we found terrible conditions, absolutely terrible conditions of the respiratory equipment. There was a part on them that was made out of canvas, and the canvas was so rotten that you could stick your finger right through it. And there were screws and bolts that were loose. So I went back to my desk and wrote it up—blew the whistle. And I got called on the carpet for it by the safety people and my boss and his boss, you know, saying that I was just trying to cause trouble. And I said, Well, that's too bad, but that's the way it is.

So did you—I mean, do you have the opportunity to actually—you can't really physically show them the equipment, I guess.

No. No, they didn't want to go out and look. They just wanted to chew your butt. And they probably didn't want to do anything about it.

Well, they did. They did something about it. The REECo shop that was doing a magnificent job on respiratory equipment took over all that shortly after that. And I had just little experiences like that from time to time, where we would find something. I went down to the decon pad one day and it was old and parts of it were starting to rust and giving the guys problems. They were [00:50:00] having problems and needed some improvements and nobody would spend any money on it. So I just wrote it up as bad, and that they needed to spend some money on it, so we got some money.

They probably didn't want to hear that.

No, they didn't. No. And it was weird. I ran into resistance with some of the people, some of the—well, the philosophy was, within some of the REECo areas, to deal with us, was to answer only the questions we asked. Don't offer anything. And of course, that led to trouble with me. *Just a troublemaker*.

Yeah, because, you know, if I saw something was fishy, I kept digging on it till I found out what was wrong, what was going on. I just kept asking questions, that's all, and that's the way it's going to be. I'm going to try to find an answer to the unwanted questions.

Good philosophy.

And so that went on.

And I was also, at Idaho and here, both, I was the team captain of the Emergency Radiological Assistance Team. That was one of my responsibilities.

OK. And what did they do?

That involved having instruments on standby in kits, so that we could just grab a suitcase and go, and I developed a procedure book that laid out the responsibilities of what we would do and rules to live by, by the team, and who was the captain and who took care of certain jobs. Experts and we were categorized, so we had people on the team that could be selected by phone calls. And a call-up system. And that procedure was sent back to Washington and nationwide to everybody that was involved, and to all the State of Nevada Emergency Management and Radiological Safety people also.

And so this team was in case of an accident.

In case of an accident in the public area by a government or a contractor vehicle, or a truck or whatever. And it was also ready to respond to anything, any radiological incident.

Did you guys ever respond?

Oh, yes. Well, I responded to a whole bunch of things. We had a truck in Idaho that was carrying reactor fuel elements, and somebody seen water dripping out of it, and they pulled into a town down the road from where we were working, and we responded to that.

What was it that was dripping?

It was water that was from the storage pool that the fuel elements came out of. And we found where they had parked the truck. We couldn't find anything on the street where the truck was moving, but where they parked the truck overnight, quite a bit of water had come out and it was contaminated. And we had a scanner for sample identification, and it was Iodine-131. And so the city came out with the jackhammers and we suited them up in anti-contamination gear and they took out a piece of the asphalt.

OK. I was just about to ask how you would clean something like that up.

Well, you just *move* it. It's just like dirt, only it's radioactive dirt. And we cleaned that up so that when we monitored afterwards, we found nothing. We took the contaminated asphalt out to an old city dump that was a landfill, and buried it. Iodine-131 has a half-life of eight days. So seven times that, it's almost gone. But it's hazardous to be laying around for public access, so they dug a big, deep hole with a bulldozer and we put it in the bottom and covered it, in there, in the city dump.

Interesting.

And I had another accident, of a Birdwell truck that was carrying radioactive sources for monitoring wells—they do tests on water and oil wells—and the truck had caught fire on the main highway south out of Sheridan, Wyoming. **[00:55:00]** And they flew us to Sheridan. The sheriff met us there and took us out there to where the accident was. And we had a radioactive source that had got out of its container.

That's a good way to put it, I guess.

Yeah. Well, it's a long story and complicated, and it's kind of funny because the highway patrolman who took us out of there couldn't figure out why we were paying so much attention to this little object. It was about half as big as this pencil.

Half the size of a pen?

Yeah, about that long [indicating length] and shiny silver. It was stainless steel.

About two, three inches at tops?

Yeah. And it actually had printing on it, embossed, which they did on all radioactive sources. He picked it up and looked at it.

He said, I wonder why these guys are so interested in this?

Then he read, This is "radioactive material".

He said, Whoa!

So he put it down. But we had to improvise. We made a container out of a tub, an ordinary washtub, filled it with sand, and put a one half-gallon can in the middle of it, and used handling tools to pick that source up and put it—it had got out of the container, called a "pig," it was in because the container was made of lead and steel. It had a steel casing, but lead inside to provide shielding. Well, during the fire, somebody got up there in the truck bed. They were worried about it, the radioactive source. They got up there and threw the lead pig out of the truck. As he threw it, the lead flowed out of it and the source floated on top of the lead, molten lead. And then they worked on putting the fire out. And then, after everything was all quieted down and everything, the fire was out and everything, they went over to the gutter of the road, the barrow pit of the road, to check on the source they thought was in the pig, and there was no source. And then when they would walk up to the truck, their instruments were low level Geiger

counters and the instrument needle would peg on them, and they wouldn't know what to do after they pegged. And, you know, there's ways to get around that. If you use shielding as part of your capability, why, you can determine where something's coming from, because it doesn't let the instrument peg. So we determined where the source was. It had fallen into a toolbox. The toolbox had been closed by somebody, and moved. So—

This thing just traveled all over.

Yeah. Right. And so when we finally found it, we had taken it out with a long-handled tool and set it on the bumper of the truck, which was still on the highway. They had to get a wrecker out to move it. The fire had melted the asphalt and started a brush fire in the barrow pit. The farmer had cattle in the field next to us, and him and his daughter—we had the farmer and the farmer's daughter. It was a classical scenario of what can happen. And it had burned clear over into his field. And he had got it out, though, him and his daughter had got it out and got their cattle out of there.

So what about the fumes or, you know, that are given off from that stuff?

Well, there's no fumes to it, because it was solid metal inside of a solid metal container, so there was no fumes. But we were concerned about that. We checked on that, because they normally carry radioactive iodine and there would've been an iodine fume problem if it had got in the fire. But they had just unloaded that in Sheridan before they left town. The only source they had was this one Cesium-137 source in the truck. It was an interesting day.

It sounds like it.

And so that was the kind of thing we did. I had another response out of here. EG&G [Edgerton, Germeshausen, and Grier] had a source rupture on them in a facility that they had over in Santa Barbara. And then they had a flood. And the facility they had was down in the earth, a basement-

type facility, and they had sump pumps in there. And I think they had had a little trouble with **[01:00:00]** one of the pumps or something because the flood got kind of high in the room. And so they went down there to fix it, and then they started pumping out the basement and that's when they discovered they had some radioactivity in the water, from a ruptured source that was in a closet. So they were pumping it out into the ditch, which was spreading it—it was headed towards a creek. And the creek went to the ocean.

So how do you contain something like that? How do you—?

Well, first, you dam field where water was running into the creek. And then you go in there and you pick it up. Suck it up.

Just suck up all the water. And then what do you do with all that water?

Suck all the water. Take all the contaminated mud. Barrel it. And we sent about fifteen, twenty barrels of earth from Santa Barbara to the Radioactive Waste Management Site here in the Nevada Test Site.

And it's just buried here. Wow.

First we solidified the water and the mud and then put it in with the rest of the radioactive waste. They flew me over there, and when I got over there, and EG&G didn't know what to do about it, and I said, Well, we need somebody over here that knows how to handle this and can take care of it and has equipment. So I called an outfit called AWC in Las Vegas. It was made up of some health physicists who had left the government business, Al Western, Bill Ayers and the "C" stood for the accountant's name.

And I called Bill on the phone, Bill Ayers, and I said, Bill, I need you over here as soon as you can get here.

He says, Who's paying for it?

I said, I am. Don't worry about the pay. Just get your butt over here. How soon can you be here?

And he says, Well, I can be there in about six hours.

And so he came. EG&G couldn't do that because they had no way. They had to go through contracts and all that. So I just called them, and Bill Ayers came up and spent about a month cleaning up the mess.

And so we had those little things going on from time to time. We had a source get off the test site, and it turned up that they found out it was gone from the lab, wherever it was that it came from, and they traced it to the truck, and the truck had gone back East.

And when you say "source," you're talking about—?

A radioactive source is a small thing about this big, maybe even smaller, usually stainless steel. *OK, another one, another small, couple inches piece. OK. Same thing.*

Yeah, it's encapsulated, and the radioactive material's on the inside so it doesn't get out and it's not going to contaminate anything unless the capsule gets destroyed.

Wow. Now, how would something like that happen, get out of the lab and onto a truck?

People are people, OK? That's how it happened. Just loss of thoughts or whatever. This thing somehow got on the back of this truck. This guy drove it clear into Kansas where we finally found it. We got the airplane out and had the airplane fly the route that the truck had gone, and they found it at an intersection of a freeway and highway, out in a no man's land in the center of the freeway. It had somehow rolled out of the truck and the plane could see it with its Geiger counters and its detection capability. So we went back and picked it up and brought it home.

Those kind of things were going on from time to time. Small cases dealing with radioactive material. We had one here at Boulder City. They called one day and they said they had some radioactive material on the ground. And we went out there—I didn't go myself. At

that time, some of our people went. And it turned out to be an outcropping of rock that was containing thorium, a natural outcropping and natural radioactive materials that are born in the earth.

Just natural radioactivity?

Yeah. You don't do nothing about it. And this guy had been out playing with a Geiger counter and found it.

We had a call one time here, a lady. Her husband had died and she said there were some things in the drawer that were labeled "radioactive material" and she didn't want to touch them. Could we come out? And about that time was when we started **[01:05:00]** getting—see, it was really a state responsibility, but they didn't have the capability and we did. And so it got to the point where I called the state every time we had a call. They didn't like us doing their business without telling them, so we tried to cooperate with them. And I called Larry Franks, the Nevada State Health Physicist, on this one and the two of us went to the house. And he confiscated the radioactive sources the guy's wife had.

And he just had them sitting in his house.

Yeah, they were sitting in a drawer in the bedroom.

High levels of—?

No, they weren't real high. There was nothing dangerous, unless you put it in your pocket, or you ate it. Carried it all day long.

So it sounds like that's sort of what, I guess, the HAZMAT team would do a little bit more these days, but you guys were specifically—

Well, that developed into a HAZMAT team at the end. We became part of the HAZMAT, and we started getting education from the industrial hygiene people, and we became a HAZMAT team towards the end of my tour of duty, which was '94.

OK, so you were essentially at the test site, or affiliated, for-

Yeah, I was at the test site the first three years. And then DOE was covering a lot of offsite areas, because I didn't know at the time, when I first came down, that this office had a lot of programs going on at other places other than Nevada, and other than the test site. We had central Nevada, we had northern Nevada, where there had been tests conducted with nuclear weapons, and at Hattiesburg, Mississippi, the Tatum Salt Dome where we conducted tests. Two or three tests there, as a matter of fact. And Colorado, we had the Plowshare tests and I was on two of those, Rulison and Rio Blanco.

Did you clean up on those?

Yes, but I got in trouble there, too, with the Los Alamos National Laboratory [LANL]. The laboratory didn't like me going over—they had an instrument that was monitoring a process and to check it, you had to throw a switch, and so I'd walk by and throw the switch to see if it was operating, and the monitor technician said, Nobody touches my instruments. And the head guy, Robert Campbell, called me into his office and he really chewed my fanny royally. He was angry.

But you guys were just doing your job.

That's what I told him. I said, Well, sir, I'm sorry you feel that way. My job is to check what you're doing and check what's going on, and I will continue to do those kind of things. I'm sorry that we disagree. And that's what I'm here for. And, you know, each of those encounters are difficult. They cause stress. But I had some good times there, too.

[01:08:32] End Track 2, Disk 1.

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

Don Hendricks took me to my first Control Room visit to experience an underground nuclear test. An interesting side story is that they had a little gambling pool at the Control Room that they conducted for each test on when it would collapse. When I came here in 1966, they were shooting underground shots, so they usually collapsed at some time after shot. So what they had was a notebook, and you signed up and put a dollar in the pot and you took a chance on what time it was going to collapse. Then they drew time entries out of a hat and assigned them to the list in the order drawn. And the very first shot I attended, I won. And they read my name, and the guy who read it says, Well, who in the hell is Layton O'Neill?

They got to know you, though.

Yeah. And I won about \$20 my very first shot with the pool.

Well, so you guys used to have pools on that. That's great.

Yeah, but what I was getting around to, it took a long time for Don to convince the management that they ought to have a health physicist representing AEC to support the manager in the Control Room group, and we finally, when they built the new control room, we got a seat there. We sat on the advisory group, behind the advisory board that was down front at the table. So we were involved, and Ollie Lynch was that person on the Baneberry event. And our responsibility was to try to help make decisions and maneuver the RADSAFE contractor we worked with. They had an office upstairs behind the windows and we talked directly to them. And they gave all the orders to their field monitors. We just talked to the supervisor that was on duty for REECo. And it became more hands-on when we went to Rulison and Rio Blanco. I was the only health physics representative there, outside of the contractor. And I had quite a bit of authority

and responsibility. In fact, at times I was the only AEC person there. When the AEC/DOE engineer in charge would go to town or something like that, one of us, between us, we always made sure one of the AEC people were there. So we had a lot of control and responsibility at that time. And those people were great people. They were Eberline Instrument Corporation, with their own health physicists, and we didn't have any problem with them, ever. It seemed to be on the test site where organizations had been working without government oversight.

That they were resistant to you guys coming in.

Yeah, they had been there for years, you know, since the early testing.

Yeah. So did your job sort of change over the years as the testing changed?

Well, it changed, yes, it did change, in that I slowly but steadily gained the test site people's confidence and I worked my way up to becoming a supervisor. I became the chief of the Radiological and Waste Management Operations Branch, and that was—let's see if I [consulting book]—branch chief in 1987. I was acting Branch Chief in '86, and then we reorganized and I was the chief of the Defense Waste Branch in 1990. I left the Health Physics part, sort of, and became the head of the Defense Waste Branch, and we were responsible for looking over the contractors' operation on disposal of low level radioactive waste out at the test site. Low level waste: that's everything but fuel elements and the transuranic waste which we stored above ground. So it's not really low level in terms of radiation.

But we like to call it low level because it doesn't have the fuel elements in it.

That's the way it's identified. It's everything but fuel elements and transuranic waste. The radioactive material in low level waste have relatively short half-lives.

Wow. I wonder what high level is?

Well, high level is fuel elements and the raffinate from dissolving fuel elements having long half-lives.

Well, it seems that that's fairly intense.

So I became the branch chief. And then it became a division underneath Joe Fiore and I became Director of the Waste Management Division and then we were doing a lot of things there, and we started **[00:05:00]** bringing more waste from offsite. We'd been doing a little of it for years, bringing it on-site. Actually, some time before—when I was the Chief of the Health Physics and Defense Waste Branch, we started bringing some of it in from offsite from a couple of places. But it became a full-time occupation, and we got new regulations of how we had to characterize and identify all the waste streams and—

Were those better or—?

Well, it was better, but it was a lot more expensive and time consuming. We made all the contractors who were shipping to us identify their waste stream, including those contractors on the test site. Well, they didn't like the fact that they couldn't haul their waste down to a trench and throw it in, you know, without a bunch of paperwork, but the new regulations said you got to do that. And so again we were in a position of bucking up against the system. And then the state started coming in on top of us and they wouldn't listen to anything we had to say and wanted to change everything they had decided beforehand that we were just all crooks and were lying. And it was quite a big struggle again to prove to the state that what we were doing was satisfactory. And we finally did prove it to them and we haven't changed anything; we're still doing the same type of thing.

Still.

Yeah, NTS is still receiving waste from offsite, currently. So there are a lot of problems associated with that. They developed a new type of container, other than a metal and wood container, to ship waste in. They developed these cardboard boxes. And Rocky Flats decided that they could even put a wet mixture of cement and waste into these cardboard boxes.

How did that work?

It worked OK as long as they kept control of the mixture of the water and concrete with the waste. But they goofed up on that and they brought some of them over here and set them on the floor of our big pit, and they all smushed down, and the walls deteriorated from moisture and it ran all—it was like wet mud. And we had a big problem. There actually became a lawsuit involved with that against Rocky Flats. So we were in the middle of all that, and then the state was on top of us, you know, for that. All those things had to be taken care of.

And then we got into the battle of Mixed Waste. Mixed Waste is waste that has both radioactive and hazardous components. A hazard other than radioactivity.

It's all degrees, I guess.

Yeah, there are. Well, there's chemicals that are highly hazardous.

Yeah. I mean, to me they would both be hazardous.

Yeah, they are both hazardous. Radioactive waste is hazardous, too, but it had been in control long before they came around to controlling the chemical wastes. In fact, you know, they were allowed to dispose of chemical waste by just putting it in any landfill, anywhere, in the early days. Fortunately for us, somebody with insight at the Nevada Test Site had not allowed that. All the medical wastes and chemical wastes were in one location at the Nevada Test Site. They were close to where people were residing. It was in Mercury, right at the edge of Mercury. I'm just curious, given everything that you know, you've experienced a lot and seen a lot and dealt with it a lot, what do you think about all this argument about what the long term effects of burying all that is, and ground seepage, and all that? What's your opinion on that, just given your experience and what you know?

Well, I think that, you know, we had the EPA [Environmental Protection Agency] lined up for a continuous monitoring program of all the weapon test sites we went to, off the Nevada Test Site, and REECo did the same type of thing onsite. I think waste sites have to be monitored for a long time. I think we can control them **[00:10:00]** and we can free them from man's environment by being careful. I'm a firm believer in that the Nevada Test Site and Yucca Mountain is the best place in the United States for us to put this waste that we have to take care of. We *have* to take care of it.

If done properly, is what you're saying.

Yeah. And so we have to do it right. And I don't understand fully what's going on with the state. We had problems with the state in the low level waste program, too, like I told you a few minutes ago. We had developed the capability for putting highly radioactive Low Level Radioactive Waste into a deep hole instead of a trench, to get it out of man's environment, and eliminate the radiation exposure by getting enough shielding over the top of it. And we called that Greater Confinement Disposal, because it was [just] a hole drilled with an augur out in the alluvium on the desert floor that was 110 feet deep and ten feet in diameter. And we put waste and things like—well, in the very early days, when the state was considering making us dig this back up— but I don't know what the status of it is now; they were considering when I left—we put in classified transuranic waste, which was a special category of waste. It's called TRU. And that means everything that's beyond uranium in the Periodic Table. Like a minerals chart with isotopes given also. But anyway, they decided that since the hole was—oh, and by the way, 110 feet still gives us—well it's about three hundred feet to the water table at Area 5. So that made the earth between the bottom of the hole and the water, 200 feet.

Right. So this is a pretty good distance, then.

Yes, a long distance in a good matrix. And we did a whole bunch of long series of studies when the state started jumping around and causing trouble. And we showed them that—well, we'd never done any ground water monitoring underneath the waste disposal [we thought a sampling hole would provide a pathway for contaminating the water], when I started working in waste management. And so we decided that we would drill three holes to the ground water table: one up on the hill up stream to the waste and two down stream and far enough below so that we could see what was going on. And when we got to the ground water at about 300 feet down, it turned out to be pristine clean. There was absolutely no radioactivity in it except for the natural tritium that's in water, and it was old tritium. And we could show that it had never been contaminated by fifty years of waste disposal or weapons testing at the Nevada Test Site. We also did a major study under the EPA regulations to prove that we didn't need to consider the container that the waste was in as part of our waste captivity It's called a "No Migration" Petition.

How so?

Because of the ground formation. We're far enough away from the ground water. There are zeolites in the ground out at the test site which pick up radioactive materials. We've done a whole bunch of tests on old shot sites. There is one where we actually pumped on one for twelve years at the rate of approximately 400 gallons a minute or something like that, and pumped on it continuously to determine the radiation source they went straight down and took samples of what

was in shot the cavity. We were able to show that the only thing that was moving, primarily, was the tritium, which is hydrogen in the water itself. It becomes part of the water, actually, so that the water becomes tritiated water, and it's [00:15:00] kind of like—well, it's sort of like heavy water. Heavy water has an extra neutron, and tritium has three neutrons, so it's got unbalanced, so the hydrogen atom gets rid of some of that excess energy it's got, and it has a radioactive component. And there was a couple of other isotopes that they were able to pump across, but not until almost a year of pumping did they see anything. And we've studied the natural flow of the water out there, and even if it did get in the water, by the time it got to the boundary of the test site, it should have decayed away to non-radioactive element. And so we feel quite confident and then, OK, then there's another phenomenon that takes place out there. Even when the dry lake beds flood with water and we get a foot of water out there and it evaporates from lake rather than seeping into the soil, we don't bury in the dry bottom of the lake bed. Also the surface and shallow underground water on the test site, due to the heat of the desert, is mostly evaporated. Some of it, of course, goes in. But we were able to show, when we dug those three holes in the desert right after a "100 year rain," that there was no free water beyond sixty feet deep and mo bound water as you deeper.

So that's pretty far from the water table.

Yeah. Like 240 feet. And as we went down, we got into a dry, dry powder in the drilling, and then just before we got into the water table, we started to see moisture again. So there was a scientist out at Berkeley that wanted to conduct an experiment here. His theory was that if he could bury something at sixty feet—tritiated water, for example—he could prove that it would never reach the earth's surface and it would never reach the water table. And part of this is because the desert breathes, the desert alluvium breathes. And an example of this is, and you

UNLV Nevada Test Site Oral History Project

may have experienced this in your own life, of a water well whistling due to air moving up and down in the hole. It's due to the atmospheric pressure which pushes air down into the earth, and when the pressure is low in the atmosphere, it comes back out. So what it's doing is moving the air up and down. This causes evaporation of the water underneath the surface of the soil. Therefore, it never gets down the 300 feet to the water table. And they were able to *show* that that's true of the water we sampled out of there, that it just doesn't have any radioactive materials in it, even atmospheric tritium; it doesn't even resemble the tritium levels in the air that we currently have everywhere from cosmic radiation.

So we were able to submit that special document to the EPA called a "No Migration" Petition and the state that showed that we didn't *need* to package, that we're not depending on the packaging, to provide the containment of the radioactive materials in our disposal pits, in our trenches and in the greater confinement disposal. But the state said that the greater confinement disposal hole is deeper than it is wide; therefore, it is an Injection Hole into the waters of the state of Nevada. And they were able to stop us because nobody would fight it. Now, I was willing to fight it, but nobody else would fight it.

So in their opinion, it wasn't sufficient testing—

In their opinion, it's an Injection Hole, and that's outlawed in the state of Nevada. And we're nowhere near the water, so how can you say it's an Injection Hole? And then, you know, in addition to that—well, I won't go into that. Weapon testing has a problem, too, because they *did* shoot some tests below the water table. And those are definitely injection holes. But the exemption for nuclear testing overruled that, I guess. I never got involved in that.

[00:20:00] So anyway, we had constant struggling going on between us. They also didn't think we were doing a good job, without even looking or checking on the people who were

sending waste to the Nevada Test Site, and we had to send all our data through them and tell them about our shipper's audits and everything. And then they even wanted to go on trips with us to the generators.

Sounds like they just fought you guys all the time.

Yeah, they were fighting us, yeah, and it was really a big strain. And I ended up getting shingles. *From the stress, you think?*

Yes, I think so.

Yeah. Wow. But you were out there for quite some time, though, doing this.

Yeah, I came down here in 1966.

When you landed back over here.

Yeah.

So you've probably seen a lot of change in Las Vegas, too.

Oh, yeah. Yeah. When I was here in '58, you know, where I live right now was out in the desert. I could've bought it for twenty-five dollars an acre. When I came back, they wanted many, *many* dollars. But anyway, I've seen a big change in what's going on here. I've seen a big change in the Nevada Test Site and how we operate and everything. Well, having been here for atmospheric testing, I was involved with that, and then the tunnels. Part of my duties was to be the tunnel man, so I visited Sandia's operations and the military operations. There was the one nut I never got to crack, and that was the "secret" classification that the military has. They were able to keep me from looking at the experiments and getting too close.

You couldn't get clearance?

Oh, no, I had Q-clearance, but that's not acceptable by the military. They don't accept DOE or AEC's Q. But I got in a lot of places.

Both Ollie and I were called in by Charlie Williams to the office one day, when he was the Assistant Manager, and I don't remember what brought this about, but he said, You two guys are health physicists out at the test site.

And we said, Yeah.

And he says, OK. I expect you to know every place on the Nevada Test Site where radioactivity and radioactive materials are being used, and be able to explain to me, to my satisfaction, what's going on. Get out and get busy. *That would probably be a lot of places and a lot of ground to cover.*

Yeah. So I got to visit everywhere there was radioactive material used on the test site, almost. *Yeah. So you've been all over the test site. Is there stuff that you've seen that you can't even talk about or—?*

Yeah, there are some areas that I was told are highly classified. And I believe they still are. *Really? That's good to know.*

Well, so I got involved, then, after three years of being at the test site solely, why, Don Hendricks decided that he needed more people in town. So what they did was brought all of us into town and set us up in an office here. What that did for Don was give him more people to send out to places other than the NTS and not have such a load on a couple, two or three people that he had. Because I think he only had two or three people. When we got in here, we brought four of us in from the test site, so that doubled his staff.

So is that sort of a little switch, too, having been out at the test site and then coming back to town?

Yeah. Well, I loved the test site. It was a great place to work.

And it's beautiful out there, too.

Yeah. And you got to do a lot of things. So we started getting jobs off the test site, once Don got control of us. And like I was telling you, I got to go to all these offsite events and shot locations. I got to [00:25:00] go to Enewetak, and Johnston Atoll, and Hawaii in the Pacific Ocean. I did a number of surveys there.

Wow. You got to do some traveling.

Yeah, I did a lot of traveling. I got as far as Enewetak, which is in the Marshall Islands. And I had another one of my little encounters out there with the military. They had me supervising on an island, Enjebi I was supervising the operation. They had two bulldozers out there, with an anchor chain strung between them, and they were tearing down trees and brush. And the island was contaminated with, I guess, we had plutonium on the island and uranium and fission products from the testing they'd done out there. I don't know if you've ever been there, but there's a very strong trade wind that blows constantly across the islands. And the islands were revegetated. And I was out there, and then there were some EG&G guys out there, too, and the two bulldozer drivers. And we had respiratory air samplers on them, called a lapel sampler, fits onto the collar so it's right by your mouth, to sample the air that they were breathing, plus they were wearing respiratory gear, half face masks. And the military had set up a regulation that anybody that went outside of the camp area had to wear two pair of coveralls, all openings taped shut, and a face mask. And so I walked out there and looked over the situation, you know, and the maps of the island, where I was going, and so I decided that—and I didn't really need all these requirements at that moment because nobody was wearing them in the camp. So I went out to do my job, and I went out and picked a high point on the island, upwind from the bulldozers so I could look down and watch them do what they were doing. And then when they would stop, why, one of the EG&G guys would go in and check on what was going on with their filters and

change their mask and sampler filters and whatever. But anyway, they thought it was necessary for me, while I was observing what was going on, to wear all this gear. I decided as a health physicist that it was unnecessary. It was hot out there, too. Terrible, you know. Those poor guys were—it's a wonder we didn't lose some people to heat exhaustion or heat stroke. So I decided not to wear it. And they sent an Army major out by helicopter to talk to me and ask me why I wouldn't cooperate with them. And I said, Well, I don't really know, why don't you cooperate with me? I'm in charge of health physics on this island, and I don't think there's any need for me to wear all that gear or a respirator upwind from some guys that are half-a-mile away from me, knocking down trees. And what did they say?

They said, Well, we'll have to ask you not to go out there anymore. And so I said, Fine. So I went back to the trailer house and drank beer all afternoon. But anyway, we went on in to the headquarters that night. We had to take a boat back to the main island at the weekend. I went back and told my boss, Bruce Church, what was going on. And while we were sitting there talking, we could hear—I said, Hey, listen. You could hear those Army guys over in the next couple of rooms down the hall. They were yelling and screaming about some Atomic Energy Commission guy out there that wouldn't obey the rules.

You became a legend.

[00:30:00] Yeah. So Bruce stood up for me. And there was a very peculiar thing going on there that you have to know and understand, that plutonium—and a lot of those people, I don't know where they were trained, but they were given advice, I think, from Oak Ridge, and Oak Ridge's experience with plutonium is that it's pretty wild, and in the laboratory it *is* wild. If you get it loose in a room, the particle of plutonium will be propelled by the alpha that's released from it. *So it makes it bounce around?*

So it propels it, yeah, and if you have a little spill in a corner, if you leave the room empty overnight and come back, it'll be on all the walls—everywhere! It just moves.

And out at Johnston Atoll—I had had quite a bit of experience there with plutonium and coral before going to Enewetak—it doesn't move. In fact, they had quit monitoring for it at Johnston Atoll when I went out there with the FIDLER instruments I was telling you about. And on Johnston Atoll, we found plutonium, and I even found a trace of plutonium in the mess hall, behind the door where the dust had gathered. They were monitoring the air, and when they quit seeing plutonium in the air samplers, they said, it's gone, and they decided that they did not have to worry about it anymore, and so they quit all the requirements for suiting up to go into the contaminated area. Well, that's why I went out to Johnston Atoll. Somebody got upset about that and they said, we want to know what's going on. So they sent me and the REECo guy out to Johnston Atoll with these new instruments. And we found it everywhere we looked, practically. And so—where was I in my story? Oh, so what they did was—oh, but the phenomena is that the plutonium bonds to the coral.

Oh, so it acts differently.

It's sort of an organic type thing, coral is, anyway, and the plutonium bonds to it, and so the plutonium is held very tightly. And if you went out with an old monitoring system and held it this high, [demonstrating height] slightly off the ground, you could read alpha coming off the plutonium. And you could see that same plutonium with the FIDLER, which was the name of that instrument, four to six inches off of the ground. That stands for Field Instrument for the Detection of Low Energy Radiation. So anyway, we had determined that—and if you walk on the coral with a pair of booties, many times you can be walking in a contaminated area, and when you get out and they check you, you're not contaminated because it's bonded to the coral,

so you don't have the particles of plutonium moving. And so they were believing that it ran all over the place, you know; if there was plutonium out there, it was everywhere. It was fifteen years old, almost, or twenty years old by the time we were out there, because it had been a long time since they had tested. It was in the early sixties, and we were in the eighties out there.

And so anyway, they called in a military team from back East called the AFRI, Armed Forces Radiological—something. I don't remember. It was called the AFRI. It was the acronym. And they were a group of experts, plus they brought along the head of the Health Physics Society from Oak Ridge. And they wanted to come out and evaluate this disturbance that I had caused. And so when they arrived, my boss, Bruce Church, said, Layton, I want you to meet the airplane and meet these guys. This is really kind of a funny story. And so I was down at the airport, and here come this whole group of guys, all health physicists, coming off that plane. And one of the guys separated himself and started walking right towards me, and when he got close enough that I could recognize him (and it was in the late evening) he says, Layton O'Neill! Is that you?

And I said, Yeah.

[00:35:00] And it turned out I'd been in school with him, as a student, years ago. He was in the Air Force and I was a civilian.

And he poked me in the chest with his finger and he says, I'll bet you're the guy that's causing all this problem out here.

I says, Yeah, you're pretty close. Pretty close.

So what we did was, this guy, this HP [the society president] from Oak Ridge, wouldn't believe us, the bonding situation, and so he took us out the next day, out there, and he had monitors with us and we were dressed in Anti-Cs, and he said, I want you to find some real hot spots with alpha. And so we did that. We had a guy with a brand new shovel,

and the HP wore a mask, and the whole thing. He said, I want you to take a shovel of that hot spot [and] throw it on me. And so we shoveled up the hot spots and threw it on him. Then he brushed himself off and he said, Now, I want to be monitored. They couldn't find anything, except for under his shoes where it was stuck on his shoes. He says, I don't believe that. Do it again. So we found another hot spot and we did it again. He ended up taking a piece of coral, a fairly large piece of coral, that was contaminated, and he took that and put it in a bag and he took that back to Oak Ridge with him to try to discover what was going on. But they discontinued making us all wear Anti-Cs. But I had to go through that bunch of bull, you know, to get there.

Wow. So you had to go to some extremes to get some things changed and some policies instituted.

Yeah. So it was always an exciting job and there was always something going on. So you mentioned earlier that you had three kids.

Yes. Well, I have three by my—actually, four. I had a fourth one after—when I moved to Ellensburg to become a Sanitarian, when I got my degree. I practiced there for two years as the Sanitarian of the local health department. And I had an experience with radiation there. We had a guy call from one of the cities, South Cle Elum, in our county and said he had some radioactive material all over the city streets. And it was in a little town up the road west from Ellensburg. And I'd been to the city. The only street that had pavement was the main street; the rest of them were all dirt. So they had a lot of little potholes. And it had rained the night before, very heavily, and it was in the middle of the forested country. And the wind had blown real hard. And when I got up there with my Geiger counters that I had—he said, Bring your instruments up here because I want you to check my readings. We've got radioactive material on the ground up here. I think it's yellow cake. Well, yellow cake is the product from the mills where they process uranium ore and yellow cake is oxidized uranium, and it is yellow. *And so it just settles, now, like a dust form, sort of?*

Yeah, and they made big cakes out of it in the mill. They were about two feet in diameter and about a foot thick. And that's how they shipped it, in cakes, in boxes, you know, contained. They shipped it across country that way in the early days, from the mills. And I'd been let me think. No, I hadn't. Not at that time. Anyway, I had seen yellow cake prior to this incident, so when I got there, why, I met him at some place there and he took me out and showed me. The water was still in the puddles in the potholes in the street, and every one of them were rimmed with yellow material. And he put his Geiger counter down there and he got a good size reading off of it, you know, 25, 30 mr per hour. So I checked it with mine, and I did too. And so I reached down and I picked up some of it and looked at it real close and I said, Bill, this is a blossom. It's a pine blossom. It was pine pollen off the pine trees. [00:40:00] And the rain had washed the radioactive iodine out of the test site cloud when we were doing atmospheric testing. And so I took some samples of it. The city had me go down inside of their reservoir, a great big tank up on the hill. Climb down into the tank on a ladder and monitor and take a sample of the water. And we monitored all around and found nothing. I decided that if it was contaminated, you know, if there was some radioactive material that had got in the stream water and it was in this big tank that only took a small portion of the stream, and the contaminated stream was down the mountain by now. It was a couple days later, or a day later, it was.

Long gone.

Yeah, long gone, right. And what we got, we got a hold of—I had to go back to Ellensburg to get it analyzed, and we determined that it was Iodine-131, a known fission product.

And so I called my buddies down at the Nevada Test Site and I said, Have you guys just shot a shot recently that went up towards Washington?

[They said] Yeah, man, in fact, we did, last night or yesterday. And they said, What have you got?

And I said, Well, we got some fallout up here. And mostly Iodine-131 washed out in the rain.

And they said, Yeah, yeah, it's probably what you got.

So now, how hazardous is that to the town or the people that are around there?

Well, it's hazardous. But you don't go around drinking water out of puddles. And the dilution factor into the tank, which is where they got their water, the Iodine-131 would be a minor amount because when the rain comes down, it's going to hit ground and run into the stream, but that's going to all wash downstream, and it's constantly getting new water. They probably had an overflow on the tank. I never did go look at that.

Wow. So that's a pretty significant mileage for the fallout.

Yeah. Well, you know, it went to the border and then it quit.

Yes, it just stopped right there.

All the monitoring diagrams that we made, the airplanes that flew, the fallout from the atmospheric shots always quit, in a straight line, right at the Canadian border, and at the border with Mexico, also. There was no radioactivity gone beyond that border. But we've seen fallout from testing in New York.

That's what I've heard.

There's a whole series of studies in the library at the public reading room [Atomic Testing Museum/Frank H. Rogers Building, Las Vegas, NV]. There was a laboratory in New York that did nothing *but* monitor for fallout, and all the other DOE laboratories monitored for it also.

Well, that was an experience I had had as a sanitarian, and that's what got me started. And when I had the opportunity to go ahead and get back in school, that's why I did that. *Yeah. It seems like there's a lot of—you had a lot of travel and experience on this job.*

Yeah, I've had a lot of experience, yes.

It seems like you have a very comprehensive overview of the nuclear test site and the general testing program and what its capabilities are.

I got involved with educating the Enewetak people, also, myself and a young lady who was loaned to Nevada Operations Office during the island activities. She could speak and write the native tongue of the islanders, the Enewetak people. And her and I put together and wrote a manual, a book, on radiation safety for the everyday folk.

For the folks out there, yeah.

Yeah, for the people out there.

What kinds of stuff do you tell them?

Oh, just to be careful and wash your food off and, you know, don't drink from the puddles, and mainly to wash, and cleanliness, and take baths occasionally if you think you're in fallout, which they were told when they were in fallout, they should take baths. And then we talked to them about the hazardous, you know, the different kinds of radiation. We educated them on alpha, beta, **[00:45:00]** gamma, and that there are various hazards. Alpha doesn't have really an internal hazard unless you take an alpha emitter internally. It doesn't even get through the dead layer of skin on your hand. And beta depends on the energy of the beta. It usually has a wide range of energies. And then gamma, of course, goes through you, and if it's stopped by your body, why, you get more exposure dose than you do if it goes through you because it leaves all the energy it has when it's stopped by you, and if it goes through, it only leaves a small amount.

So that's why they—and we got involved, in my time, involved in X-ray equipment,

doctors' concerns of that. And I have worked on those kind of things. When I went to Johnston

Atoll, they had a facility out there for X-raying, and we looked over their facilities.

So we've learned a lot about this.

Oh, yeah, we know more about radiation and radiation exposure than any other hazard there is to people. And it might be coming less true now, but in the earlier days it was. We just knew a lot about radiation and nothing about all these other hazards.

So at the time while you were traveling around and, you know, doing a fair amount of work that had sometimes high levels of exposure and all of that, was your family aware of what you were doing? I mean—

I don't know if they were or not. My folks, I don't know. My wife was.

And how did she feel about that?

Pretty good. She's not afraid of it; she's like I am, and we've had lots of talks about it. I don't have any fear of the radiation exposure that I have received, at all. I don't think that it harmed me. There will be people who will disagree, but the proof is in the pudding.

As they like to say. But, you know, there are a lot of, obviously, you know, a lot of folks out there that feel like it's had a pretty severe environmental impact. It made a lot of folks sick.

Yeah, there are a lot of people. There are people that think others have died due to radiation exposure. I have a friend who thinks her father died up in Utah, due to his exposure. They can't prove that. And I don't believe they will *ever* prove it because I don't think it's possible. They kept track of the exposure doses and they've done studies of all kinds—just *tons* of studies with reports in this building upstairs and in this room next door that you can read. And they use some examples, such as the sheep that died from the radiation exposure. If you read the documents on that, they died from a weed that was poisonous. And then the cattle that got the big sores on them that was from radiation material deposited on their bodies, and that's probably true, but they just—when the clouds came through those areas, they sampled the milk and they confiscated the milk, the United States Public Health Service did. The team that I was on—not myself, because we just monitored—had another group that went to the dairies and sampled, and they actually closed them down. They made some of the stuff into cheese, because it would have a long time to sit before the cheese became prime cheese, and the radioactivity would be decayed away, so that the farmers didn't lose their income. We had people [who] advised home owners to close up their houses. We had people who blocked highways so that people couldn't drive down the highway where the cloud was going through. But I never ran into anything that I was overly concerned about, you know, that would make me be afraid.

[00:50:00] Right. Yeah, I don't know. It's just that there are those two schools of thought out there. I mean, you have extensive knowledge about it. You mentioned earlier a helicopter incident. What happened there?

Oh, yeah, the helicopter. Well, the test site was having problems with invaders, people coming from the offsite, trying to get on the test site. Anti-nuke people.

Like protesters and stuff. OK. Like in the eighties?

Yeah, they were just trying to invade the test site. I don't know exactly why. I never could understand that because if they'd got in close enough to some of those shots and we had not known about them being there, they could've died, not only from possible radiation but from just shock waves, physical impaction, because the rocks were rolled off of the mountains and sides of the hills fell down and the ground was raised ten to fifty feet in places, you know. No, really, the shock wave was what could've killed them. And then if they'd have been downwind, from an accidental or planned release, they'd have been having radiation exposure problems later on.

But management had decided that they needed to do an over-flight of the test site. And my boss asked me if I would meet two security guards and the pilots at the chopper landing site outside of the main NTS gate. It was right after we got to work, so it was very early in the morning. And so we got in the chopper and I sat in the middle, on the back bench seat of a Huey H-1 chopper. I was there to determine and advise them if we set down anyplace, whether there was contamination or not, and also whether the areas where the people might—if we found some people, if they'd been in a contaminated area. So we flew all the way up to the north end of the test site, looking over the mountains in between, just looking back and forth, looking at the ground, and then we turned and came down Forty Mile Canyon, which runs all the way from about Area 19, up in the north end of the test site, all the way down the west side of the test site, clear down into Area 25. And when we got down in the canyon—it's a rather steep-sided canyon—the pilot advised us that he had lost radio communication in the canyon, that he couldn't talk to his Indian Springs control. But he said, We're sticking with it. So we were flying along, looking at car tracks and all those kind of things. As we came out of the canyon, why, the security guards decided that there was a road going towards the west that we should look at. So we made a rather sharp turn out of the end of the canyon and turned to go up the mountain slope. So he was going up at an angle, plus he was turning at the same time. And there was a loud noise that occurred. And I was not wearing a helmet or phones. The two guards did; they had helmets and earphones on, and also the pilot and the co-pilot.

And one of them turned to me and said, Layton, did you hear a noise?

You know, he's sitting beside me on the bench. And I said, Yeah, I heard a loud noise.

And he says, Can you describe it?

And I said, Well, not really. It was just a loud noise and it came from somewhere. Not from in front of me, I thought.

And so we started up this mountain and we got quite a ways up the slope, and it happened again. And he said, Did you hear it again? And I said, Yeah. And he relayed that to the [00:55:00] guy that was driving, the captain, and his message back to me was, Put your head down on your legs. We're going to make a sharp turn and land this thing. So he put that thing into a turn, going uphill and making a left turn, and it shook the chopper, just like somebody had taken and shook it up and down. And we made that turn, and then he leveled it off and it was headed gradually down the slope and picked an area where there was like sandy—it was this fine volcanic rock—on a ridge, and he landed on that ridge with the rudders in a forward motion, and skimmed along for about a hundred feet. Well, about the time we were about ready to, I thought, stop, I could hear the engine revving up. And within about half a second, we were going *vhooom!*

So you just went back up again.

We went back straight up in the air again. And when we got to the top of that, the body of the chopper started rotating, and we started in this rotational descent. We came down and we hit hard enough to break the rudders off on the left-hand side of the chopper. Well, I don't know, when we hit that, my head popped over and I had an electrical shock go through my body, and I figured that I had pinched my spinal column somehow. And then we took off again and rotated about five times and crashed backwards into the side of the mountain, into the same kind of fine soil. At that point, the transmission of the helicopter fell forward and the propeller blades chopped a corner of the Plexiglas bubble off the top of the chopper. I was pinned in a sitting

position on this bench with a great big wide belt, about six inches wide, and I was pinned down. I couldn't release the catch that you have on those belts. And everybody else evacuated the plane. So I was stuck there. And they wouldn't come back after me. The plane was still—the motor was still roaring because when the propeller had stopped—it broke the transmission. It had broke right off at the top when it clipped the [bubble]. And the pilot had bummed his knee up. And I had a contusion on the top of my head where I'd got hit, I guess, by the bulkhead when the transmission crashed forward it dented the top of the chopper in. But they wouldn't come near me till the thing almost quit making a noise. It was still winding down when they finally came back over. And they said, Why didn't you get out of there? And I says, I can't. I can't get this off. And so that co-pilot reached in with his hand from the side and was able to release my buckle, and I dropped to my knees on the floor, and I was trying to find my glasses. He grabbed me by the arm and jerked me out of the plane and said, Get out of here. We don't know if this thing's going to burn or not. So we went over and sat on the side of the hill till it quit making noise. And it never did catch fire or anything.

That's good.

Right. Well, I'd have probably been gone if it had caught fire. And me and one of the other guys went around and got the flare-gun out. Then an airplane, an F-111, flew over, and he shot the flare-gun but the F-111 missed the signal. And then they also had a beeper box finder box, and the pilot said, You guys keep the flare-gun here. I'm going to take this beeper box over to that high spot over there and set it up on the hill, which was a ways away from us. And then another plane came over and the guy, **[01:00:00]** a sergeant, he shot the flare-gun again. Anyway, he shot it up, and the second F-111 pilot—we didn't know whether he'd seen it, but he ended up making a big circle around us. Within twenty minutes after

crashing, we were picked up by another chopper and taken back to Indian Springs. They flew me on into Nellis, and looked at my head and had X-rays taken, and they looked at my neck, but everything seemed to be fairly good. They didn't find anything in particular. So then they flew me back to Indian Springs, and when I got to Indian Springs they said, We'll fly you back to Mercury if you want. And I said, I've had enough choppers for the day. How about driving me over? So they drove me over.

Wow. That sounds pretty harrowing.

Yeah, it was harrowing, and exciting, you know. I don't know. It was just part of [referring to a small book]—that crash was in April '71. In '81, ten years later, in June, I was having a terrible time with the nervous system in my back and my right arm, and pains in my back. And I finally got the REECo doctor to consent that the chopper was the cause of it. And in the meantime, I'd had a detached retina in my right eye, and that was due to the centrifugal force I experienced, too, and the crash. And I finally got the REECo doctor to sign a letter saying that he thought that the causal agent of my back pain was the crash. So I got the Department of Labor to work on my neck, and I had a laminectomy of the fifth and sixth vertebrae, where calcification had grown in around my nervous system to my left arm. And that wasn't 100 percent efficient. But that's my chopper crash story.

That's quite a story. That's quite a story.

Yeah, all dedicated to Uncle Sam.

That's quite a little logbook you have there.

Well, I have dates to remember.

So do you just write in this as you remember things, or as you go along and things happen? Yeah, as they happen. As they happen, I try to.

So how far does this go back?

Well, it goes back to when I had my first operation in a hospital in Montana. Then the SL-1 incident was when I started it. I decided I ought to start keeping things. JFK [John Fitzgerald Kennedy] was killed. That's important to me because my first wife divorced me at that time, and the last time she talked to me friendly on the phone was the day he got killed. So it's an important date for me. And then the chopper crash. And then Erculei, the doctor who operated on my neck. And then the detached retina.

Wow. So this is amazing. You've had this book for-

Oh, I—no, I had not—I don't know when I first got this book. I was in the process in the early days of recopying it every year, because it's one of these annually issued, and finally I got to the point where there was so much information in it that I decided I'd just keep it. And I modified it. Instead of just keeping dates in it, I have addresses in it and all kinds of stuff: DOE. My children. Birthdays. And all of my clan. My wife calls it my Brain Book. So I thought it was a good idea to bring it because I can't remember all these things.

Yeah. That's amazing. So everything's in there. That's great. So we're getting near the end of the second CD, and I guess maybe just wrap some things up, and I would love to talk to you again if you'd be—

[01:05:00] OK. Well, I'm available anytime you want to talk.

OK. Yeah, I would like to do another interview.

I don't know what you want to do to wrap it up. It's been a very exciting, interesting career, one I couldn't have even—beyond my dreams. And one that I've tried to promote and encourage. I'm still a member of the Health Physics Society. One of the biggest thrills I ever had in my life was my son called me up one day, and he was in college and trying to make up his mind what to do with *his* life, and he said, Dad, what would you think if I told you I was going to become a medical health physicist? And I said, Well, after I get up off the floor and do a couple flips, that's probably the nicest thing that could happen to me. So he's a medical health physicist. He works in Houston, Texas at the Catholic hospital there, and been in his career for almost twenty years now.

That's great. Obviously, you were inspirational.

I really enjoyed working in the job. One of the things that bothered me a lot about it, though, was I have a very dear friend, Gene Kendall is his name, and he's the contractor in charge of waste management, he was. He and I got laid off about the same time.

When was that?

Well, in '94. I think it was a year later that he actually retired. They sort of forced him out when Bechtel moved in. He was with REECo. And Gene was a very fine man and cooperated with me as a government employee. And he gained a reputation for doing that. He was not a REECo team player, according to the rest of the REECo crowd. And he had too much to do with the DOE. But we got a lot of great things done in waste management. He came down from Idaho also, to take over the waste management program for REECo, which was in a big mess here. And that was about the time that *we* became involved in it, in the eighties. And before that, it had been all under the contractors' operation and nobody overlooking it or anything. We established a whole group of people to work over the whole thing. Of course, we had people going to all the generators, and I hired a bunch of outstanding HPs, four of them ladies from REECo. And had a couple guys. Sent them out to the wolves. And I had a little note over the top of my desk that was my guiding light for them and for myself with my life: "Act, for it is easier to gain forgiveness than it is to gain permission." And so my people did that. They were good. And we started this whole new regime on waste management that the DOE wanted to do. It came out of Washington that we had to do this. And it turned our organization inside out. And Joe Fiore **[01:10:00]** was heading it up, and he was a kind of a doer, too. The thing I have about Joe was, he kept beating on my head all the time I was there, [was] about our budget, and organizing our budget, and knowing where the money was going, every penny. And one day he finally cornered me and he says, Layton, don't you remember any of the training you got about this method of doing things? And I says, I never had any training like that. He was really shocked. And I said, You're the first time I'd ever run into that. And, you know, my career was very interesting in that I never worried about money until I got into waste management. The last eight years was my first acquaintance, of *all* the work I did up until that time, and I was there for thirty-six years, so twenty-six years I worked without ever seeing a budget figure. I had somebody else to worry about it.

I definitely want to continue to talk to you. We've got roughly two minutes left here on the CD, so I think what I'd like to do is maybe just come to an end and then I'd like to just schedule another time to talk with you again, if you want to do that, because you just are a wealth of information, and thank you.

[01:11:22] End Track 2, Disk 2.

[End of interview]