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FERNALD LIVING HISTORY PROJECT
Transcript

Name: Mike Boback
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Tape FLHP0087

17:01:00
(Off camera: If you could just look at Joyce and say your name and chatter just for a second so I can get a sound check on ya.)

(Laughter)

A:
Okay. My name's Mike Boback, and this is College Hill (laughs).

(Off camera)
How many grandkids do you have?

A:
Tough question. Let's see, seven. One granddaughter.

Q:
Oh, you have six boys and one granddaughter (laughs).

A:
Yes. In fact, you may, depending on how close we are to feeding time, you may get some background noise.

Q:
Oh, that's okay. We interviewed a guy who was a

(Camera cuts off and comes back)

17:01:44
Q:
Great, well, the first question is always the hardest, (laughs) if you could just give us your name, and spell it just so we have the spelling right.

A:
My name is Michael W. Boback, B-O-B-A-C-K.

Q:
Great, and uh, we usually begin with a little bit of background. If you could tell us a little bit about where you grew up, where you were born, a little bit about your family.

17:02:04
A:
Well, I was born and raised in Wilkes-Barre, Pennsylvania, which is in the heart of the hard cold district in northeastern Pennsylvania. And uh, went through high school there, uh, spent almost four

years in the, in the Army. Came out and went to King's College in Wilkes-Barre, and after graduation, moved to Cincinnati to take a job with National Lead Company of Ohio, at Fernald.

17:02:33
Q:
And uh, tell us a little bit about your Army service.

A:
Well, I was uh, first of all in the signal corps, and then assigned to the Army security agency, which was, I guess the Army branch, of one of the intelligence groups, and uh, we did, we did work with communications. My military operational specialty was Morse Code Intercept Operator. And I was located near Nuremberg, Germany.

Q:
So you served overseas.

17:03:08
A:
Yes, for several years.

Q:
And tell us how you got your job at Fernald.

A:
Well, it was almost accidental, I was um, a member of the newspaper there at Kings College in Wilkes-Barre. And right next door to us, to our office, was the office of, of the publicity director. And he would come in and borrow our pictures occasionally, and we would go to his office and borrow his pictures for the newspaper.

17:03:40
A:
And he had a habit of keeping all of his clippings that he got into, into the local newspapers, in, in old books, kinda loose-leaf books, but books that he no longer had need for. And the set of books that he liked to use, was a set of books that described job openings for college graduates across the company. And these were given to him by job placement office when they were finished with them.

17:04:10
A:
And while looking through some articles that he had, clippings in those books, I noticed that in the pages not yet covered, that there were some descriptions of facilities that were run by the Atomic Energy Commission, or operated for the Atomic Energy Commission. And I ended up writing a letter to Argon lab in Chicago, and the National Lead Company of Ohio.

17:04:37
A:
Uh, Argon never answered, uh, National Lead did. And they had a chemist in health and safety laboratory that was being drafted. And they needed someone to replace him. So they sent me a offer, I went out for an interview around Easter of 1956, and got an offer and went to work for them in

September of 1956, the day after Labor Day.
17:05:05
Q:
What intrigued you about that letter that you saw that made you want to write to NLO?

A:
Well, both the uh, location, both Argon and the description for NLO, described a whole uh, list of different possible uh, majors that they were looking for. And I had a major in pre-medical biology and a minor in chemistry. And both of those locations needed both of those types of those people, so I thought there was a good possibility of finding something there.

17:05:40
Q:
Tell us about your interview.

A;
Well, the first interview, the one that took place on um, the week before Easter in '56, uh, was um, well, I would say typical of what I thought an interview would be, although I never had a job interview of that sort. And um, fellow by the name of Jack London, believe it or not, was one of the people that conducted part of the interview.

17:06:09
A:
And uh, a very interesting description that he gave of the site, and I remember liking him almost immediately because he was a friendly sort. And of course, there were interviews with the prospective supervisor and a tour of the health and safety facilities because the job opening was for the chemist and Health and Safety lab. And uh, I, I thought it was interesting.

17:06:33
A:
There was someone else who was there for an interview, and um, I think he was from New York and maybe this might sound typical of New Yorkers, but I recall him saying to me; isn't this place a dump? (Laughs) Now look at those, look at those block walls. And I said, what're you here for if you think the place is a dump?

17:06:58
A:
So he says, oh, just to get experience in interviewing. So there's someone who caused the government to pay for his flight from New York out, and I guess a stay overnight just so he could get, gain experience in his um, in his interview skills. But I, I liked what I saw and what I heard, and I especially liked some of the people that uh, I either heard about or met there. And after coming to work, got to know 'em better and was very glad that I took the job.

17:07:31
Q:
Tell us a little bit about your very first day.

A:

I can't say that I remember much in details, of the first day. I know it was perhaps several days before I met the other, the supervisory people, all of 'em, in the Health and Safety division. I know it was several days before I met Dr. Quigley, who was the division director, a very fine person, uh, someone who I had a good deal of admiration for, or developed a admiration as, as I got to know him.

17:08:06
A:
Uh, he was originally a Canadian citizen, who uh, took part in the AEC program to train, um, doctors in industrial medicine as it pertains to the nuclear energy work. And um, I guess he did so well in that program, that the AEC then offered him a job, um, within the AEC system in the U.S.

A:
And he took that job and worked for I believe the New York office for a while, and they offered him the job of coming out to Fernald to set up the Health and Safety division there. So he, he was a short fellow, an ex, ex-hockey player, someone who liked cold weather, cool weather. He had a favorite word for, or series of words for Cincinnati weather, which I can't repeat (laughs) in company I guess.

17:09:10
A:
Um, swore like a trooper, but uh, was a very good person, and as I say, he was one of the, one of the people that made me glad I was, I was there working at Fernald. He could have made much more money, somewhere else, in a private industry. But he figured that he had a background and he was doing a good job there, and was needed uh, there, so he stayed.

17:09:38
A:
I guess he also uh, put in some time in, at the Hanford site, too, before coming to Fernald, so he had a good bit of experience in industrial medicine as it pertains to nuclear industry before coming to Fernald. Uh, he and, and Dick Heatherton, who was the head of the uh, Industrial Hygiene and Radiation department, was another person who um, started out in the um, AEC business before Fernald.

17:10:10
He was a ah, chemical engineer at uh, the Niagara Falls plant where ah, they produced green salt, uh among other uranium compounds, very early in the Manhattan Project. And um, um, after that work was finished, the AEC liked his work there, as a chemical engineer and offered him a job as a health protection specialist, working out of the New York office. Which he did for a while before ah, being offered the job of heading up the ah, Industrial Hygiene and Radiation department at Fernald under Dr. Quigley.

17:10:53
A:
So those, those two people um, ah, I had great admiration for and ah, they ah, they were good people. And Dick Heatherton is still ah, still lives in Fairfield. Dr. Quigley passed away several years ago. But ah, they ah, they made life interesting and, and pleasant for the most part at Fernald.

17:11:14
Q:
Did you have to get clearance to work at Fernald?

A:
Yes, at that time ah almost everyone, in fact maybe everyone had a Q clearance. Ah although ah it seems to me it didn't take ah the time for the clearance wasn't anywhere near what it later became, cause I know trying to hire people became a problem um, perhaps in the '60s. It would take months and months, in fact sometimes 6 months or more and ah, course sometimes you lost the person while they were waiting for a clearance. They took another job.

17:11:54
A:
And in a few places, in a few cases we were able to hire ah, people un-cleared um, while, but have to escort them and have certain restrictions on what they could do or where they could go. So that, that at times was a difficulty getting people in, in a timely manner. New employees in, in a timely manner. But ah, something we lived with obviously.

Q:
Tell us about getting your clearance um, how did that whole process work?

17:12:28
A:
Ah, there was a ton of paper to fill out I recall, the clearance paper that had to be filled out. Ah, after that ah, ah, I don't think I ever heard from any of the references I put down or family members that they were contacted. Ah, I did have a clearance while ah, while in the service, as part as the Army security agency ah, that was, I'm told equivalent to a Q clearance.

17:13:01
A:
Ah, but nevertheless ah, I think, I think I still had to go through the standard clearance process for the AEC clearance. And I don't recall that it was any particular problem. If I did have restrictions while waiting for that, I was hired without, when I was hired I may of already had the Q clearance. Because there was ah, something like four or five months between my filling out the papers originally and then starting work.

17:13:32
A:
So, I don't really recall, but I may have had the clearance. If I didn't it really didn't cause me any problem at all, that I can recall. Now it did for some people, especially if their jobs demanded that they, they move around. Ah, they would have to have ah someone to escort them, and they couldn't go into certain locations like the library, or the library vault.

17:13:55
A:
Ah, the records storage room and perhaps a few other locations. But for the Health and Safety laboratory ah, ah the only problem was escorting someone to wherever they had to get to. Whether it was the cafeteria or the restroom or whatever.

Q:
And why did you need a clearance to work at Fernald?

17:14:20
A:
Well, there, there was classified material at the site. There were classified documents, ah, occasionally it might be required that ah, you'd have to use or see those classified documents, either confidential, secret or top-secret. Ah, certain aspects of the work were classified ah, surprisingly for the average person not much was classified.

17:14:50
A:
You could, contrary to what you might hear from some old-timers, you could describe the operation that went on in great detail and never, ah never go over the line on any classified items. I was surprised to find, when I got to Fernald and started work that I found in a desk drawer of our lab, a reprint from a, a magazine, a chemical magazine that described in great detail the operation that went on.

17:15:24
A:
And uh, named part o' the plant, it named all the compounds, of course it didn't have the classified material such as the production rate, the purity of the material, the dimensions of the final pieces, but uh, here was this big description, uh, complete with pictures, pictures of the final products. So uh, the, the classification bugaboo uh, really was, sh-, shouldn't have been a great problem.

17:15:51
A:
I do know, that some people told me that it was easy for them at home, merely to, when someone asked them about their work in their family or friends, it was easier for them to say, I can't talk about it. Well, they could talk about it. They could say that they were a machinist, or they could say that uh, they worked in Plant 4 and produced green salt. They could've said any of those things.

17:16:15
A:
They just couldn't have talked about the quantity or the purity of the material. So um, the secrecy aspect, or the classification aspect, was, was really not a problem, although some of them may have made it that way, because it was easier for them.

Q:
I'm not at liberty to say. (Both laugh) I've heard that phrase a couple of times. Um, tell us about the early years of your job, um, a little bit about your responsibilities at that time.

17:16:48
A:
Well, the Health and s-, the Health and Safety division had several departments; there was the Fire and Safety department, of course they did the things you might expect Fire and Safety to do. The Industrial Hygiene and Radiation department that uh, looked after worker safety; uh, there was the Medical department, and uh, they took care of the physical exams.

A:
And the laboratory testing of blood and urine for the medical aspects; and then there was the uh,

Analytical Chemistry laboratory, which was the name of my department when it, when I started there. It was later changed to the Bio Assay Laboratory department to avoid any confusion between it and the uh, Chemical Laboratory department in Technical.

17:17:37
A:
But our laboratory analyzed air and water samples principally. We analyzed uh, thousands, tens of thousands of uh air samples a year, for uranium radioactivity. And these were samples generally taken out in the workplace. Uh, we analyzed water samples collected both off site and on site. And we analyzed urine. Urine samples from the production, and other workers at Fernald.

17:18:12
A:
And there were thousands of those samples a year. In addition, anything else, that any of the other departments would pick up or have an interest in, we would end up analyzing, and we would analyze 'em for either radioactivity or uranium, or chemicals that were used on site, such as nitrates or, or fluorides, which of course were, were widely used.

17:18:41
A:
Uh, but uh, although those were our major categories of sample matri-, matrixes, we uh, we got dead animals, uh, we got fecal samples, uh, we got wood, uh, we got pears, fruit that was picked up, on site. Um, almost anything you can name, I'm sure we analyzed it, at least once, for either radioactivity or chemicals of various kind.

17:19:10
A:
We analyzed fish, that were taken outta the river, um, as I say, anything that anyone's imagination could make 'em think there might be something of interest there, we ended up analyzing. All of the information of course, reported back to the people who submitted the samples with copies that then went into, copies of the report sheet that went into the files.

17:19:35
A:
And uh, I know when I left in '93 that those data sheets were still there in Central Files.

Q:
Did you analyze any-.

(Something said off camera)

Q:
Sure. Yeah. That's fine.

(Tape pauses and resumes)

17:19:52
Q:

Did your department ever analyze Knollman's milk?

A:
Yes. Yes, we did um, I think that came about as interest generated by Clarence Karl, who was the uh, head of the AEC office. I, I don't know what caused his thought about the milk, but we did, we did analyze the milk and analyzed a number of samples, perhaps at monthly or quarterly uh, schedule, and it was dropped for a while, and then picked up in later years, again.

17:20:30
A:
And I think when it was picked up the sec-, for the second time around, not only was a sample from Knollman's dairy herd analyzed, but also a sample from a distant location. Uh, either I, I think we had a distant location in Indiana for a while, and then later, a distant location in Kentucky. In fact then, maybe we were analyzing three samples, Knollman and then the two distant locations.

17:20:58
A:
And then I believe at some point, those samples were sent off site to a commercial laboratory, uh, just to show that a commercial laboratory would also find nothing as, as, as we did in the milk samples. So yes, we had milk and grass. We analyzed grass from both the pasture area as well as the other locations.

Q:
Did they ever take a look at any of the internal organs or meat samples or anything from Knollman's farm?

17:21:33
A:
(Pauses) I don't uh, believe so. I know we analyzed uh, samples that were collected from animals in Indiana when we were interested in, in setting up, in developing a procedure for the determination of uranium in tissue.

17:21:55
A:
And um, one of our laboratory workers lived in Indiana, and he was able to obtain uh, parts of a steer, various organs uh, which he was able to bring in, either frozen or in formaldehyde, and we used those then to test out, our procedure that we developed for uranium in tissue. We might have analyzed uh, a sample from Knollman's, Knollman's animals, if we did, it was only once or twice.

17:22:30
A:
Uh, I know we did analyze samples of tissue from animals that were found dead, uh, rabbits, woodchucks, raccoons, a black snake that was killed, out in the pit area. Uh, those, those're the major animals, or, or animal life that we analyzed, including the fish.

Q:
Somebody mentioned to me before in a previous interview about the, the fish in the um, ponds out near the waste pits. Do you know anything about those fish, were they put there on purpose for that type of

purpose, or?

17:23:17
A:
No. Now there're a lot of cute people at the site, and someone surreptitiously uh, brought in some fish uh, from their own farm pond, and dumped 'em into those ponds. And that was relatively clean water that was uh, water that was mainly discharged out of, either from water treatment, or from the water storage tanks periodically when they were flushed.

17:23:51
A:
And um, I know that one pond filled up with mat-, with uh, treatment material from the water treatment plant, but the other pond remained uh, had water in it until, I guess it was decided to do away with it. Um, and, and the stories though, of fish as big as your leg however, are greatly exaggerated. There were bass, and pan fish in there, and when that uh, that pond was drained, water pumped out.

17:24:20
A:
And the fish then that collected in the little pool of water, were, were normal size fish that you might expect in a small, shallow pond like that. So the stories of big, huge fish two and three feet long were (laughs) not proven out. Ah, but, no. As far as I know, there was, there was no effort made to stock that pond by management for uh, any, any particular purpose.

Q:
Tell us a little bit about the process that you, that your department developed to track uranium in tissues.

17:25:00
A:
Well, it was a uh, merely a chemical separation um, as you might expect, you've got to destroy the, the tissue first of all in order to extract whatever you're looking for. And we chose to do that with drying and furnacing. And after that, you end up with a very small amount of whitish ash that all the organic material destroyed. Then that ash would be put into solution with nitric acid.

17:25:33
A:
Uh, that take to dryness after everything was dissolved, and then the, the res-, the syrupy residue taken up in aluminum, in aluminum nitrate mixture. And um, with a measured quantity of aluminum nitrate. And then when you mix that aluminum nitrate mixture which now has whatever was in the tissue, or whatever's remaining behind after the muffler furnace destruction of the tissue.

17:26:02
A:
Um, mix that with a uh, organic, and um, I believe we used a acetate solution, and you mix that together and the uranium passes out of the aqueous phase into the organic phase. So now you have in a, in a separatory funnel, two layers, the bottom layer, the heavier, aqueous layer, the aluminum nitrate layer, and the upper layer, the organic into which the uranium has passed.

17:26:35
A:
Forced out by the aluminum nitrate that's in the aqueous solution. Uh, you drain away the aqueous solution, uh, put in another aqueous solution to kind of scrub out impurities, and then finally put in another aqueous solution that re-strips the uranium from the organic phase into the new clean aqueous phase.

17:26:59
A:
And essentially what you have then is uh, several milliliters of relatively pure water that has the extracted uranium in it, and then you analyze that to determine the quantity of uranium. Uh, nothing special about it uh, that's a, separation technique uh, that was similar to some techniques that were used on, in production, in production levels.

17:27:26
A:
Aluminum nitrate, or other nitrates were used to force the uranium out of the aqueous phase into the organic phase. Basically in the pulse columns that you talked about earlier in the Refinery, that's, that's what happened. Uranium left a heavily laden nitric rich or a aqueous solution and went into an organic, and was later stripped outta that organic with uh, ultra pure water, and the process went on from there.

A:
So we did it on a much smaller scale.

Q:
That's interesting. I hadn't thought that would be sort of the same thing, picking up the uranium outta the tissue.

17:28:07
A:
Well, one o' the first systems that we tried for uh, getting uranium out of tissue, uh, mirrored the system that was used in early days, uh, at the plant in St. Louis, where ether was used as organic. And of course that's a trickier material to work with, uh, but we, we finally ended up with the acetate solution being the organic, and that's much easier to work with than ether. Excuse me (leans over)

17:28:41
Q:
Sure. (Two minutes we have left. Yeah) okay. Um, what types of findings, um, after doing this process, did you ever have any interesting findings of uh, some of your analyzation?

17:29:00
A:
Yes, they were interesting in that um, the amount of uranium found in tissue samples uh, was not as much as might have been predicted, as would have been predicted, by the uh, early models, that were developed principally out of the animal work at the University of Rochester. Which of course was reassuring.

17:29:25
A:
Uh, had there been greater quantities of uranium in the tissue then, than anticipated based on the uh, potential exposure of the individual, then that would have been a worry. But as it was, and, and this fit in with other information reported in the literature that the uptake of uranium into body tissues was not as great as had been modeled uh, based on that animal work at the University of Rochester.

17:29:58
A:
So that was, reassuring. And, and we did end up analyzing tissue from former workers when it came to us because of autopsy or, or an operation of some sort. And uh, not many cases, but several. And in no case did we find uh, uranium present in the lung tissue, in lung tissue, or any other tissue that exceeded whatever the limits might have been at that particular time. So yes that was good news, was reassuring.

17:30:35
Q:
Terrific, well, we're gonna pause for just here a second and switch tapes here, and we'll keep, that's great.

Tape FLHP0088

18:01:19
Q:
Um, tell us your various responsibilities. I understand you had four different jobs under NLO.

A:
Well, I, as I say, I started out as a chemist in, in the, what became the bioassay laboratory in the health and safety division and was there 13 years. And in that lab we, we did the, in that department, we did the laboratory analysis. We did the film badge work, the dosimeters that people wore, and we also had the instrument repair shop that repaired all the instruments used by the health and safety division.

18:01:57
A:
And I started out as chemist and ended up as head of that department. And after 13 years, became head of the industrial hygiene and radiation department. And was there for about 13 years, and then became division director in 1982, and that went through the NLO, until about 1985 and uh, moved into director of special projects and stayed at that for several months until the end of the NLO contract.

18:02:32
A:
And of course had other jobs with Westinghouse and with Fluor Daniel.

Q:
Tell us about your other jobs, too, with Westinghouse and Fluor Daniel.

18:02:4
A:
Ah, with Westinghouse I started out in the ah, um, Health, Health and Safety division. Although I'm not sure what the proper name ah, was under Westinghouse, and did a variety of things. Special projects ah, there of course were a lot of questions by the new people that Westinghouse brought in. And I did my best to answer those questions or provide, provide data for them.

18:03:12
A:
Find documents, ah, try and make a tie in between what went on before, what they wanted to do. And ah, then ended up ah, in a group I believe was called a Self-Assessment group. Ah, at the end of the Westinghouse tenure, and ah, was in that or similar to it, in that group or one similar to it ah under the Fluor Daniel ah, time.

18:03:43
A;
Our principal job there under Fluor Daniel was to work out a system f-, that people could use for the self-assessment of their own activities. And another principal job was looking at the um, accident reports that DOE had put into a database to see which of those um, accidents and follow-up could be used by us.

A:
That is the information about them could be used in a lessons learned kind of thing. I don't know if that's still going on but it was big at that time.

18:04:20
Q:
Tell us about the inner workings of the dosimetry. I think some people are still kind of foggy about how all that works.

A:
Well, the original badges that were used, or original dosimeters were pieces of film similar to the film that the dentist puts behind your teeth when, when he's gonna take an x-ray of your teeth. And uh, what happens is that when radiation strikes the film, of course the film is still wrapped up in its, in its light tight wrapping.

18:14:56
When radiation strikes that film, it does to the film, to the silver halide particles that are in, in motion, it does the same thing to it that light would do. So if you then take that piece of film after the wearing period, and open it a dark room and develop it just as you would develop the uh, negative out of your black and white 35mm camera.

18:05:23
A:
You have then a pattern of, because of the way the film was in its holder, you have a pattern of light and dark. And that if you then put that in a densitometer, which is merely a device that reads the amount of light getting through or the amount of light that doesn't get that through, those dark areas.

18:05:50
A:
You can equate that then by using standards that have been exposed to a known amount of radiation, you can then get an idea of how much radiation exposure struck that piece of film while the employee was wearing it. The uh, film was in use from 1951 when the project started (clears throat) until I believe into the '70s when we switched to thermo luminescent uh, detectors, TLDs.

18:06:16
And I believe the TLDs are still used now. The TLD is a kind of a piece of salt, a particular kind of salt, maybe in a matrix, and uh, when radiation strikes it, the crystals become excited. They store some o' that energy. Then when you take that piece of salt or dosimeter and put it in a heater, and heat up the dosimeter.

18:06:38
Why the light uh, light the energy that was stored in the salt crystals is emitted, and it's emitted as light. And if you have a very sensitive detector, then you can measure the amount of light. And of course you then equate that to a s-, group of standards that you've exposed to a known amount of radiation and carried through the same process.

18:07:01
A:
And you can develop a curve then that, on one, one axis reads the amount of light and the other reads the amount of exposure, (clears throat) and either do it by hand, and of course now it's done electronically, convert that to a dose for the badge wearer.

Q:
That's interesting (laughing). I've never heard that explained to me.

18:07:21
A:
Well, the TLDs is a system that's much neater and cleaner than, than the dosimetry film. Um, dosimetry film could be bothered by vapors. You might get a yellowing from, from certain chemical vapors if they made their, somehow got through the wrapping. Uh, you would have to develop in a dark room, so you would needed all the solutions. And it had to be scrupulously clean.

18:07:54
A:
It was all stainless steel equipment. And then after uh, each uh, developing, that equipment had to be scrubbed out so that you wouldn't get any, it was stainless steel so you weren't get rust, but so you wouldn't get some oxides or some film, uh, that is chemical film, on the surfaces that would then affect the next batch you were gonna put through.

18:08:16
A:
Because the uh, your accuracy of course depended on, on being able to have a system that ran the same for the standards that you ran through, and, and everything was the same for the actual dosimeters that, that you ran through. So it had to be kept clean.

18:08:37
A:
And there was a dark room that we had uh, fair size dark room where anywhere from one to three people would, would work at the film badge processing, from the ah, emptying out the badge. That is taking the film out of the badge at the end of a wearing period. By the way we did have two sets of badges.

18:08:58
A:
Ah, there was a blue badge, and forgotten the other color. Green. Blue and green. One month you wore green picture badges. And in the picture was the piece of dosimetry film and at the end of a wearing period you exchanged your green one for, for your blue one, and ah, the green ones were taken to the dosimetry lab, opened up, fresh film put in.

18:09:24
A:
The badges were cleaned if they had to, if they had to be cleaned because of some dirt or dust that might be on them. Ah, the film stacked up ah, oh by the way the ah, the dosimeter bad-, the dosimeter badges had a piece of metal into which was stamped the employee's badge number.

18:09:44
A:
So before they were issued these loaded badges were put into an x-ray machine and a narrow band of x-ray then hit that little foil and because it was stamped with the badge number, it, it made that picture then on the film. So when the film was developed, the little strip at the top or at the bottom, had the person's badge number so there was no, no um, no mi-, mix-up.

18:10:15
A:
Uh, you could tie in a piece of film with the, with the badge number of the person who actually wore it. And then of course, before the new ones were issued, reissued, why uh, they were x-rayed also. So uh, that was a very good system and it worked, worked well, but the thermoluminescent system that came along later uh, was much neater.

18:10:38
A:
And, and uh, is in fact I think the changeover to the TLD system was so great that Kodak and the other major film producers stopped producing the dosimetry film, because they weren't selling enough of it to, to make it profitable.

Q:
Hmm (laughs). Um, tell us about the safety culture at Fernald and how it changed over the years, from the process years to the cleanup years.

18:11:10
A:

Well in the process years, uh, from, from what I saw both in the laboratory and uh, in the industrial hygiene department, uh, for the most part on the part of the employees, was, was kinda lighthearted.

Um, people were working, day in and day out, and they for the most part were relatively healthy. And the familiarity with the, with things, I think bred a little contempt uh for, for some of the requirements.

18:11:42
A:
And things like respirator requirements uh were uh, occasionally circumvented by the individual employees. It was too much trouble to, to wear a respirator, some cases, too much trouble to wear gloves, change gloves uh, frequently.

18:12:02
A:
Uh, so there was that that culture, and of course as the uh, radiation control requirements uh became uh more strict. When not only did you have to prove that the individual was not overexposed because of the badges or tissue analysis or the in-vivo counter, but uh you had to provide a uh, working conditions that would prevent it from ever happening.

18:12:32
A:
So uh, toward the end of the NLO years, this different attitude on the part of DOE became uh, started to come in. And of course then was accelerated when Westinghouse came in and the big emphasis uh, part for publicity and, and, and part because of pressures from, from various sources, uh greater emphasis was both verbal and actual was placed on health protection.

18:12:58
A:
And I assume the same continues through the Fluor Daniel days. Uh, looking at and reading of, what I read about what uh, what goes on when work is done in some of the production buildings, I doubt very much if the site could have produced the amount of material that they had to produce in the busy years with.

18:13:20
A:
Uh with, with the equipment that's available or was available, if they had today's requirements, uh that would have applied in those days, it just wouldn't have happened.

Q:
Tell us about the in-vivo process. How does that work?

18:13:37
A:
That was a very interesting uh piece of equipment that is the in-vivo counter that came to us first in 1968. Uh uranium, or any radioactive material in the body, uh emits some gamma radiation. And that gamma radiation leaves the body, uh doesn't interact with the tissue, floats out into space, so if you put a detector close to the body, the proper kind of detector, it can pick up that radiation.

18:14:12
A:
And of course, again by using standards, uh you can get an estimate of how much of that particular

radionuclide is in the body. Um, in-vivo counting can be used for, you may recall stories about the radium dial painters, women who worked painting radium on, on dials, luminescent dials for use in aircraft. And um, they would touch their brushes to their lips periodically to put a fine point on.

18:14:45
A:
And go back into the radium and paint a number and touch it to their lips, and of course, picked up a fair amount of radium in their body. Uh, in-vivo counters, once it was realized what was going on, were used to great success to um, to determine their body burdens and where that radium went in the body, because radium is a very energetic gamma emitter.

18:15:10
A:
Uranium on the other hand, is a weak gamma emitter, so the task is made more difficult to detect it through an in-vivo system. But the Y12 group at Oak Ridge did develop a mobile, they had their own fixed unit, but they developed a mobile unit, a trailer that could be pulled by a, a truck tractor. And then was taken to the various sites uh, that were controlled or under control of DOE at Oak Ridge.

18:15:45
A:
Um, it essentially consisted of a heavily shielded room one edge, one end of the trailer, electronics in the other part. Uh, air conditioner in the back and heater in the back so it could be used in any weather. Um, approval had to be obtained from the various states, since this was an overweight vehicle, uh before the vehicle could be moved, and Oak Ridge took care of all those details.

18:16:17
A:
Um, when the counter came to us, uh we used it for however long we needed it or the number of weeks or months that uh (clears throat) Y12 could spare it before it had to get to another site. And we would count, as the word is used, as many people as we could uh chemical operators, because of their potential exposure, and some groups in the uh maintenance area, were, were given first choice.

18:16:50
A:
And uh, anyone who was involved in any kind of incident and anyone who thought they should be counted, uh was counted during the visit. The count took about 20 minutes, we had people shower first to remove anything that was on the outside of their body because one, one gram, one microgram of uranium on the outside of the body I believe looked like ten, ten times that inside the body.

18:17:18
A:
So we wanted to make sure we, we didn't have that problem. And then the individual changed into clean clothing uh, and walked into the counter. Waited until his turn in the counter, had his 20-minute count, and he, the person would go into the shielded room, lie on a cot and then a detector would be positioned under the back and another detector over the chest.

18:17:44
A:

And this, this in-vivo counter was strictly for determining uranium in the lung. Not meant to detect it in any other organ, the lung being the principle organ where insoluble uranium would deposit. Um, the uh output from those detectors was then fed into the uh electronic equipment, and a, a, a calculator, a calc-, calculation was made, to go from the amount of output that the detector saw to the uh,

18:18:18
estimated quantity of uranium in the lung. And we used that uh, I think that went through, certainly through the Westinghouse years until the onsite counter was, was uh, built at Fernald, which I presume is still in use.

Q:
What type of metal is used in that room?

18:18:41
A:
Uh, iron, relatively pure iron. I recall when we were making plans to build uh, the in-vivo counter at Fernald, and then that really started in the NLO days. Um, and for a number of years, our, our re-, re-, request for money was not approved or it was approved,

18:19:04
A:
but the several hundred thousand dollars that would have been needed for that job had to be used for other things that were not funded such as roof repairs and other things to keep things going in the lean years when money was very scarce.

18:19:20
A:
Uh, so I do know that we had arrangements to get sheets of iron from an old battleship that was in storage at, at some government site, and that metal was going to be used to make the shielding for our onsite in-vivo counter.

18:19:42
A:
And uh, that was a, a good source, because that was, that metal was produced before the advent of uh, the, the radiation age, so there was a very good chance then that it would not have picked up any radionuclides which of course would compound, would compound the problem. You don't want radionuclides in your shielding material.

18:20:04
A:
You're trying to shield out the extraneous radiation from causing you a high background. The uh, uh, output from the detectors in the mobile in-vivo counter uh, could be seen on a graph and was al-, also could be printed out, and except for uh, the radiation from some of the uh bomb test fallout which you could see, you could see a little peek of cesium and some of the background from uranium,

18:20:35
A:
Probably the uh, the spectrum, for, an unin-, for a uh low exposure person or certainly for a resident,

would have probably looked not much different than a spectrum from George Washington or, or St. Peter for that matter.

A:
All of us have some radiation in us and we always have. In fact, we probably had more billions of years ago, or millions of years ago when there was more uranium 235 in the earth than there is today.

18:21:07
Q:
So it was pre-Trinity metal.

A:
Yes. Yes, essentially that. A good term for it.

Q:
That's an interesting story. I like that. Umm. Let's see, I'm just gonna go through my questions here and then I have some other things I'm gonna ask you. Umm. I got that. Um, generally, how did you feel about having worked at Fernald?

18:21:37
A:
Well, I feel now, and when I worked, I felt very good about it. Uh, I think, we uh, certainly the jobs I had were jobs that needed to be done. And the work that Fernald was doing needed to be done. We were an important part of the nuclear energy program.

18:21:56
A:
And we were able to produce a tremendous quantity of uranium compounds and uranium metal (clears throat) at purities that stagger the imagination. Some places have had difficulty doing that. But at Fernald, it was done, and it was done in, in, as I say in huge quantities.

18:22:19
A:
Uh, and I think, it's my opinion, that the safety of people was not compromised despite uh, what is said by some perhaps former workers, and politicians and activists. We had in the Health and Safety division, I believe at one time, on the order of 40 some people who were devoted to seeing that uh, the employee's health was not compromised, and that standards were met.

18:22:47
A:
And that applied also to offsite locations as well. To my recollection, the concentration of uranium in air at the site boundary never exceeded 10 or 12 percent of the limit that the AEC or DOE had in effect for uranium in uncontrolled areas. So I think we did a good job. I think it paid off.

18:23:17
A:
Uh the Soviet Union collapsed, and part of that collapse, or a great part of that collapse was due to the fact that they could no longer sustain the economic burdens of uh, standing armies to control their

satellite countries or uh to keep up with the U.S. in it's weapons production. So yes, I, I think we did a great job and I'm proud of what we did, and I'm very happy I worked there.

18:23:43
A:
It provided a good life for me and my family. And uh, provided a happy retirement. And I enjoyed the people I worked with. I even enjoyed some of the antagonists I run into occasionally. Uh, yes. It was an interesting time, and looking back, I don't know that I would have done anything differently.

18:24:03
Q:
And speaking a little bit about the Cold War, and uh those Cold War years, what was the typical American mindset during the Cold War, regarding Russia and the threat of nuclear war?

A:
Well, basing that on my own feelings plus what I think was the feelings of others, it wasn't something that was on everyone's mind all the time. I think that if you got in, into a conversation with someone, they might say, yes, I, I, we have to do something about this. We can't have this, this antagonism go on.

18:24:40
A:
Uh, certainly it could explode in, into a full-fledged fight sometimes, some time, and that would be a terrible thing for either side, but it wasn't something that uh, uh, people had on their minds all the time. Unlike President Carter's daughter Amy, uh, I don't think daughters in the average home ask their parents about the nuclear threat that causes them sleepless nights.

18:25:10
A:
It was something that we were aware of, and we knew there were programs to deal with it. And uh, we knew there in some schools, there were practice, practices for what to do when if uh, something happened. But uh, I never experienced it myself. I don't think any of my children ever, ever did. We talk about it from time to time.

18:25:36
A:
I think there was a basic like for the Russian, Russian people, just as there is among Americans for Chinese. They were our copatriots during the war, and uh there are people who, who have had a hard life, and deserve better than they had under communism and probably deserve better than what they have right now under their new capitalism.

18:26:00
Um, so there was a um, not a great antagonism. If there was antagonism, it was with the Russian leaders, the Communist Party and the, the Russian communist leaders. But not for Russia as a whole, and there was no great day in and day out fear, at least not one that I saw.

Q:
And how do you feel about the work that's going on at Fernald right now?

18:26:24
A:
Well I, I think that it has to be done. We have, different rules and regulations that, then were in effect, 10 or 20, or fif-, certainly 50 years ago. And uh for better or worse, uh if the rules are on the books, uh they should be complied with.

18:26:43
A:
Um, from some of the little bit I've heard about what's being shipped offsite, I'd have to suspect that we're probably spending more money to ship low level materials off than we have to, but if that's what it takes in order to prove to everyone that a good job is being done, and everyone's satisfied when the work is finished that a good job was done, then okay, it's, it's tax money that will be spent,

18:27:08
A:
and in the end, it'll be all over, and hopefully everyone'll be satisfied, and we'll go on from there, and there'll be new problems that we face one way or another.

Q:
And let's talk a little bit about um, the years that were the uh, impetus for the cleanup in the mid '80s when there were dust collector releases and those types of things. Um can you tell, tell us a little bit about from your perspective, uh what happened in those years, and what the consequent years?

18:27:39
A:
Well, the things began I believe toward the end of uh, things, the troubles began toward the end of 1984. Uh, there was a dust collector in Plant 9 that uh, uh showed a, a loss according to a new detector that the Health and Safety vision, Health and Safety division was trying out.

18:28:04
A:
This was a detector that was placed on the stack sampler, and the detector would show the buildup of, of radiation from the dust collected on the filter, and uh, the uh industrial hygiene and radiation technician that uh, was principally pushing along this, this new, new thing, reported to production people that his detector was, which was still in the trial stages,

18:28:36
A:
was showing that there was a buildup of material. Uh, perhaps the dust collector should be inspected. The dust collector was inspected. Uh, nothing was found, that is it was inspection doors were opened up, and it was looked in to. No, no conditions were noted that would indicate any losses were occurring. Um, several days later, the technician reported to the production people the same thing.

18:29:05
A:
Uh, as it turned out, indeed there was a loss occurring, and uh you could not see the effects of that from the inspection doors that were open. You'd have had to actually physically gotten into the

collector and looked around in the back to see that indeed there was a bag that had, a dust collector bag, that had come loose and that was allowing dust to escape to the atmosphere.

18:29:31
A:
Part of which was being picked up by the detector. When it finally became clear then what had happened and was reported to the plant manager, the plant manager decided that under the newer DOE rules for reporting unusual occurrences, perhaps this fit their new definition.

18:29:53
A:
That here we had a loss, a new detector was telling us that a loss was occurring. We looked but didn't find it, finally after taking a closer look, actually getting in and removing some bags so, to make a full inspection, the loss could be seen. That, he thought that was unusual enough to report to the DOE manager at, at Oak Ridge.

18:30:18
A:
Um, they decided, DOE decided that that warranted a press release. And that press release then lead to everything that's happened since then. Uh, once the press got hold of it and of course the activists got hold of it, and the politicians came into it, and there were public meetings and politicians saw, uh our local politicians saw a great chance to get some publicity.

18:30:48
A:
They would da-, their representatives would dash into the public meeting, ask to speak first since they were so busy, uh swear that Congressman so-and-so or Senator so-and-so or was watching this closely and was ready with new legislation and he has your, your, your um, health and welfare at heart and then dash out again.

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19:01:22
Q:
Oh. Okay. Okay (laughs).

A:
If in our dosimetry work a badge, film badge came up with a higher dose reported for an individual than you would expect for that individual based on past history or where he worked, there was an investigation that was made by someone in the industrial hygiene and radiation department.

19:01:48
A:
And at one time back in the '50s, there was one person who showed up with uh what would have been much more a radiation exposure than you would expect for where he worked. And uh the hygienist who talked with him didn't get uh, didn't find out too much. The man, the employee wore his badge to to, work, he always wore it uh outside his clothing where badges were supposed to be worn.

19:02:22
A:
Uh, never put it in a desk drawer at work which of course you were never supposed to, always wear it. And at home he always put it in the same location so that he knew where to find it the next morning when he was hurrying off to work. The uh, for some reason technician asked, where do you place it? Thinking that maybe it was placed on a warm surface, and hot surfaces will cause a film darkening.

19:02:50
Uh, he said, well I put it on a piece of that very colorful plate we have, that my wife has. And we use it for decoration, and I put my badge there and it's there when I get up in the morning. Turns out that he was putting his badge on a piece of Fiestaware, um, colored orange, and the coloring of course is done with uranium oxide,

19:03:14
A:
Um, and the badge was getting a nice dose during the 16 hours it wasn't being worn or of course over the weekend. Uh, so that, that was once when a badge storage was a problem. I do recall someone else that um, one of, one of the people who worked only in the Ad Building whose badge was a little darker than others,

19:03:42
A:
uh, nothing to ever get worried about, but far more darkening than you would expect for the type of work he did. It turns out he was keeping his watch on a, or his badge on a container that had in it one or more watches that had radium dials, so the badge was being radiated there. And we did have badges that were left on dashboards, over the weekend in, in the summertime.

19:04:10
A:
And um, very often when that badge came in, it looked like a waffle, because of the plastic had melted and of course the film would be dark. Sometimes um, if the badge wasn't damaged, just the film would be darkened and you'd have to ask the individual where the badge was stored.

19:04:30
A:
And very likely was, end up find, finding out that it was left in the car, on the dashboard and over the weekend, out in the sun, and hot enough to, to affect the film. So there some interesting times, in trying to determine whether or not an exposure was legitimate or not or, or should be changed,

19:04:48
A:
according to where the person worked and what his exposure was in previous months or what others in his workgroup had for an exposure.

Q:
That's great. Fiestaware! Um, Let's go back a little bit to uh, your opinions on um, the uh, the attention that the media gave in the mid '80s to Fernald. And subsequently.

19:05:14
A:
Well I think the attention uh was probably deserved to a point, certainly a press release from an agency talking about uranium releases would be expected to, to cause some concern or at least an interest in an individual. Uh, things though were, were greatly exaggerated.

19:05:36
A:
We would spend uh, sometimes hours with a reporter or reporters and uh video cameramen, and find out that uh, just a few seconds were used, and uh not the best of the few seconds either, in, in, in the broadcast. Uh we had one local station that I believe uh, perhaps on Christmas Eve,

19:06:03
A:
came out with a special about Fernald in 1984, and started the program with the with the picture of an exploding atomic weapon. Uh of course that can't happen at Fernald, there were no weapons, or anything that would give a weapon-like detonation, but that was one way of getting the readers' attention.

19:06:25
A:
Uh, when one station was wrong in something they said, um, and it was pointed out to 'em, at the end of one newscast, they said something like, yesterday we reported such and such about Fernald. They called us and said that wasn't true. That was their total retraction. The politicians were no better. Uh, one of our senators um, at a, at a local hearing when told by a union representative

19:07:03
A:
that the union representative had information to show that we carried him in on a stretcher so he could clock in once when he was injured, when, when that information failed to materialized, we asked the senator spokesman if there would be some sort of word coming from the senator's office about that, and the spokesman says, you'll never hear anything like that come out of the senator's office.

19:07:32
A:
So there was some very selective information used and I think what happened at Fernald and perhaps at some of the other sites, atomic energy sites, is something that only a behavioral scientist would ever have an interest in. And I think it would make a good subject for a behavioral scientist to look into to see indeed what the problems really were, or how bad they really were,

19:07:59
A:
or might have been or might have become, and compare it then to things that were reported in the press and things that were spoken by some of our politicians and activists. I know at one time when I was a youngster I thought that I would like to be a journalist.

19:08:20
A:
After our experience at Fernald I'm ashamed of that feeling that I had, and I can see why journalists and politicians are on the citizens' list somewhere below prostitutes of people that they uh, they uh would like to emulate.

Q:
And once Fernald is torn down and all the buildings are gone, there's gonna be a considerable amount of ground left there, what would you like to see done with that property?

19:08:57
A:
Well I think most of the property that the government owns there could be sold and used for unrestricted use. I, I, I have no strong feelings about, about how it should be used. If everyone out there who lives around there wants to see it left as a park, that's fine. I like parks. It, it could be a park, with a chain, chain-link fence around the areas of course where there should be controlled access.

19:09:21
A:
Uh, if they wanted to turn it into an industrial park, that's fine. That's for the people who live out there in that area to decide. And uh, I have no strong feelings about it one way or the other. I do know that most of the land that the government owns there could be used for unrestricted use.

19:09:41
A:
Based on the contamination, low levels of contamination that are present, whether political or local pressures would allow that I don't know, and I have, I really have no strong feelings about it. If it's a park, fine. I'll probably visit it along with my grandchildren.

Q:
And one of the terms that's sort of been bandied about especially during while we've been doing this history project, is uh, Cold War Warriors, and that's the name that they're using for a lot of people that are like you. That had worked at Fernald especially during the Cold War years. How do you feel about being called the Cold War Warrior?

19:10:16
A:
I have no feelings one way or the other. I, I do know that we often name, uh give names to things, that in some cases that we have no connection with. So those who're calling us Cold War Warriors now uh, they're probably the newer breed. They can say it if they want to. We didn't consider ourselves warriors, we considered ourselves people working at a job that had to be done.

19:10:42
A:
And most of us I know were, were proud to be there doing it. And most of us now looking back, we're proud that we were there. So we wanna be called Warriors, that's fine. I won't use the term, but others can if they wish.

Q:
And how do you feel generally about um, the Fernald Living History Project, what you know about it?

19:11:04
A:
Uh, I think it's a good thing, and I hope it's thorough. Uh from some of the things you've said about not having a good source of information say about in-vivo counting, or the dosimetry system or in your own experience in how the plant worked. I'm aghast that there isn't available to you documentation that would explain all those things in the greatest of detail or certainly all the detail that you would want.

19:11:37
A:
They certainly, they were in existence at one time, I presume they're in the archives somewhere. Um, no one who wants that information should lack it at all. It should be there. It should be retrievable, if it's not retrievable, it should be made retrievable. Who, for those who need the information for your project, the Living History Project, or any other project.

19:12:01
A:
Um, certainly if I can do anything to add to the knowledge that, that you're looking for about some particular subject, I'd be happy to do so and I know others that I worked with would be happy to do so also.

Q:
Great, and is there uh, is there anything you'd like to add? Anything that we didn't cover that you'd like to cover?

19:12:26
A:
No I think uh, we certainly covered the things that come to mind while sitting here talking with you. Probably if when I'm shaving tomorrow I'll think of something, and (laughing) if I do I'll give you a call.

Q:
Well thank you very much for spending your time with us.

A:
You're welcome.

Q:
We really appreciate it. Uh, we're gonna get a little bit of what we call natural sound and that's just sort of room tone, so we need to have quiet on the set for just about 30 seconds. This is nat sound.

19:12:56
(Off camera: Rolling)