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FERNALD LIVING HISTORY PROJECT
Transcript

Name: Louis Levy
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Tape FLHP0209

17:01:00
Q:
Yup, first of all it you could just give us your name and spell it to make sure we have it right.

A:
Louis Levy. L-O-U-I-S middle initial M as in Mary, Levy L-E-V-Y.

Q:
Great, can you give us some background, sort of pre-Fernald? I know that you've had a couple of jobs in the '40s before you got to Fernald.

17:01:25
A:
Well, I graduated from college, Brooklyn College, in 1941 with a degree in chemistry and my very first job was making shoe polish. I worked in that job rather briefly and my next significant job was, I worked at the food research laboratories as an analytical chemist. And with the advent of the war I was able to get a job with the War Department.

17:02:05
A:
And I was a signal core inspector making signal equipment ah, the contractors made signal core equipment and the inspectors traveled all over the country inspecting the equipment. I spent a couple of years in the Army, the Infantry, 84th Infantry Division. After the war I went back to college for a year and got another degree in chemical engineering.

17:02:40
A:
And after I got my degree in chemical engineering from Brooklyn College Tech in 1947, I went to work for Monsanto Chemical in Dayton. The Dayton Project, that was the forerunner of the operation in Miamisburg, the Mound Laboratory. And I worked at those sites for about 3 years in polonium operations.

17:03:12
A:
Then I had, received an invitation to do teaching in South America as a visiting professor of chemical engineering. I did that for 2 years. When I came back from South America I took the job at Fernald in 1952.

Q:
And how did you hear about the job at Fernald?

17:03:35
A:
See I'm not real sure, perhaps it was through an advertisement in *Chemical Engineering News*. It may have been that.

Q:
So then, when you came here you got an interview right away or were they looking for chemical engineers at that time?

17:03:52
A:
Well, ah, in 1952 ah, Fernald was hiring and ah, I had the background that was suitable and I was selected for a position in the technical division and I was hired on as a section leader in the chemical department of the technical division in 1952.

17:04:20
Q:
Tell us a little bit about your very first impression of the site when you came here.

A:
Well, I was tremendously impressed by everything I saw here. The newness of the facility. The tremendous opportunity it presented. The challenges that you could see on all sides and it was excited, I was excited coming here and I enjoyed the work very much.

Q:
And who interviewed you and what was your first interview like?

17:05:02
A:
My first interview was with John Bratenstien. He was head of the chemical department. And it, it went very well and he offered me the position on the spot.

Q:
Now how much did you know about the process when you started working here?

A:
None. I didn't know much about the process. I was with, familiar with radioactive materials from my 3 years at the Mound Laboratory and its predecessor the Dayton Project. So I, I had that leg up compared to others.

17:05:45
Q:
Now I read on your pre-interview form that the Dayton Project was actually a part of the Manhattan Project, is that right?

A:
Yes.

Q:
Tell us a little bit about the Dayton Project and what exactly was going on and what year it was then.

17:05:58
A:
Well I started there in 1947 and ah; it may have been September of 1947 at that time, perhaps a month earlier. And the ah, the operation was ah, highly classified, everything was compartmentalized. The people who ah, worked there worked in only a limited part of the facility. And they weren't privileged to go else where on the site. And we weren't allowed to discuss our work.

17:06:45
A:
The part of the project that I was involved in was the ah, involved in the processing of irradiated slugs from the Hanford reactor and removing the outer coating and then dissolving the slugs and going through the various separation steps to separate polonium.

Q:
And polonium was used as a trigger?

17:07:20
A:
It was in the bomb project but I don't know very much about that aspect of nuclear operations.

Q:
And how much ah, contact did you have with the Atomic Energy Commission at the time that you worked on the Dayton Project?

A:
Not very much, ah, I was in production operations and at my level ah; we didn't have much contact with the commission. I might say this about the Dayton Project ah, it was a very crude operation and ah, that's, that's one of the reasons the facility at Miamisburg was built. To take the state of the knowledge and make a much better operation and to provide the protection that the personnel needed.

17:08:21
A:
Our exposure there were rather significant I think and ah, in the Dayton Project under the pressure of production we did the best we could with what we had but it was clear that we had to have a much better facility. And Miamisburg was what resulted.

17:08:47
Q:
So the Mound Plant wasn't even there yet. Were exactly did you work when you worked on the Dayton Project?

A:
I worked in the Ernie Mead Playhouse in Oakwood and ah, and they called that room the malight room where the slugs were processed. We dissolved the aluminum jackets from the slugs and then we

dissolved the, the slugs themselves in _____ nitric acid, hydrochloric acid and ah, and then we ah, filtered the material and then there were some other steps which I don't really remember too well at this point.

17:09:42
Q:
And how many other people worked with you on the Dayton Project in your location?

A:
Oh, perhaps a 100 or so, I'm not sure whether that's an accurate number, but I would guess around 100.

Q:
Wow, that's at Oakwood.

A:
In Oakwood, right.

17:10:01
Q:
I wonder how many people in Oakwood know about that?

A:
Well they sure know about it now (chuckles) and ah, they knew about it to the extent that they didn't like the fume releases that came from the building. Oakwood was a very ah, ah, upgrade residential area and ah, the fume releases from the plant was something that they complained about. And ah, interesting, at Fernald, the fume releases from this plant is something people complained about, so in a sense, nothing has changed.

17:10:50
Q:
What types of fumes were being released in ah, Oakwood?

A:
Ah, nitric acid fumes. We had a denitration operation there and ah, so those are the fumes that they would see. Ah, of course there were other fumes released from the plant but they were not visible.

Q:
Wow, so what was your first job at Fernald and what were your responsibilities?

17:11:21
A:
Well I said, in my first job at Fernald was a sectional leader in the chemical department. And while I was waiting for my clearance I worked in the laboratory; and I think my first significant assignment was to come up with a process that would remove the chlorides from raffinates.

17:11:45
A:
And I did the initial work on that project ah, with an ozone generator and I was able to oxide the chlorides with the ozone generator. Sparge them out of the raffinate and that process incidentally using ozone was actually put into production. So when the, in the refinery itself the Plant 3 component of it, we had ozone generators and it stemmed from the work that I did in the laboratory still awaiting my clearance.

17:12:33
A:
And the reason we had to remove the chlorides, the chlorides were extremely corrosive to the raffinate evaporators. And before the ozone generators were put in place we were corroding the _____ on the raffinate evaporators every six or eight weeks. And we had to replace them, and so the corrosion was server.

17:13:05
A:
And that's an example of a process that's not fully developed. We knew how to make raffinate, we knew how to treat the raffinate and ah, so that it wouldn't corrode the equipment. So a person like myself awaiting clearance was assigned to do the job and that was my first assignment in the chemical department.

17:13:35
Q:
So, you're talking about (Cameraman: can we pause) sure.

Q:
Oh yeah, hang on, we're not rolling yet. Okay.

17:13:49
A:
The interesting thing about doing work for the plant before I was cleared reminds me of ah, some of the material we prepared while uncleared, was later classified (laughs). So that's, that's a question, how can a uncleared person produce a classified report (laughing)?

Q:
While we're on the subject of Q clearances, can you tell us a little bit about how you get a Q clearance? How do you, what was your personal ah, experience of getting a Q clearance?

17:14:22
A:
Well, you have to remember that I had ah, equivalent of a Q clearance when I worked at Miamisburg and the Oakwood facility at the Ernie Mead Playhouse so, on the polonium project. Ah, that was ah, at least as high a clearance as a Q so it might, the investigations were already in place. And I didn't go anywhere except to South America for 2 years. In a sense that in one place, I was at the university teaching chemical engineering, so ah my background was easy to check on.

17:15:11
Q:
So did they ah, when you got your original clearances, did they talk to friends and family and did they go pretty far back in time?

A:
Oh, I, I presume they did, yeah, I never had any feedback from anybody that I can recall at this moment. But I presume they went back to the friends and family.

17:15:38
Q:
Now the process was new, the plant was new um; they built it in quite a hurry. They were pretty much still testing out a lot of the processes, when you got here.

A:
Oh absolutely, that's the reason the Pilot Plant was the first plant built. The Pilot Plant was the first plant built before some of the (clears throat) technology hadn't been developed adequately so we did a lot of work on solving extraction in the Pilot Plant. And, in addition to solving extraction, course we had the forerunner operation of digestion, solving extraction.

17:16:25
A:
Ah, we had the re-melt operation was there, we had the reduction operation we had the 36/20 unit, which was the forerunner of ah, Plant ah, 4. But we reduced the material; well we made green salt. So the Pilot Plant played a very important and very significant role in ah, producing ah, process information that we needed for the main plant.

17:17:02
A:
And even then unfortunately it wasn't near enough, because the plant went into operation without many of the details that we needed fully resolved. So we were always improving the plant, the processes.

Q:
What were some of the, the problems real early on with the process?

17:17:30
A:
The ah, starting out with the refinery, well I have to start back ah, before the Refinery I have to start back in Plant 1 where the material came in and was sampled. Ah, we had ah, the silos (turns around) well; I can't see them from here. We had silos in Plant 1 that was suppose to hold the feed materials coming into the Refinery and the materials were also to be feed from Plant 1 to the Refinery and the conveyers, the conveyers never worked.

17:18:15
A:
So, ah, that whole conveying system was abandoned and instead the materials were feed into the plant from drums. And ah, we had to ah, do all kinds of work on the conveying system to feed the drums

containing the ore into the Refinery. We had all kinds of problems with the ah, the drums being deteriorated, material being wet, the drums containing foreign matter. When the drums would dump at the bottom of the conveyers would lift the materials to the top of the Refinery ah, the ah, boot to the elevator would frequently become blocked.

17:19:18
A:
We had to send crews and materials in there to clean it out. It's a very unpleasant job. The dust collection, when we dumped the drums was horrible. It was inadequate to the job that we had at the time, so we had to make many improvements.

17:19:37
A:
We ah, we got the material up into the ah, tanks that held the feed materials before they went into the digesters many if not all of the automatic systems that we had in place didn't work properly. We had to ah, eliminate many of the ah, features that were in there. The conveyers conveying the materials to the digesters were not dust type.

17:20:18
A:
They leaked, so we had dust just about anywhere and containing it was a challenge. And dumping the material into the, from the ah, silos or the hold tanks into the digesters was another problem. The ah, tanks didn't have an adequate ventilation system to take care of the fumes.

17:20:54
A:
So we had frequent fume releases. Oftentimes the tanks belched. Ah, the lines got plugged; we had to send people behind the concrete barriers to open up the lines. It was ah, a difficult operation to say the least. And ah, nevertheless ah, we ah, modified the dust collection systems. We increased the ventilation. We added ah, monitors to the digestion tanks to tell what kind of draft we had on a tank so we could dump the feed in at a rate such as not to overpower the existing ventilation.

17:21:50
A:
And that was a project that I was ah, responsible for putting _____ on all the digestion tanks. And ah, this could take many hours, and we're still at the refinery digestion area so ah, so maybe you'd like to ask something else.

17:22:10
Q:
So there were a lot of problems at the plant when you first started out (laughing).

17:22:19
A:
Well, that's digestion there, but jumping from one end of the project to the other ah, when I was still in the chemical department ah, I was given an assignment to do something about the ah, grinder sludge

that the Plant 6 machining area was producing. It was very pyrophoric and, uh, no sooner did we, uh, take the material out of the machines and put in the drum, the drums would catch on fire.

17:22:48
A:
And uh, and my assignment was to do something about that highly reactive grinder sludge. And uh, I tried many different things but what I found is that since the uranium is so highly reactive, and uh, that I would ah, use that reactivity. And I improvised a sludge reactor on the pad of Plant 6 where by, where by we took the sludge, dumped it into a tank, heated it up, and allowed the reaction to go forward.

17:23:28
A:
And still allow the hydrogen gas that was produced to be vented to the atmosphere. And by, uh, using that technology we're able to come with a process and a procedure where by they, the people in Plant 6 could take the react, reactive grinder sludge and pacidate it. And then it could be drummed and shipped to Plant 8 where it would then be burned.

Q:
That's ingenious.

17:24:01
A:
(Laughs) It was something ah; the Plant 6 machining people liked it because it worked.

Q:
That's terrific. Wow. So you had to do a lot of ah, sort of thinking outside your normal job to make the plant work?

17:24:22
A:
Everybody in the plant had opportunities to do just the sort of thing I'm talking about. And most of the people did. Uh, the hourly people had suggestions, the foreman had suggestion, the maintenance people had suggestions, and uh, the technology people had suggestions. And uh, we improvised a great deal to make the plant work.

17:24:58
A:
And uh, and there were process improvements just every day being made in every plant, uh, in every process. There were no end to problems. And, uh, in a sense it was a young chemical engineer's dream to be put into a plant that had problems to be solved. And it was uh; it was in a sense rather straightforward to do them.

17:25:33
A:
And we had so many people coming up with ideas and the combination of talents that we had in production, in engineering, in technical. We made the process improvements. Every day, I think,

every year, in every plant, and all the people were very, very helpful.
Q: So what was the typical day like?

17:26:10
A:
Well, it depends what plant you're talking about (laughing). The uh, you remember my first production plant assignment was in Plant 9 where I was a thorium plant super at. The, the first order of business for me was to find out what the plant had produced in the previous twenty-four hours. And uh, and I was called by my supervisor, Sam Audia, just about nine o'clock every morning asking me what the plant had produced.

17:26:56
A:
And frequently I told him, "I don't know. I'm out in the plant solving a problem." (Laughs) Because no sooner did I get in there was a problem. Here, there, everywhere. But that didn't satisfy him. He still wanted to know what the plant produced. And so I had to change my pattern. Instead of solving problems my, the first thing in the morning, I made a point of finding out what the plant had produced.

17:27:29
A:
And in reality if the problem had waited until I come, came in, it could wait another hour. (Laughs) I can still find out what the plant had produced. But I was more interested in the technology rather than in the production numbers. He in turn had to give production numbers to someone else. But in a, in a typical day, ah, there were uh, there were fume releases, there were fires, there were explosions, uh, and there were process difficulties.

17:28:13
A:
We had all kinds of minor work orders that had to be processed. The maintenance people wanted to get in to fix the plant. They had to ah, ah huge backlog of minor work orders. The uh production foremen were pressed to keep operation going until the modifications or improvements or the breakdowns that were experienced, that had been experienced could be fixed. It's a matter of priorities.

17:28:51
A:
So the typical day was one of ah, meetings, conferences, ah, visiting the plant areas, seeing what was going on, making recommendations, approving recommendations. And I must say that the, my foreman, in particular Roy Bravad, who has since passed away, I ah, he had no end of ideas on how to improve the process. He wasn't a chemical engineer but he had the ideas.

17:29:33
A:
And it was up to me to polish them or get them prepared in such a manner that they could be sent to others to do the necessary work that needed to be done to make his ideas work. And they were always by and large very good. He, he was responsible for many, many improvements in the plant. And many of the production achievements in the plant. He.

Q:
We're gonna pause right there just for a second cause I have to change tapes.

FLHP0210

18:01:02
A:
Business

Q:
Great hang on just a sec.
18:01:06
A:
If you see me shivering you better (laughs).

(Off camera personnel offering jacket).

A:
That's all right. It's, it's-

Q:
Um, tell me a little bit about uh, your work in Plant 9 when you were plant superintendent of the special products plant. What was going on in Plant 9 at the time and what were your responsibilities?

18:01:30
A:
Well, I described the Plant 9 was originally a thorium plant. And uh, the name "special products" is the name I gave to it when the thorium operation ceased in Plant 9. So, uh, and the idea was, uh to introduce uh, new operations, new processes, in the plant area that were uh, not appropriate for the Pilot Plant. And uh, I believe uh, we very early on got into enriched operations.

18:02:20
A:
And we, uh, thought we could do enriched operations in Plant 9 because it was a more highly controlled environment. And so uh, we did enriched operations in the plant and uh, we were very concerned about nuclear safety. And it was felt that the uh, challenges that nuclear safety presented to production operations in a production plant could best satisfied in a plant like Plant 9.

18:02:59
A:
And uh, we did uh, enriched material; we made uh, unique shapes there. We made washers. I showed you a sketch where we had to make uh, washers out uh, out of uranium. Uh, we installed a punch press in the plant and the washers were punched out. Uh, the die sets that we used for making the washers were prepared in the uh, in Plant 6 uh, the um, the special area of Plant 6 where they had the craftsmen that could make uh, die sets.

18:03:49
A:
And uh, we made them in Plant 9. Uh, we did uh, reduction operations there. We did re-melt operations. And of course, uh, I, I, I uh, really and we did some casting uh, operation uh, in the empty _____ furnaces that were put in there. I, I uh, really didn't touch on some of the very significant thorium operations that we had in Plant 9 before it became uh, special products plant.

18:04:42
A:
But uh, in ah, in ah, in that, in what area of the plant we uh, took thorium nitrate, precipitated it, dissolved the thorium nitrate crystals, uh, precipitated the thorium as an oxalate, dried the material. Well, uh we filtered it, then dried the material, then calcimined it to thorium oxide. Which was then sent to Plant 4 where uh, it was converted to uh, white salt, thorium tetrafluoride.

18:05:26
A:
And then that came back into the plant for the rest of the thorium operation. But I, I think I'll just stop there with that description of the thorium operation.

18:05:39
Q:
So thorium was used in the same way uranium was? Was it making rods for reactors or was it for something else?

A:
Well, the, the thorium, the initial thorium orders for the, for the uh, naval reactors program. And we made thorium slugs. And what happened to the thorium slugs after they left Fernald, I'm not particularly knowledgeable.

18:06:10
Q:
Wow. So why did they stop with the thorium? They really kind o' stopped processing the thorium after a while. Why did they stop?

A:
Well, I, I didn't describe you know, the whole thorium process, but since you want to get back on that subject, when the thorium uh, white salt, thorium tetrafluoride uh, came back, we reduced the uh, thorium to a, a derby. But it wasn't a thor-, pure thorium derby; it was a derby that contained zinc. Because one of the ingredients used in the uh, induction reaction was zinc-chloride.

18:06:56
A:
And uh, the zinc-chloride was reduced with finely divided calcium, and, and the induction reaction produced a thorium-zinc derby. That thorium-zinc derby uh, was put into retorts, and the zinc was distilled out o' the derby. And the zinc was col-, collected in condensers. And that was a very crude operation when we made the th-, thorium-zinc derbies.

18:07:36
A:
But any event, we did that operation. We produced the thorium derbies that would de-zinc, and then those thorium derbies were melted to make thorium ingots, which were then rolled into rods, off site I might add. Then the rods were brought back here and machined into slugs. And the uh, the melting operation that we had in Plant 9 for the thorium was not adequate.

18:08:17
A:
And we put in an arc-melt operation, and, which made a better metal. And uh, in order to do arc melting, we had to cut up the thorium derbies up into pieces, weld 'em together by hand, and in a inert atmosphere make stinger rods. And the stinger rods were then melted in an inert atmosphere in a, in a furnace called an arc-melt furnace. And uh, those furnaces had uh, their problems.

18:08:59
A:
We had fires and explosions. And we also had uh, quite a bit of uh; residue that was produced on derby, on the ingots themselves, which had to be machined off before those ingots could be processed. And that was a uh, an operation which resulted in quite a bit of exposure to personnel.

18:09:36
Q:
Now with the thorium project um, (pause) I guess what I wanna know is who decided to try thorium, or was that a special project that came from the AEC for Fernald to do?

A:
Oh, yeah, sure. That, that was a uh, the AEC had a, a mission to operate this site produce the uranium, and part, part o' that mission was to produce the thorium for the Naval reactors program. And thorium was produced at this site in the Pilot Plant and elsewhere for other programs, that I'm not too familiar with, but I knew of them.

18:10:29
Q:
So is thorium more dangerous than uranium?

A:
Well, thorium is a totally different material than uranium. It's much more pyrophoric, at least in my experience. And it's uh, much more hazardous from a inhalation standpoint. It's a bone-seeker, and therefore inhaling thorium dust was a hazard that had to be contended with. And uh, we didn't always do that successfully.

18:11:17
Q:
Huh. I haven't ever talked with anybody that knew as much about the thorium project as you had (laughs). That's great. Um, tell us a little bit about Plants 2 and 3. When you were working as a Refinery superintendent, what went on in those plants, and uh?

18:11:42
A:
Well, I described in a earlier part of the interview some of it. That the conveying system from Plant 1, the automatic system, had to be abandoned, and we fed the refinery with drum material. So that led to a major project to put in those big, long conveyors that we had at the uh, at that end of the refinery, the head end o' the refinery.

18:12:15
A:
And uh, and, and I told you about, that the, it was a high-tonnage operation. And people took the lids off and they were dumping, during a high-production days, the material into the boot of the bucket elevator just as fast as they could. About a drum every five minutes just thereabouts. And, then the elevators carried the material to the top of the Refinery.

18:13:01
A:
And then I said into the uh, hoppers, and, and other conveyors. There were hop-, I don't remember now as I speak. Just a sequence, but there were hoppers, and conveyors, and hoppers. And finally it would come out o' the uh, final weigh hopper. And as I, and as I told ya earlier, it was thought that we would weigh the material out o' that weigh hopper into the process.

18:13:35
A:
But that proved to be a very slow process, and finally we went to the point where we were feeding the material directly to the digesters. I mentioned earlier that frequently the uh, the conveyors uh, would feed the material faster than the chutes feeding the digester could take 'em away, so we frequently had the chutes that fed the digesters clogged.

18:14:07
A:
And I mentioned earlier, people had to go in there behind the barricades and unplug those chutes. It was dumped into nitric acid. And then the material was digested. From there it went to a hold tank where we adjusted the, the material. And, from the uh, feed hold tank it went to solvent extraction. To a solvent extraction columns.

18:14:47
A:
And it went into the uh, it went into the solvent extraction about 400 grams per liter of uranium as I recall. It produced an okay liquor coming out of the extraction columns at about a hundred grams per liter. From there it went into OK liquor hold tanks, we had about 4 of them. I think three 25,000-gallon tanks and one 50,000-gallon tank.

18:15:22
A:
And from there it went into the evaporator at the top o' the Refinery, but that's the Plant 3 part of it. Where it was evaporated from perhaps 100 grams per liter of uranium down to about 400 grams. And then it went into the uh, um, boil down and sparge tanks, and we boiled it, we concentrated that

material from about 400 grams per liter to about 1200 grams per liter.

18:15:59
A:
And then from there we dropped the uranyl nitrate, which is at around 1200 grams per liter, which is roughly 10 pounds uranium per gallon, into the denitration pots. And then we uh, those were gas-fired pots. We heated the pots up until the fumes were released, the material became denitrated and then finally became uranium oxide, orange oxide and it was gulped out o' the pots.

18:16:41
A:
And went through a conveying system through a crusher, and into what we call the uh, a hopper for uh, orange oxide. Orange oxide hopper. From there it went to Plant 4. So that's where my responsibility ended.

18:7:01
Q:
So the material. Sure. No problem.

(Cameraman makes adjustment to interviewee's microphone, tape stops and clock skips 2 minutes, 25 seconds)

18:19:38
Q:
Um, tell me about working in the Advanced Planning Department. What exactly was that all about?

18:19:51
A:
Well, the idea was to plan for the site, not for the month or the year ahead, but long-range. And uh, the managers of the plant and the AEC felt it would be a good idea if we were looking to the possibilities uh, for the site X years in the future. And to do this, we had to know what was going on in the rest of the industry.

18:20:43
A:
And uh, so my job as uh, as manager of Advance Planning, was first to educate myself, to the whole idea of advanced planning, and, and then recruit a, a staff of people from the workers on the site. And then to go out and make contacts within the AEC family, in various parts o' the country.

18:21:20
A:
And then beyond the AEC family to other government agencies, in various parts of the country, to see how the facilities we had here could fit in with the needs, unmet needs that people might have, now or in the future. And it turns out that we were able to do this in a very significant way. And, the uh, the uh, people at the other sites were quite happy to work with us and to educate us, as to what their needs might be.
18:22:15

A:
And, in this regard, it was necessary to do a good deal of travelling and to meet with people at these other sites. Not only our regular customers, Savannah River and Hanford, but elsewhere. And uh, I went to Lawrence Livermore Lab, I went to Sandia, and I went to some o' the military facilities where they were looking into how we could support their needs.

18:23:00
A:
So uh, that's uh, one o' the things we had to do. The idea also was to, to take a look at the facilities uh, because we not only had to come up with the programs, we also had to come up with the budgets that would satisfy those programs. And I think that when I first got into the Advanced Planning Department as head of it, the AEC had a program that they called um, PPB, Planning Programming and Budgeting.

18:23:49
A:
So it meant to plan ahead, come up with a program that fits in with those plans, the budget the funds that you'll need, so you can put your plan into effect, and accomplish your program. So that's really was the job of the Advanced Planning Department.

18:24:23
Q:
And that was from 1968 to 1980, so it was a significant time in your tenure here that you were in Advanced Planning Department.

A:
Yes. Yes.

Q:
What were some of the plans for Fernald? Uh, some of the long-ranged plans for Fernald?

A:
Well, one of the things uh, that was occurring during that timeframe, was the need to uh, recognize that the AEC had more facilities, physical facilities, than they had work to do. So we entered into a very competitive phase with the Mallinckrodt Chemical Works, which was, and Mallinckrodt was the operator of the Weldon Spring Refinery. And that was a newer facility compared to Fernald.

18:25:38
A:
But one thing it did not have, it didn't have what I like to call integration. It was not a fully integrated plant. And one o' the things we tried to do in Advanced Planning, and one o' the things the AEC agreed here at this site we should try to do, was to integrate our facility to the extent that we knew how to do it.

18:26:15

A:
And to that end, I must say that, we had a deputy at a, deputy manager of the AEC, Bill Awana, who was extremely visionary, in helpfulness regard. He worked with me, at every step o' the way; he was very supportive in what we were trying to do. And he used his good offices as a deputy manager of the AEC to open the doors for me, at many locations so that I could proceed to do the kind o' work that we needed to do.

18:27:05
A:
But having said that, I wanna go back to the Weldon Spring Refinery. We were in competition with that facility. And the AEC decided that they would go with the facility that would produce the product for the lowest cost. So cost-reduction was a very big item for all concerned, and it was a very big item in terms of planning. Uh, how could we reduce costs?

18:27:44
A:
So all the plants, and all the departments, and all the divisions really, were under great pressure to come up with plans and programs to reduce costs. And some o' those plans and programs involved building new facilities, or adding facilities. And it was a, part of the job we started in Plant 9, was to try and close the loop on integration of a facility.

18:28:24
A:
So that whatever we produced, as a bi-product or a residue, we could handle. We didn't have all the facilities needed to do that. And I wanna take a moment here to give credit to one o' the unsung heroes in my book of Fernald, Joe Carvetti. He was a much-maligned person, but he was an unsung hero in many respects. Every rotten, nasty job that we had to do, (chuckling) it was given to him.

18:29:13
A:
And Joe relished in that work. He loved it. I was not at all in support of some of his improvisations, as a matter of fact, I condemned 'em. But in all fairness to him, he was trying to do a very difficult job, and didn't have the facilities he needed to do it. So, yes, a lot o' the people that worked with him got lots of exposures which they wouldn't have gotten, had we had the adequate facilities to do the job that he was trying to do.

18:30:06
A:
And I think this is significant for me because wherever he went he would have a great big pile of debris and crud and what not for which we had not way of getting rid of. And he came up with handcrafted ways that would; you'd have to admire inspite of their crudity. So ah, he, he did a lot in that regard. I don't want to talk about the downside that's, that's something else.

Q:
And he had really big feet.

A:

Little better now.

Q:
Yeah, the sun came out a little bit, so. Okay. Another significant person.

18:31:07
A:
Another significant person at the Plant was Joe Beckelheimer. I mentioned earlier Roy _____, who was my area foreman in Plant 9.

Q:
Staff can you spot that for me. That's kind of.

A:
Who was responsible for many, many of the innovations and achievements of the plant. Terrific guy Roy _____. And I mentioned ah, ah, Joe Carvetti. And before I leave Joe Carvetti, ah I might say, one of the reasons I know a lot about the work that Joe did, Cliff Chapman assigned me one time to work with Joe Carvetti every where he went and to reduce his improvised processes.

18:32:05
A:
(Laughing) To writing so I could document them. And, and Joe was very cooperative because here was somebody at a high level in the organization, Cliff Chapman director of manufacturing, assigning me, and at that time I was a senior staff engineer reporting directly to Cliff Chapman. And I was as-, assigned to follow him around and reduce his processes to writing and so that we had a procedure in place.

18:32:48
A:
So that we knew exactly how he did what he did and where he did it. And ah,

Q:
We have to change tapes.

Tape FLHP0211

19:01:13
Q:
All right, okay.

A:
_____ one of the jobs he had was to feed the thorium furnace in Plant 6 and he came up with the idea of feeding very hazardous, pyrophoric materials into that furnace by putting them into ice cream containers and pitching them into the furnace (laughing) a container at a time.
19:01:41

A:
But at least, some people might dispute what I'm saying, but we had pyrophoric materials on this site and the idea was if they're gonna burn, ah, keep them in small quantities and put them into a furnace so they could be oxidized. And we needed to do that with the uranium materials as well incidentally. We had to oxidize them so that when they were, these materials were feed into the processes else where in the site particularly in the refinery we would have that un-reacted uranium going through the digesters.

19:02:27
A:
So it was essential that they were fully oxidized. And ah, the other person that I wanted to mention ah, that the site needs to be grateful to is the area foreman I had in Plant 2/3, Joe Beckelheimer. Um, many if not all of the production records that the ah, plant refinery was able to achieve ah, wouldn't have been achieved without the driving force of Joe Beckelheimer.

19:03:07
A:
He was a, a highly production oriented person. He knew how to get the work out of the men. He knew how to bring to my attention problems that needed resolution and he was highly effective. And he was, he too was a sacrificing kind of person. We had very frequent fume releases in the refinery and the digestion area and in the denitration area.

19:03:58
A:
I remember him running to get on the emergency evacuation fans in the Plant 3 area, risking his life, which I didn't approve of because he would do that without even having a gas mask on, into the hazardous area and get those fans on. So, ah, but he, he was very highly production-oriented and he was very effective.

19:04:35
A:
And in the Refinery he told the story about the operators. He had been an operator once and this is ah, typical of, of the man. He said a good production operator doesn't need a lot of supervision but what when he needs it, he needs it in a big hurry. What that means, you haven't got time to go back to the drawing board or to the textbook, you have to give him an answer now.

19:05:18
A:
And why now, 'cause he realizes that he had confronted something or did something that was beyond his skill, beyond his knowledge and needed the input of someone else. So, that's one of the reasons why all the plant superintendents were chemical engineers, or metallurgical engineers or mechanical engineers or highly trained technical people.

19:05:48
A:
So the that the line supervision who did not have a technical background by in large, could go to somebody to get them out of trouble when they got into trouble and to get them out of trouble in a big hurry. So you're, this reminds me of an incident at the plant that occurred when the plant was shut

down because we had a strike.

19:06:19
A:
And I was then Refinery Superintendent. And at that time, since we figured the plant was being shut down for a strike, we would have the best inventory ever. Because the, we used to take ah, in processing inventory while the plant was running, but now with everything was shut down and everything in a tank, why everything could be measured and weighed.

19:06:52
A:
We would have the best inventory. It turned out that we had one of the worst. We had a huge amount of material, enriched material mind you, that was unaccounted for. And the people in production control and the people in accountability checked their numbers, and checked their measurements, and checked their calculations over and over again.

19:07:26
A:
They said the material is still unaccounted for. At that time I suppose the plant manager got a hold of Cliff Chapman and said "you get a hold of Lou Levy and make him straighten this out." And Cliff Chapman came to me and Cliff Chapman by the way, just passed away. He's a person I loved, but when he needed to, he could be hard as nails.

19:07:55
A:
And he came to me in my office, and he said, "you find that material." And I said, "Cliff, how can I find the material if all the accountants and all the accountability people and all the measurers have checked and rechecked their measurements?" He says, "you find it. That's your assignment."

19:08:16
A:
And he walked out of the office. Well, fortunately as I said the, and he was mad. And I was at the receiving end. I had the opportunity to talk to my foremen, one by one. How did they shut the plant down and what did they do. And I sat down and took meticulously took notes.

19:08:45
A:
Of what they did the night they shut, 'cause where could the material have gone. And finally a foreman who shall be nameless, came to me and said, when we dropped the concentrated material down from the boil down and sparge tanks, remember this is material that's 400 grams per liter, in the boil down tanks and the sparge tanks 1200 grams per liter.

19:09:21
A:
I might have gotten those names inversed, but the concentrations are correct at 1200 grams per liter, we dropped those materials into the OK liquor feed tanks at 100 grams per litter. And as he said that I could just see all the material precipitating or crystallizing in that tank. Because hot material was going

in at 1,200 grams per liter into a cold tank of liquid at 100 grams per liter. The concentration ingradiant was enormous and where could the material go.

19:10:04
A:
It just crystallized and I didn't have to go out and look at the tank and I didn't have to measure the, there it was, in my mind I could see it. But none of the foremen who, and none of the accountability, and none of the people who had been involved in the operation could see it.

19:10:28
A:
But my training ah, immediately came into plan. I got a hold of Joe Beckelheimer, we found the uranium and he said how do you know? You take that OK liquor tank just blow air through it for several hours through all the inlet lines; the crystals are there. I'm positive.

19:10:56
A:
And after we, re-suspended the crystals and they re-dissolved in dilute liquor they took their measurements, there was the uranium that was unaccounted for. So, ah, I got off the carpet. Of course it precipitated in a tank on my watch. So I'm responsible, it was my responsibility.

Q:
Why was it so important to keep good accountability of that, of that material?

19:11:28
A:
Well, we always had to keep good accountability of uranium, but this was enriched uranium. You couldn't have a large amount of enriched uranium laying some where that you didn't know where it was. So we had to find it.

Q:
How valuable was that material to, I mean how valuable is uranium or was uranium?

19:11:50
A:
I, I gave you a chart in there that ah, in Plant 9 in order to get the people to understand how valuable the uranium was, one of the workers Howard Foster, I hope he's alive. If he's not alive I hope his family hears this, he came up with the idea that we ought to tell the workers how valuable the uranium is and put it into tangible terms.

19:12:12
A:
So, we got the idea of a converting the value of uranium into the cost of a car, a house, something that they could realize. And we made a big chart and posted it on the bulletin board in Plant 9 to show how value, valuable a derby was, an ingot and a slug and so forth.

19:12:41

Q:
And we'll shoot that later on, but the one that impressed me was that one derby was good for a 4-year education.

A:
(Laughing) I don't remember the values but ah.

Q:
That's what I remembered, it was 6,000 and some dollars which back then was good for 4 years at a college (chuckles).

19:12:55
A:
I can think of one other anecdote. Ah, and I'll try to make it short, I hope you're enjoying it (points up). But ah, ah, while I was a staff engineer working for Cliff Chapman, they had another period where uranium ah, accountability was such that ah, we had ah, material unaccounted for in Plant 8.

19:13:33
A:
A rather significant amount and I wasn't in direct production operation at the time, but what I did was simple apply operations analysis techniques. I interviewed all the supervisors and foreman and some of the workers and looked at the process. And I made a meticulous calculation of what ur-, uranium outflow should be of the residue going out to the pit.

19:14:10
A:
I did it batch by batch; day by day; month by month. And I calculated that the uranium should be in the pits. Well then I was asked how come the accountability people didn't pick this up? And then I checked into the process. Well, we didn't have enough tanks in Plant 8 to do the accountability function properly.

19:14:45
A:
In Plant 2 when I, we had ah, a proper tankage system where by you would put the material in a tank, measure the volume, take a sample, and after the results were back you could, if the material was in specification we could pump it to the pit. Well in a system like that you have to have at least three tanks. One being filled, one being analyzed, uh, material in a laboratory, and one being pumped to the pit.

19:15:24
A:
Ya had to have at least three pits. Well the effluent system from Plant 8 only had two. So I don't have to tell you where the problem was. Material was being pumped before the results were in and we just didn't have, have the results. But I, I figured it out and (laughs) that the process equipment wasn't adequate to the need. And perhaps some of the people felt well, uh, they could get by with what they were doing.
19:16:04

A:
Well the numbers didn't add up and I proved it. So that's operations analysis uh. And I guess maybe uh, uh, when I was staff engineer for Cliff Chapman maybe that's why he gave that job I'd, after being a staff engineer I was promoted to refinery superintendent. Uh, why he felt I would find it. But I uh, and there's uh, one other incident that I can think of that is perhaps humorous as well as interesting.

19:16:48
A:
A piece of uranium, and here I don't remember all the details well as I speak, but a piece of uranium was found off site in Maysville, Kentucky. How did it get off site or why did it get off site, I don't know. But while I was staff engineer I was assigned the job of finding out where it came from and to prove where it came from (wipes nose).

19:17:23
A:
And it was just a little small piece of uranium and it, it; it clearly looked like a bar, a piece of bar end from Plant 6. But why, it could have come from some other plant elsewhere in the country. And to make a long story short cause I don't remember all the details, but I analyzed that uranium did, uh, I had to have analyzed, did the spectrochemical analysis on it.

19:18:01
A:
And then looked up all the spectrochemical records of all the uranium that we had ever produced. And this is before we had computers to do this, and matched the spectrochemical composition of that bar of uranium with an ingot that was produced in Plant 6 and so we could identify it uh, with a particular ingot, produced at a particular time, at a particular place. So, so we did do that.

Q:
That's amazing.

19:18:36
A:
I was amazed that, that we could do it (laughs).

Q:
That's incredible.

19:18:41
A:
But in, in order to do this I had a lot of help in, in the spectrochemical department and the accountability department (wipes nose).

Q:
Was Cecil Duff over there then?

19:18:51

A:
Yes.

Q:
We interviewed him (laughs), he's a good guy.

19:18:54
A:
Yes, ya, ya, and, and he was very helpful.

Q:
Let's talk a little bit about the K-65 silos. You gave a little sort of an anecdote about the uh, waste pits and what were your um, responsibilities when it came to sampling those silos and what was going on with those?

19:19:09
A:
Well, before I became uh, involved in direct production while I was still a member of the technical division, uh the chemical department, uh my assignment was to uh, conduct, uh, the first two major production campaigns in the refinery. Uh, several hundred tons, in two campaigns and the idea was to measure the uh, Q11 material going into the refinery and then measure the K-65 residue coming out of the refinery.

19:19:57
A:
And the reason we had to do that is the K-65 was then the prop-, property of African Metals. And African Metals was interested in the radium and the _____ for it's economic value. And uh, my assignment was to uh, come up with a sampling plan for the K-65 and a sampling point for the K-65. So, uh, jumping from one end of the process to the other the Q11 went into the head end of the refinery.

19:20:39
A:
And it, it was all weighed. When the K-65 was produced as residue going through the Hot Raffinate Building, the K-65 that came off of Oliver filters went into tanks in the Hot Raf-, Raffinate Building that were on uh, load cells so we could weigh the material. So we knew what was in there, we knew the weight of it. What we needed to do was have an, an analysis of the material.

19:21:17
A:
And sampling was not simply a matter of just reaching in and taking a dip sample. The K-65 was a slurry, so we had to suspend the material and there was a powerful agitator in the tank and one could suspend the material. Well, there was a great question as where the sampling point should be. And one of the things I did is I installed a recycle loop coming out of the bottom of the tank and going back into the tank.

19:21:53

A:
So in addition to the agitator stirring the material, it was being re-circulated. So by re-circulating the material and stirring it we were able to come up with a sample of the material. And in order to check this out before the process was, was defined I had to go behind the barricades in the Hot Raffinate Building uh, uh, and spend quite a bit of time getting samples personally, uh, of that material.

19:22:29
A:
And I did that and I don't think that my exposure during that time ever figured up into my exposure that the plant records have. I would, I would doubt it (laughs) I would just doubt it.

Q:
Why do they call it K-65?

19:22:53
A:
Why did we call it K-65? Ya know, that's a, a good question. I'm not sure I know the answer. Uh, I don't, I'm not sure. I think it was called K-65 uh, when the material was produced off site in the Lake Ontario Ordinance Works uh, at Niagara Falls where it was stored. Uh, it, it may have been uh, a Mallinckrodt designation. But I think it's a designation that uh, stemmed back to the days of the uh, early days of the Atomic Energy Commission.

19:23:34:
A:
Perhaps uh, the atomic uh, the atomic bomb project. I don't know. I really don't know.

Q:
Okay, tell us the swordfish story.

19:23:46
A:
(Laughs) The swordfish story. Uh, one day (laughs) uh, while I was at uh, attending a meeting in the, in the administration building I think the pant, plant manager Jim Noise was speaking and all the superintendents were there and uh, and quite a few other department heads and division directors. And uh, uh it was a pretty high level meeting.

19:24:20
A:
I forget what the subject was. And I was sitting near the front row and Jim Costa of blessed memory who used to be the superintendent of Plant 1 was sitting behind me and about a half-hour into the meeting he tapped me on the shoulder. And he said uh, I said, "what's, what's up, Jim?" He said uh, to me uh, "you, you're not taking notes."

19:24:59

A:
I said, "that's right. I stopped taking notes about ten or fifteen minutes ago." He said, "Don't you feel well?" I said, "As a matter of fact I don't, I feel terrible." He said, "Well, you're as red as a beet." And with that, (laughs) I ran out of the conference room into the men's room. And I looked at my face and it was as red as a beet. With that I ran over to the Health and Safety building.

19:25:25
A:
I ran into the (laughs) where the uh, nurse was on duty uh, and she took one look at, at me. She ah, she motioned me into one of the ah, rooms where they put me on a slab and called Dr. Quigley and a couple other doctors that were on duty there. They cleared out the whole area. They said we have an emergency here.

19:25:47
A:
And I had to, a, a massive reaction to swordfish which I had eaten at lunch. And I really wasn't aware that it was swordfish. It was lunchtime and I order fish. Ya know, Friday ya eat fish. And uh, and so I had a massive reaction to the swordfish. Uh, fortunately Dr. Quigley and I think Dr. Tom Burn may have been on duty uh, they gave me a shot of uh, adrenaline right away.

19:26:18
A:
Took off my clo-, clothes, had great big welts all over my chest the size of silver dollars and uh, they had the nurse come in and take my blood pressure and my blood pressure was falling. They elevated my feet. Another doctor came in. He said, "let's give him uh, another shot." Uh, Benadryl uh, I guess it was. And then they called the uh, hospital and they shipped me out in a couple of hours later as an emergency patient to the hospital.

19:26:54
A:
And they saved my life. But they reminded me that I'm lucky that I had that attack where we had doctors and adrenaline and Benadryl and people to look after me. What, Fernald saved my life. And, and I'm grateful.

Q:
Tell us about the cartoon that uh, somebody drew for you.

19:27:19
A:
Oh, oh, so that's the story of the swordfish. The, the workers at, at Plant 9 and Plant 6 heard of that story and they, they just ate it up (laughs). They just ate it up. And one of the fellows in Plant 6, he was quite a cartoonist drew a couple of sketches of me while I was at the hospital (laughs) and, and then uh, she also, he also drew a sketch of, of uh, a nurse bringing in something for me to eat.

19:27:55

A:
And uh, and it's a great big swordfish on a platter. And the comment says, "the cafeteria supervisor," her name was Ruth, I don't remember her last name now, "said you have to have your vitamins." (Laughs) And uh, the other sketch that I told you about that I couldn't find in my notes was by the same cartoonist. Uh, he drew one of me rushing off to a meeting.

19:28:24
A:
I, I was always rushing to a meeting it in the uh, general superintendent's office from Plant 9. And to get there I would have to take a bicycle. And I had a helmet on and a, and a smock over my street clothes. And I would get on a bicycle and paddle just as fast, peddle just as fast as I could to the uh, to the uh, to the meetings.

19:28:51
A:
One day (laughs) he decided he'd really have some fun with me. And somebody must have tipped him off that I'm going to a meeting and he snapped a padlock across a chain and sprocket of a bike that I was gonna take (laughs). And the way he tells this story, I had pedaled my way all the, half way down (laughing) the road to the superintendent's building without the sprocket moving.

19:26:23
(Laughs) Cause then he drew a sketch of me trying to, to pedal that bike when the sprocket was locked up cause it couldn't go anywhere (laughs). And naturally I, I, I didn't hurt myself and I laughed and ya have to really a, a, admire the, the plant operating people and first and second and third line supervision. Uh, uh, a lot of them, I loved a lot of them and a lot of them loved me.

19:29:53
And uh, uh, that's the greatest compliment when they do that. And uh, of all the awards that I won it's the one that I got from the uh, Plant 6 personnel uh, when we were trying to get work for this site, when we were looking for work badly and its, to prevent layoffs. And I was trying to bring in uh, some of this uh, penetrator program work.

Q:
Well, before we get into that, let's change tapes real quick.

Tape FLHP0212

20:01:
Q:
Okay, so you left the plant in 1980.

A:
'83.

Q:

'83, and ah, since then of course we have launched into cleanup. When a lot of stuff starting happening in '84 and the community surrounding Fernald got quite upset um, did you sort of keep up with that at all?

20:01:24
A:
Well, I did to some extent because I did some consulting work ah, when I left the ah, employ of National Lead and ah, and to do consulting work I, I felt it was worthwhile keeping up. Initially I kept up with what was going on. I read the papers, attend the meetings ah, and ah, and also when the ah, litigation ah, of National Lead took place I became involved as a consultant.

20:02:13
A:
But a consultant for the workers rather than management. Because I felt very strongly about the role of the workers and first line supervision ah, because they were on the firing line day in and day out. They needed somebody to explain to the attorneys who would represent them what's in the documents they were allowed to see.

A:
And they needed somebody to help them. I did that and I'm proud that I did that. And ah, I persuaded Roy _____ to make his expertise available and he did. So I, I kept up, what was happening ah, during those, during that period. With regard to what happened, shortly after I left, you know, the fume release at Plant 9 which triggered off a major investigation, I just, I thanked my lucky stars that I was not working here any more.

20:03:50
A:
I absolutely would have had a major assignment to deal with it and I was just tickled that I wasn't involved in that.

Q:
So you worked with Stan Chesley and the attorneys for the good of the workers?

A:
Yes.

Q:
Can you tell me what some of the health and safety concerns that were starting to come to light were at that point.

20:04:16
A:
Well, what, what I'm about to say is primarily in the record and are reminded over and over again that I didn't want my opinion to be taken at face value. But what it is, that the plant records would show and that I could help them find and interrupt and so, they, they requisitioned all, all the plant health and safety records. And all the SOPs and all the construction proposals and all the idea letters.
20:05:12

A:
And history books and pictures, and health and safety records, workers records, they had tons and tons of records. Interpreting them was their challenge so, they were able to get a pretty good feel of the ah, air dust levels in the plant, what it was day in and day out.

20:05:42
A:
They got a good feel for the radiation exposure and, and the records are pretty clear and what the individual records were on particular persons. And ah, and there's no question about the, in operating the plant we didn't have all the facilities we needed to do the job at all the time. We were designing and improving and bettering and to the credit of the AEC and management, there were betterments and ah, went forward.

20:06:34
A:
But the weren't necessarily in place at every time, at every day when the workers needed 'em. And it's a question then of shutting down the plant or shutting down the operation or shutting down the process or continuing the operation on some improvised, makeshift basis.

20:07:02
A:
So, you could go into almost any plant and see high dust floatings. You could go into almost any plant and see fires ah, in the machines. Even though the machines had ventilation, the ventilation didn't cover every single part of the machine and every single area where uranium was burning.

20:07:36
A:
So, the, one only had to take a picture, a look at the re-melt plant and you'll see burning uranium dropping out of the furnace onto the floor. So the floors became contaminated. Plant 8, which was a plant filled with furnaces, had enormous dust floatings. Plant 9 had, had its share and I was superintendent of Plant 9. I was, Plant 2 had its share, so fires and fume releases and explosions, we had to deal with them.

20:08:22
A:
But we kept the production operation going and I think the AEC was mission-oriented because they could have stopped the operation at any time.

Q:
Looking back on that now do you worry about your health at all?

20:08:40
A:
I am ah; I don't necessarily worry about it. I have concerns, I have concerns that I, I came down with bladder cancer in 1985 ah, not, prostate cancer in 1985 and ah, bladder cancer in 1992. And I, I get

checkups every six months now so it's a concern. I was exposed to a lot of thorium, and during the

days when the thorium operation wasn't great. And ah, so, sure it's a concern.

20:09:38
A:
I know some of the workers that, in the plant have came down with problems, health problems and I'm sure some of those problems relate to their, ah, to their work at Fernald.

Q:
If you had to spend 30 years here again and work would you do it again?

A:
No, no.

20:10:05
Q:
Why not?

A:
Well I started out my career in food research, I could have remained a chemist instead of going into chemical engineering and ah, worked in foods. I think that would have been a lot healthier, a lot safer, you know, there's incidents can occur in any factory. Bakeries have their problems. Food processing plants have their problems. But it would have been on a comparative basis a much safer environment.

20:10:46
Q:
What do you think of the cleanup that's going on now?

A:
I think it's great. I think it's great the cleanup is going forward. Ah, and I, I read about that from time to time. There's only one aspect of the cleanup project that I, that I wonder about and that's the K-65 silos. That I told you earlier, I helped fill them. Course Joe Carvetti helped put a great deal of K-65 in that came in from the lake from _____ in the early days. That's another rotten job that he, he handled and that he did. But that's another story.

20:11:41
A:
But I've often thought about some of the work that's been going on out here over the decade or so that I've been gone and I remembered when we were trying to make improvements on the site shortly after I left, or a few years after I left. And spent, you know, lots of money to improve the site and I remember telling colleague's of mine that it's impossible to achieve the criteria, the design criteria of today.

20:12:24

A:
With a site that old. They would be better advised to just start with a fresh piece of paper and design an entirely new facility than to try and rehabilitate the one they had. But nobody asked me and the money (laughing) was spent and it went down the drain.

20:12:53
A:
But, and now that brings it to the K-65 silos of today. I see all the money being spent on the K-65 silos today, to encapsulate the material to get it out of here, to take it off site. And ah, I've often felt that the, one of the best options for that material is to encase it, totally encase it in a _____.

20:13:28
A:
Suitable designed and ah, and I'm sure that could be done. And then as a second line of defense they could put a freeze wall around the facility. There's a company in Washing, state of Washington that has designs on freeze walls for tanks like this and ah, I'm sure they'd like to come in here and put a freeze wall around the K-65 tank. And I'm sure they'll say they could do it cheaper, better, more effectively than what is envisioned to be done in the future.

20:14:19
A:
And then the last thing I thought is if we're worried about the radon you could build a suitable high stack, several hundred feet high, and stack it. And that reminds me what somebody said at a, a chemical engineer meeting some 25, 30 years ago – the solution to pollution is dilution. If you build a stack high enough, big enough with enough dilution the, the problem with the radon would dissipate.

20:15:04
A:
And you could do that even if your _____ were to leak or have it be vented. But I do believe ah, that the ah, that could be done. And when I think of the work that's gonna be done here to take those materials out of those tanks, no matter how they take it out, no matter how they drill it out, no matter how they slurry it out, it's gonna be a messy, sloppy operation. And I'm, nobody is gonna be satisfied with what they're doing as they do it.

20:15:50
Q:
Now they're tearing down buildings really quickly out here and soon, you know, this site will be gone. What would you like to see done with the land?

A:
Oh, I, I thought one of the things they could do with this land and the facilities years ago, but now things have changed, but ah, is ah, to use it for processing waste. You know, Rumpke's dump is not far from here, he processes waste all the time. I thought that ah, this would be a great place to, for processing waste.

20:16:36

A:
Using the facilities to processing waste. But if one didn't want to sell it to Rumpke and, and since it's over a aquifer, nobody would want to put waste in and again I say that with tongue and cheek for Rumpke. Ah, using it as a, a park, returning it to nature would be a good thing.

Q:
Great, is there anything you want to add, anything we didn't cover, anything you wanted to say?

A:
Well, there's probably a jillion things I'll think of later, and maybe we'll do that at another time because it's, I don't want you to freeze me to death out here (laughing).

Q:
Do we need to get nat sound?

(Cameraman: yeah)

Q:
Okay we're gonna, we just need quiet on the set for about 10 seconds, while we shoot off some nat sound. This is nat sound.

20:18:07
Q:
Thank you so much.

A:
Not at all.