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FERNALD LIVING HISTORY PROJECT
Transcript

Name: DuWane Bonfer
Date Interviewed: 7/15/99 Date Transcribed: 10/13/99 Tape: 55 Project Number 20012

Tape FLHP0124

08:01:03
Q:
All right. Uh, the first question is always the hardest question. If you could just give us your name and spell it.

A:
Uh, DuWane Bonfer. D-u Capital W-a-n-e B-o-n-f-e-r.

08:01:18
Q:
Great, and you can just talk to me (Response – okay) instead of talking, you don't have to worry about (Response – okay) just ignore the big black thing right there. And uh if you could tell us a little bit about your background, um where you were born, where you went to school, little bit about your family.

08:01:35
A:
Uh, I was born in Milan. We were away from here for a few years, couple, three, then we came back. I spent majority of my uh high school, elementary and high school here in Milan. And uh, uh after that time I took a few courses at UC and a couple at Purdue and then I went to work for Schinley Distilleries in their penicillin production.

08:02:12
A:
And from there I went to the Air Force and spent four years in the Air Force, which I wound up in Germany for about three of it. Came back and um in June of '55 and I went to work at the plant in November of '55. I'm married to Doris Wiley; we had two children, Kevin Jay and Deborah Lynn. Uh my son lives in Florida; my daughter lives near Cincinnati.

08:02:48
A:
Um, we currently don't have any pets, got rid of them. But uh that's about my story as far as the family is concerned. I love to play golf and do it about every day. And it's not too far, about 500 yards that away.

08:03:13
Q:
Did you play today already?

A:
Nope, nope, I (response – we're holding you up) had to take my mother to the doctor. She's a little over 90, so had to do that.

08:03:23
Q:
Does she live in the area?

A:
Yeah, (response – oh great) we just currently moved her to the health care center here in town. She was in her own apartment though about 3 weeks ago but she had some problems.

08:03:37
Q:
Tell us how you got your job, how'd you find out about it?

A:
How'd I find out about it? Well, I was told that uh Fernald was hiring people so I went to Fernald and filled out the necessary paperwork etc. And while I was waiting uh for the uh personnel people to tell me they didn't have anything at that particular time, and put my application on file.

08:04:12
A:
Why the Assistant Plant Manager walked through the lobby and I happened to know him from working at, he was the Assistant Manager, I think maybe he was the manager of one of the areas in the Penicillin Plant at Lawrenceburg, he recognized me. And asked me what I was doing and I told him, I told him what I had been doing and he done some checking around.

08:04:39
A:
Then we had a mutual friend, Joe Votaugh who was in the Chemical Department of the Technical Division and he had Joe come over and Dr. Arnold came with him and they interviewed me.
Dr. Arnold was the department head for the Chemical Department and they interviewed me and hired me on the spot.

08:04:58
A:
That was probably in July and then of course in those days you had to have an extensive search of everything. Your clearance for being Q cleared and so it was November 28th when I actually started at the plant.

08:05:22
Q:
Who was your friend who was the Plant Manager, or the Assistant Plant Manager?

A:
Uh, Jim Noise. He later became Plant Manager. He's dead but yeah, that's how it happened.

08:05:36
Q:
Tell us about getting a Q clearance, what did they do and who?

A:
I really don't know. They done a lot of checking obviously. I know they came out and checked with various people around here. And of course, I'd been, prior to this I'd been in the service for four years and I'd been working in some classified areas so I don't know what all went on. That's about all I can tell ya about it but it took them a long time to get the job done, about three or four months. I had taken another job in the meantime but I didn't like it, selling insurance.

08:06:15
Q:
So when uh they came to you and said you had the job um did you know anything about the process?

A:
Nope. Not at that point.

08:06:24
Q:
When did you learn about what was going on?

A:
Oh, fairly quickly. I mean, you um, course as I told you I was in the laboratory and sort of uh working primarily associated with the chemical plants not the meteorological plants at that time and uh primarily when I first started I was involved with the production of green salt. We done a lot of thermobalance work uh testing uh trying to improve the, the process with time, temperature that sort of thing.

08:07:17
A:
In those days uh through the '60's, the '50's and the 60's we were in competition with the Mallinckrodt Company who had the plant on Dustahand Street in St. Louis and then they moved out to another area near St. Louis. And actually they shut our refinery down in '63 and Mallinckrodt along with Port Hope out of Canada supplied us with the UO_3 for a time along with the recycle tails coming back from Hanford.

08:07:56
Q:
This is going to sound like a crazy question but how do you spell Mallinckrodt?

A:
M-A-L-L-I-N-C-R-O-D-T I believe, I think.

Q:
We've been sort of going back and forth about that.

A:
It's just like, it's just like the, there was a lot of chemicals produced by the Mallinckrodt Company in those days but they were in that as a sideline as National Lead was, they were lead producers and paint producers and other products and but at that time the government was looking for a lot of people to come in and manage their plants.

08:08:40
Q:
And tell us a little bit about your various jobs at Fernald starting at the beginning.

A:
Okay. At the beginning as I said I was in the laboratory primarily for about, oh for four and a half years uh doing laboratory testing, there was a number of different things we were involved in. Thermobalance, we were involved in trying to recover HF in the magnesium fluoride. Uh, we done a lot of work in the refinery area, back shake out test that sort of thing.

08:09:17
A:
And uh, um, trying to think of some other, we done some thermobalance tests where we discovered that UO_2F_2 which is a product you can produce if you take um, uranyl nitrate and hit it with hydrogen fluoride you wind up with UO_2F_2. And uh we found out that UO_2F_2 under the proper conditions you have a sublimation um forming which actually the UO_2F_2 vaporizes and uh you, you wind up with vapor. In fact there was a friend of mine who, I done all the lab work, but he got his uh master's thesis at X on that particular project.

08:10:23
Q:
Now what would that be used for then that vapor?

A:
Uh, it really wasn't used for anything. It was just a side issue with the production of green salt, which meant that you had to have a good UO_2 product coming out of that operation in order to get a good green salt. Otherwise you could wind up with UO_2F_2 which was bad when you go to metal reduction.

08:10:54
Q:
Can you really just briefly tell us how the process worked?

A:
Oh yeah. It's not going to be briefly but I can tell ya. (Response – that's okay) Uh, first of all we received concentrates from a number of different areas, all of the Colorado plateau areas from Belgian, the pitchblende come from there. And uh which produced the residues, which are in the K-65 tanks.

08:11:25
A:
And the uh, they came at any where from oh 30 percent uranium content up to 70 percent something like that. And what you're doing is you take the concentrates and then you dissolve them in nitric acid. The nitric acid then is contracted, that aqueous solution is contracted with um tributophosphate and kerosene. In the extraction columns in Plant 2 you remove the impurities, that goes out as a raffinate.

08:12:06
A:
And then you have the product which is in liquid form in the TBP which you then extract out with water again getting you back in to uranyl nitrate, well we called it okay liquor about 100 grams per liter. Um, uranium, then you took that particular solution, you took it to the denitration area and you concentrated it into a couple of boil down tanks.

08:12:39
A:
It was then pumped to the sparge tanks and the sparge tanks then fed the denitration pots. The denitration pots, you fill it about 275 gallon of the uranyl nitrate which is around oh 1000 to 1100 grams per liter which its very viscous and you've got to keep it heated at all times until you get it from the sparge tanks to the vessel.

08:13:06
A:
And you cooked it then in the vessel removing the water and the nitric acid and you wind up with a powder called UO_3 which that went through a mill and then was either packaged for use in Plant 4 or for, to be sent somewhere else. Uh, we sent UO_3 to Mallinckrodt. They had the same operation there that we did up through the metal stage.

08:13:35
A:
A lot of the work when they went out of business that we added later but at that time we were essentially doing the same thing except they were trying to produce a piece of metal which was an ingot, well they called it a dingot that they could go directly into uh an extrusion or rolling process and it didn't work because they could never get the hydrogen low enough.

08:14:00
A:
And that's the only reason that we were still there in 1990 or even there now I guess or it would have long since been gone. Um, now where was I? Okay, on the other side of the thing the raffinate produced in the Plant 2/3 area went to a raffinate area. In the early days it went through a kiln operation, was dried and that's what was then taken to the K-65 tanks and also they drummed some of that material.

08:14:37
A:
Which some of it was throwed in the silos that were in Plant 1 which had been dismantled now and gotten rid of. Uh, also um, let's see where was I, I keep forgetting where I'm at. The, later the raffinate was pumped to a series of pits which we had, which we had a total of six pits out in the pit area. And that's what they're about to start excavating I read somewhere in some of the literature very shortly.

08:15:14
A:
And that's kind of a thumbnail uh talk about the 2/3 area. I was involved in 1959 and 1960 in trying to perfect a continuous pot in that particular plant. Where we instead of uh putting 275 gallons in you put a bed of UO_3 in and then you um add the uranyl nitrate through a measuring system and it denitrated. And you continually added and took of the product and drummed it out.

08:15:56
A:
Uh, that was never too successful. One reason the material that's produced there comes out in a spherical form which the reactivity wasn't as good as uh the other process. And I done the lab work on the reactivity of the material that was produced out of there. I was also out on the project team but I was also back in the lab, I was back and forth on that particular project.

08:16:27
A:
And uh and then going to Plant 4, Plant 4 is where you take the uranium trioxide, UO_3 and you uh put it in a reactor system. Uh, we also received UO_3 from Port Hope out of Canada. We received some from Mallinckrodt. We received some from um, um not really, primarily from those two places we received UO_3 from. And what you did is you took the UO_3 you put it in a closed system.

08:17:15
A:
You add hydrogen to the UO_3 as it went, the early days they had what was called cocoa reactor, which changed the UO_3 to UO_2. And then the UO_2 went from there into a series of three talcum reactors uh which you added HF and UO_2 countercurrent operation. The HF went in one end and the feed went in the other and it went through a series of one, two, three talcum tubes on three different levels.

08:17:46
A:
And you wound up with the product, which then went through a milling system in the early days but that wasn't operated very long, and then we quit doing that. We also, that then was packaged and uh sent to Plant 5. We also sent some to uh Mallinckrodt in the early days. We were kind of swapping stuff back and forth. And then we came along and um the late '50's, well it was probably '60 or '61 and we perfected the ORO process, the oxidation reduction oxidation process.

08:18:48
A:
I done that work in the lab and then it was later transferred and put into operation in Plant 4. Uh, in the early, I missed one step. Uh, well we'll talk about this first. Uh the material coming back from Hanford is recycled tails that's after we got into the enriched programs. Uh, the particle size was not correct, it had the material had to be milled and then the uh the true density of it was a little different.

08:19:15
A:
And the reactivity if you run it through the regular system you didn't get a near completed reaction to give you a good green salt. So we perfected the ORO process and there you, you reduce the material

to UO_2 and then you hit it with air, took it back to black oxide and then you rereduced it with hydrogen and then put it into the talcum system.

08:19:48
A:
And what we actually done there uh we ran it through the fluid beds and uh reduced it and then we took it through the cocoa system and oxidized it back to U_3O_8, uranium oxide. And then we took that hopper, to put it into a hopper took it back to the top floor and put it back through the system again which was a different bank of material where we uh reduced it and then hydrofluorinated it in the other system.

08:20:30
A:
Now we did that what we called a uh, uh forgot what we called it. Anyway it was a system that was developed where you could do it all in one bank but it was very slow. And we got into a point where we needed more production and that's where we went to this other method. And then in the I don't know it was in the '70's somewhere they quit the, the one where it was in the other case you went from a fluid bed to the cocoa and then they had a hopper in between and then they used another set of fluid beds which was next to it.

08:21:12
A:
And uh, and then went through the process there but it was called an integrated bank it came back to me okay. The other point that I missed in the regular production was that when we started out using the um cocoa tube as the reduction vessel uh we got about 250 – 300 pounds per hour and we were able by going to the fluid bed process which was uh actually mid to late, I forget exactly when that was, in the '50's.

08:21:52
A:
Uh, when we went to the fluid bed process then uh we were able to get the reaction to the point where we could produce it at oh 750 – 800 pounds an hour. When we went to the ORO process we were able to do the first reduction oxidation about 1150 pounds per hour and then we could run it about 1000 pounds per hour um on the reactor banks.

08:22:20
A:
The material was packaged out of course after sampling uh which we checked for U+4, total U, uh UO_2F_2 and moisture and some metallic impurities uh iron, nickel, uh couple more which I've forgotten, chrome and I forget what the other one was. But the primary ones was, oh copper was the other one, primarily the problem was with iron and nickel.

08:23:01
A:
Uh, the reactor system uh during the operation you would get high contaminates of iron and nickel at times. And uh then there was a certain specification for use in the metals plants and if you didn't have

it at that level then you would have to blend it up and I remember when I first got involved in that which was late '50's early '60 they had about 200 ton of off spec material.

08:23:34
A:
Which was something that they couldn't use and I was able to blend probably 98 percent of that down by using some good material in some of this and actually matching up the various impurities and come up with something that met the metallic specifications to go to Plant 5. Uh, then moving on to Plant 5, Plant 5 was a metal production system where you took the green salt called uranium tetrafluoride and UF_4 and you combined that with magnesium.

08:24:14
A:
And you blended it, put it into a magnesium fluoride line vessel and uh for most of the time, I'll get back to that, then you put it into a reduction furnace, which was a Rockwell furnace made by Rockwell. It had three resistant type elements in it. And uh we used anywhere from 1100 – 1200 degrees temperature on those furnaces.

08:24:46
A:
And after oh 3½ to 5 hours they would autonation would occur and reduction would take place and the molten uranium metal would settle out in the bottom of the vessel and this was called a derby. Then you took the derby to a breakout area and you dumped the contents of the pot out and you set the derby aside and the mag fluoride was then put through a jaw crusher and was uh in the later years well most of the years was transferred to the mag fluoride production plant.

08:25:22
A:
Then the very start up of all of the systems they used dolomite as the material uh in the reduction vessel. And that was stopped um I don't know '77 or '57, '58 somewhere it was very early in the, in the game. But most of the years we used mag fluoride as the liner in the uh uranium process. Then that derby in the early days, we had a lot of problems because of the quality of the green salt before we had improved that system you wound up with a lot of what we called AOI, which was, unreduced uranium dioxide.

08:26:08
A:
And then that wouldn't convert well in the reduction system so you wound up with massive pieces of slag hanging on the top of the derby. And uh then you had to use jackhammers and other means of removing that and uh then as we processed through the years and we got the green salt process better, why uh that all improved greatly.

08:26:36
A:
And then we also uh in the very early days we had which is kind of a side lead up to this, we had the 6-4 production plant in Plant 7. Now I was not involved in that at all. I know what they did because I

read about it but they were primarily producing normal natural uh uranium green salt from hex, hexafluoride.

08:27:04
A:
And uh some slightly well depleted it was they didn't do any enriched in there, it was depleted and normal. And that material reduced very well because of very high purity but they had some other problems uh with uh another phase of the metal reduction process of the material splitting apart. But uh then the uh and as I said the mag fluoride primarily came from the mag plant.

08:27:42
A:
And then the derby was then taken to the what we called the remelt area and there depending upon the size of the equipment they started out producing 8 and 10 inch ingots and then we eventually wound up with as big as 12 there. And we done 13-inch ingots in Plant 9, which I'll get into a little bit later. But there you took generally one to three derbies depending on their weight, added scrap metal which came back from the process either from chips and churnings which had been briquetted.

08:28:23
A:
Or uh the slugs that had, didn't meet the specs when they were inspected, the ends off the end of the ingots; all of the scrap that was produced we tried to use it all over as much as you can unless the metal impurities got completely out of line then some of it had to be discarded to the pit area. There wasn't much of that because it was cost a lot to get them to that point and therefore you tried to save as much of it by one means or another.

08:28:56
A:
You produced the ingot and that particular mix was done in a graphite crucible and uh that was put into a vacuum induction furnace which was kept under vacuum and that was critical. And there you heated up to uh 11, 1200 degrees; no it was more than that, wrong. You heated up to 2000 – 2100 degrees and the metal become molten and therefore you got the mix of all of the of the various pieces.

08:29:33
A:
And then they also added uh some things at this point in the form if they needed iron or silicon to meet the various specs. And once that became a molten system then they dropped that into another vessel called an ingot mold. And the ingot mold was a two piece vessel, then they cooled them then they were taken out of the ingot by removing the bottom.

08:30:03
A:
And then you sawed them on a, was a big circular saw, they started out using um I believe a uh some sort of a grinding saw but it didn't last very long. They had a huge metal saw blades that we sawed the end of the ingot off and then after they sawed the top crop off which was what they were called; then they took a sample, they sawed another cut and then broke off a piece which was a half moon piece.

08:30:40
A:
And that went to the laboratory for all the analysis they needed which was about the periodic table. Uh they checked for everything in the early days and then eventually they finally backed off on some of the things that you knew wasn't going to be there. But we still checked for a lot of analysis up until the time we quit production.

08:30:59
Q:
We're going to stop for just a second, we need to change tapes. (Response – okay)

TAPE FLHP00125

09:01:07
Q:
Okay, so we were at the sampling of the ingots.

A:
Right, right, okay. Then the ingots uh after being sampled were staged and depending on where they were going; in the early years everything went to Plant 6 for rolling. Uh later which was probably about 1970 might even started in the late '60's we started sending uh depleted product to Ashtabula Ohio to that plant for the uh production, they put it into an extrusion press and produced the tubes.

09:01:52
A:
Uh of depleted uranium which then came back to Plant 6 and the product was taken care of there. Uh also after we started the enriched production which was primarily in Plant 9 which I'll get into in a minute, that went to Ashtabula also and upset forged into billets. In Plant 5 what they had to do was take the ingot and cut it into the proper size billets for being sent to Ashtabula.

09:02:29
A:
And it was done in (Plant) 5 and it was also done in Plant 9 depending on the time frame you're talking about. Uh and that was approximately uh the operation in the Plant 5. There were a lot of little sidelights but uh that's the main production process in Plant 5. Now in Plant 9 that started out as being; I'm going to skip Plant 6 for a minute; uh that started out being the thorium production plant back in the early '50's.

09:03:08
A:
But they had just about shut down uh not quite but almost when I arrived at the plant so I don't know a lot about that process other than what I've read. That they produced uh thorium metal by a different process than we did in the '70's and uh and then arc melted it and produced another system which they eventually made into thorium fuel rods and cores.

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09:03:41
A:
Uh my real involvement started in Plant 9 in about 1962 where we had taken the uh Hanford UO_3, tested it in the laboratory uh tested it well not only tested it but started producing it in Plant 4 as recycle uranium material. And that was processed in Plant 9. Uh, a little sidelight back to Plant 4; when that material first started coming to site it came to us in T-hoppers which I'm sure you're familiar with.

09:04:20
A:
However the material itself was confidential and the assay was secret. Uh you had to have a Q clearance to be able to get a hold of any of that information. Also the additional fence that was around Plant 4 and the laboratory uh and parts of Plant 5 was put there strictly because of that particular material. The recycle tails coming back from Hanford which uh were very classified in those days.

09:04:58
A:
Uh the, the train that they brought it on had an armed guard which rode with it and stayed there 'til it was unloaded into the secured area and then they went back with the train and brought another load whenever they got around to it. Uh, okay in Plant 9 we started out there with the metal reduction of the enriched material.

09:05:23
A:
And we were primarily producing .95, 95 percent U-235 at that time. And again that's the same process as the uh one in Plant 5 where you take the uranium tetrafluoride mix it with magnesium and we actually used liner material to start out with that was produced at Plant 5 but then because it was enriched and we didn't own a downgrade to residues; that then was produced in what they called a tight melon Plant 1.

09:05:55
A:
Uh and you produce the mag fluoride up there. They put it into drums and brought it back down and it was put into the reduction vessels in the Pilot Plant. And that was fairly successful. We did have some problems later on but in the early days that was the best looking derby metal we ever produced because of the high purity of the green salt and we had of course worked out a lot of the conditions by that point in time so that we were able to produce a derby which was as clean as the end of that clipboard there.

09:06:30
A:
And it looked very metallic, was very nice looking metal. Then that metal was then uh the derbies were used to produce what they called I and E ingots, which were ingots, which went to Savannah River. They had a enriched program down there. And some of it went to Hanford but the one that we did in the I and E furnaces primarily went to Savannah River.

09:06:58
A:
There again that was the same process where you added derbies, scrap, briquettes, uh made the derby, the ingots. The ingots were crops, samples, same process as Plant 5. And they were then taken to Plant 6, rolled into rod and the rods were then sent to Savannah River. That's back at the time when they had a number of different type reactors going down there.

09:07:25
A:
Uh in the case of the NPR furnace we only had uh a pair of those and uh those made the larger ingots which were 12 and 13-inch primarily. And they were the same process again you add the derby and scrap, produced the ingot then they were cropped and sampled OD turned, the ingots were then sent to Ashtabula Ohio to that plant to be upset forged.

09:08:01
A:
They produced uh about 4 billets out of an ingot I believe it was. And then those billets were machined, sent then on to Hanford where Hanford coextruded that material with uh copper with a zirconium clad outer shell. And then they extruded that and they made their own fuel rods there and then we would get their mistakes and their scrap back as uneradiated material of which then in Plant 9 we had what we called the Zirnlow process.

09:08:45
A:
And the Zirnlow process you took uh went through a bath where you cleaned them off with nitric acid first and then you uh used hydrogen fluoride to remove the zirconium producing ________ silicate I believe it was called, zinc or not zinc but zirconium fluorosilicate I believe it was; then you got down to the copper then you put, you had the copper parts you put them back in the copper tanks and removed the copper.

09:09:24
A:
You come back to the bare tube and then that was used in the remelt system to reclaim the metal. And that's a thumbnail sketch on the Zirnlow system. The acid after it got to a certain level of uranium was transferred to the refinery where they recovered the uranium from that. Uh for the most part the tails with the zirconium in it went to the pit areas.

09:09:56
A:
There was a period where someone wanted to buy uh the off product from that which was uh, anyway we took that to Plant 8. I wasn't really involved in that but they uh dried it and they were able to produce a product where they were able to use some of that but not very much of it. And that kept up, that was still going on when we shut down in '89, that Zirnlow process 'cause we were still producing enriched material and you needed to keep that scrap in the stream.

09:10:30
A:
Okay, also in Plant 9 uh when we started out with enriched over there which they had been into enriched production prior to getting the material from the ORO process but it was coming from the Pilot Plant in the form of green salt from the UF_6 production. But they also had, they had their own briquetting system the same as Plant 6. They had their own area where they cropped and machined the ingots.

09:11:09
A:
They also had a machine and that in the metals area where once we got into depleted production which came along in the '70's where they took the ingot and bored a hole down the center of the ingot before it went to Ashtabula Ohio for extrusion. Now we didn't have to do that, yeah we did too, we did that on enriched and depleted both and then we done some normal but that was just sort of test things that went on.

09:11:40
A:
Uh, that's approximately what went on in Plant 9 until in the '70's then the enriched production had all been transferred as far as derbies are concerned to Plant 5. Plant 9 was still doing the remelt work producing the ingots. But the reduction work had been transferred to Plant 5 and we done that on a campaign basis.

09:12:09
A:
We would run so much enriched and so much normal or so much depleted depending upon what you wanted. Then we got into where we started heavy depleted production and that actually started out in Plant 9 where we used the same reduction furnaces as we had for the enriched material and the same I and E furnaces when they started and then they started transferring it to Plant 5 for the remelt part of the process.

09:12:45
A:
And that went on and I was involved in that somewhat; the metal reduction end of it, in temperatures and following the system and making sure that the proper ingredients were in the reduction vessels and so forth and so on. Uh, then we also had a project over there where we were trying to make a larger derby which we called a 20-inch pot process.

09:13:10
A:
Which we had some uh 20-inch pots with a slight taper fabricated out of corten steel and use the same liner everything's the same except it's just a larger uh vessel. We adapted their filling station and revamped the remount furnaces by taking out a liner they had in there and going just with the bare elements and we were able to use the same furnace.

09:13:47
A:
Those were in the days when we didn't have any money to do anything. They wanted us to do things but you didn't have any money to do it with. So we tried to adapt the best we could and it was fairly successful. We made good metal and uh things went well but the politics weren't quite right plus uh the economics weren't there when we finally finished that project so it sort of died by the wayside.

09:14:10
A:
The pots were put aside and kept which I later used in the Pilot Plant which I'll get into when I get down there. And that's about it on Plant 9 during my main activity out there. Uh Plant 6 I wasn't really involved with in the early years at all. I know what went on there, they had a rolling mill where they rolled the various products and after rolling why they went across the cooling bed were cooled and they went through a straightener to straighten them before they went to the cooling bed.

09:14:48
A:
And uh then the rods were taken to a number of what they called Acme-Gridley machines where they actually blanked the cores to the proper length. And then they used a drill to drill the center out. And that was quite costly and had a lot of pieces, which would wind up with broken drill bits in them and that sort of thing.

09:15:12
A:
Now out of that process you took all of the chips and turnings, took it to the briquette area, briquetted it into a 4-inch briquette which depending on how much they got in that particular charge the size would vary from an inch to maybe three or four inches tall. And that material went back to the metal remelt areas either Plant 5 or Plant 9 and was put back into the process again.

09:15:39
A:
And then they done the finish machining of the cores in Plant 6. And they had what they called a transformatic machine which eventually done away with all of the Gridley's and all that sort of thing. And you put the fuel core in there and the blank so to speak and then they went through the system and came out as a finished product to be sent to Savannah River.

09:16:06
A:
And that was primarily on the depleted. We did do uh few minor runs of .86 production for Savannah River. Uh I didn't talk about the various enrichments but our primary product in the beginning was some depleted and natural uranium, which is .711 U-235. Uh the also .86 we produced some of that. The majority of the enriched material was produced at the .95 level and at the 1.25 percent U-235 level.

09:16:45
A:
And most of this was used at Hanford. There was in the early days some uh material that went Savannah River. That was the .86 material and uh a little bit of .95 but not a lot. Once Savannah River quit the .86 project we wound up with a lot of scrap metal uh in the system at .86 level and that was all blended together with high enrichments to bring you to .95.

09:17:18
A:
Uh which we would use 1.25 on other things that came back to us as recycle material. Uh, you come out with the finished product and that went to the inspection area and was inspected and sent to either Hanford for Ashtabula or to Savannah River. Uh, let's see; going back to the Pilot Plant I talked about the Pilot Plant briefly but the Pilot Plant started up that was the first plant that started up and they had all of the they went from uh the concentrated, uranium concentrates.

09:18:00
A:
They had a two and a four inch column over there and they, or two and a six inch column excuse me, and they produced uranyl nitrate. Uranyl nitrate went through their same system as I explained in Plant 2 to produce the UO_3 and then that was taken to Plant 4 and made into green salt. And then it would come back to uh the start up material came back to the Pilot Plant as enriched.

09:18:37
A:
Their depleted material and other enriched material, which they produced, they we got that in as hex in cylinders. And that was then taken clear through to the derby process and in some cases they had two uh vacuum out furnaces which was smaller. Then they had one huge one that they used for experimental work.

09:19:03
A:
Uh, when I really got involved heavily with the Pilot Plant was in uh '69, '70 and the production of thorium metal where we changed the, the process. A gentleman by the name of Gifford Briggs uh he adapted the Ames Iowa process I believe it was to the production where you produce thorium nitrate which was produced out of the 6 inch column and that by taking thorium nitrate crystals that weren't pure, running them through that system and producing a pure (excuse me) thorium nitrate.

09:19:46
A:
Then they, they took that and made uh thorium uh tetrafluoride out of it with a wet process. And they also produced zinc fluoride there and we mixed the two and after being dried they were put into vessels where you, they were about oh I don't know 4 feet 5 feet tall had a huge top on them and you put them under nitrogen and uh actually dehydrated the wet material.

09:20:21
A:
Both the zinc and the thorium tetrafluoride. Then the dried products were analyzed and if they met the purity why then they were blended together in the proper quantities and calcium was added as a reductant because you need a higher temperature to reach reduce the thorium than you do uranium metal.

09:20:44
A:
And then the same furnaces were used to produce the uh the thorium metal which was again the same process. The derby, which they had a breakout station there we broke them out to start with. We later went to Plant 9 with that but in the beginning we done it all right there. And uh you produced a uh thorium derby. Then the thorium derby had zinc in it.

09:21:10
A:
So then you put it in this large remelt furnace and they put about three or four derbies into a graphite holder. And they actually put it under vacuum and then was able to remove all of the zinc from there with vacuum and you wind up with a pure piece of thorium metal. Then the thorium metal after it came out of there the derby was sampled and analyzed and uh if it met the specifications which most of it did why you um most of it they cut in half, sampled and then sent to Oak Ridge for secret project.

09:21:49
A:
I never knew exactly what happened to it after it left there. Uh also we had what was called uh a grit blaster in the Pilot Plant where they would take derbies that had too much slag on them and hit them with uranium shot. Which they used to at one time they produced uranium shot in the Pilot Plant also from a shot tank.

09:22:16
A:
And we used that until we exhausted the supply in later years and then we started screening some of the material, which was a by-product out of Plant 5 to get the shot to put into that machine. The only problem we had with that system was you wound up with a lot of finely divided uranium coming off the tops of derbies and it would catch fire frequently in the duct work and sometimes right in the system.

09:22:41
A:
So uh then you had to stop everything and go through all of the follow up that was required before you could start back up. Then in about 1978 I'm guessing, '77 somewhere along in there, uh Y-12 which was where some of the pure metal was going also for them to use; we started producing derbies for them and we were shot cleaning them and it wasn't really successful.

09:23:15
A:
It was getting all the mag fluoride off of them. So they had come up with a process of using molten salt uh potassium and, potassium lithium carbonate. About a 70/30 percent mixture. Well I really

perfected the mixture after we started doing it there. But I met with them and we had our discussions and so I was asked to develop a process without spending any money of course that we could use.

09:23:55
A:
So uh I thought about the 20-inch pot that we had used on that experimental project and I got those over there. And we adapted one of the Rockwell furnaces in the Pilot Plant and we made up the mixture of the two salts. And put it in there and it will melt at about 1100 degrees; 11 – 13, we used to take it to about 1350.

09:24:23
A:
And once it became molten then you put the derbies in there and uh the derbies then would sit in there for about an hour and you would take them out and let the salt drip off of them. And then there was weighing and all for accountability and all these things I've been talking about which I haven't touched on. Then those particular derbies were taken and actually acid cleaned.

09:24:54
A:
Uh, that was done for a time in a short period of time in the Pilot Plant then it was done primarily in the uh in Plant 6. Which is where they cleaned all the cores and things in acid prior to putting them back into the remelt system. And so the derbies went up there and they were cleaned there and sent to inspection. And if they met the inspection criteria they were packaged and sent on to Y-12.

09:25:30
A:
That was the depleted product. And that was done then up until the time we uh we quite production. Also those same derbies went into a process which we started, I don't remember the dates 'cause I wasn't involved in it, but we started with a high purity thorium metal back in the '70's where we actually perfected the, the penetrator before it was given to private industry.

09:26:06
A:
Which was an outfit down in Tennessee called Aerojet. And we, that's where we run into some of our problems but as far as mag fluoride; but the one's we was really problem was Y-12. Whatever the work they were doing which most of them were classified projects at Oak Ridge. And that was very successful and we later transferred that to Plant 9 where uh they were salt treatment was done up until we shut down in '89.

09:26:42
A:
And let's see I guess the Pilot Plant; then we also had some small, one small reduction furnace where we done some testing metal reduction over there as well. And uh the only one I think I haven't touched on is, well a couple plants. Plant 1 uh that's where all the ore concentrates came in and they were sampled and analyzed and prior to going to the refinery.

09:27:12
A:
And uh, also uh all of the residues that were coming from other areas would go to Plant 1, be sampled and analyzed. All of our, all of our residue products from all the operations went to Plant 1 were sampled and analyzed prior to being used in one of the other areas. And I was involved in that quite a bit.

09:27:36
A:
In 1976 the refinery had shut down, I didn't get into that either, I'm back to the refinery. Refinery shut down in 1963. It started up again in 1970 and what they called the surf process, which was slightly, enriched recovery facility, where we were taking the enriched residues and dissolving them up and extracting the uranium and going through the process there of thorium enriched materials.

09:28:07
A:
Which primarily stayed uh one percent or below because of the criticality problems. We did have a two inch, a two percent U-235 campaign in one denitration vessel over there where we produced uh I don't know a couple hundred ton of uranium trioxide. Which we later then went through Plant 4 produced UF_4 and used that as sweetener to sweeten up the tails.

09:28:38
A:
Uh another thing I got to go back to the Pilot Plant I keep forgetting. In the Pilot Plant they had the 6-4 process which they got the hex cylinders in and produced UF_4 from UF_6. All of the early, the early enriched material came by that method. And then it was actually shut down uh and we started using uh material that we had on hand that we were able to blend in to get to the, the isotopic level we wanted.

09:29:08
A:
Primarily that 2 percent UF_4 that we produced would come out of the refinery. Uh, okay that's a sidelight that I hadn't got into before. Back to Plant 1.

09:29:20
Q:
Before we do that let's switch tapes real quick. (Response – okay)

TAPE FLHP0126

10:01:04
Q:
Okay.

A:
Okay, back to Plant 1 the refinery what I was going to say something about; the refinery stayed on uh the slightly enriched production from when they started back up 1970 until about I'm not sure of the

exact timing, '74 or '75 something like that; where the AEC or I'm not sure what it was which one it was, who was in charge at that time.

10:01:41
A:
But uh they decided to bring all of the ore concentrates that were in the country and put it in the form of UO_3 and get it into the system. So we had some stored at our place on the Plant 1 pad and so they started running the ore concentrates in the refinery again. It was either '75, I got involved in that particular project in '76 where we got I don't know something like 115 truckloads of residues back from Paducah.

10:02:22
A:
Which were uh slightly enriched and we used that in a run in the refinery after we got the normal produced, the concentrates gone, to produce UO_3 which we in turn then sent back to uh Paducah and they put it into green salt and put it back into the reactor system. It was all different kinds of their residues. Uh it was black oxide, some pure brown oxide, there was UF_4, there was just pure scrap.

10:03:04
A:
There were hoppers of material. I know we got one hopper that uh had uh some real crap in it and we finally was able to get it out. But that was unloaded in Plant 1 and then transferred to Plant 8 and we worked on it over there. And a lot of that material had to go through Plant 8 then which I haven't talked about through the furnacing operation to dry it.

10:03:35
A:
We had also set up in Plant 8 in the, in the gangway I call it, a, a large magnetic conveyor which we dumped some of this material on the conveyor and then the metallic parts went into a dumpster. And you washed the dumpster down and the dumpster was taken to the pit system and discarded out there. The rest of the material was all uh caught in Plant 8, dried and then went into the refinery operation where we dissolved it and after the furnacing.

10:04:15
A:
It went through the furnacing operation and once it met the refinery specs why then it was taken uh to the refinery. I know there was a lot of green salt that had uh magnesium in it and I put that in the furnace and it was just like the fourth of July inside the furnace, the magnesium burning. And we managed to get through the thing but it was a little different.

10:04:42
A:
And so all of that material then uh through 1976 sometime was put through the refinery along with the remainder of all of the concentrates in the country. And uh then the refinery sort of shut down and they went on a campaign basis where they, well they really done that starting in 1970 actually. They started campaigning between Plant 8, the refinery and Plant 4.

10:05:12
A:
They run Plant 8 then the refinery then Plant 4. That actually started in 1970 I had forgotten about that but some of it comes back. Okay Plant 8; uh what really went on there in the early days they were primarily on normal, natural uranium U-235 content uranium .711 percent U-235. And what they would do would take the residues and reclaim the uranium out of it uh through what they called a hydrometallurgical process.

10:05:48
A:
Uh, they also had a lot of airport scrap, which came from uh, Mallinckrodt. What it was, was mag fluoride that had been stored on the airport runway and that's why they called it airport scrap. And that came back to us in gondola cars and that was unloaded and then put through the, they had a ballmill process there where they ballmilled, they ground it up.

10:06:17
A:
And they had a drying process which they had a huge circular kiln and they had a vertical kiln as well where they dried the various materials. And then it went to their hydrometallurgical system and uh also they had, there were three other furnaces. Uh there was a, forgotten the names of them but they were hearth type furnaces and uh then the product out of the furnaces after being analyzed went to the hydrometallurgical system and there they actually uh dissolved the uranium uh in hydrogen chloride.

10:07:04
A:
And then they took the hydrogen chloride and the liquid and precipitated the uranium. I'm trying to think of what they used to precipitate. Well they used several things I believe. They used sodium one time and or sodium oxide and some others. Anyway they precipitated the uranium then it went to uh, that ain't right, yeah it is.

10:07:36
A:
They produced, they produced what they call a trailer cake out of that operation which was the discard. And what that was, was primarily mag fluoride with a very low content of uranium. Then that was transported to the pit area. Primarily Pit 2 when that was going on. Fact there was a pad built out of Pit 2, which that's what they used to dump this particular material into Pit 2.

10:08:02
A:
And that continued on, that process actually continued on to 1970 I believe and that was discontinued. I really wasn't involved in that particular part of the process. Also they tried a wet uranium tetrafluoride process in Plant 8 at one point which was called the Winlow process, where you took the KC or the uranium that was dissolved in the HCL and you precipitated that with HF and produced uranium tetrafluoride by wet process.

10:08:43
A:
And that was done uh late '60's somewhere in there. Mid to late '60's. And then that material however you come out you have a, you have a ¾ hydrate and you couldn't take this through the metal reduction area. So then it had to go to Plant 4 and with the use of HF was run through three of the talcum reactors to remove the moisture and you wound up with a uh product then of UF_4 that had a low enough moisture content that you could use in Plant 5.

10:09:22
A:
But it wasn't good. Plus you picked up a lot of metallic impurities in Plant 4. So we had a lot of problem with nickel and copper and iron in that particular material. So that really, after we worked through that phase of the testing uh they didn't do that anymore, they discontinued it. Uh, it might have worked if we'd done further development work on it.

10:09:49
A:
But at that point in time money got very tight then Plant 8 shut down entirely, not very long a couple years maybe after that. And uh that process there was never anything done with it after that. I was also involved in uh the control and handling of the magnesium that came to the site for probably 20 years or more.

10:10:21
A:
Which was stored in what they called a magnesium warehouse. It would come in, in 7½ gallon cans for a long time and the cans were unloaded over there, put on skids then brought to the various reduction areas. Whichever one you're talking about 9, Pilot Plant, or Plant 5. Then later we went to a paper bag system.

10:10:42
A:
And uh then that was a bidding process every year of the companies that were grinding the magnesium. They didn't produce the magnesium but they ground it. Uh, we also used a lot of the GSA magnesium ingot that was stored at the various depots. My first experience with that was at the Hastings depot out in Hastings Nebraska.

10:11:11
A:
We went out there and done a sampling. Gathered up a number of ingots representing the most of the material that we were interested in. Brought it back, analyzed it and we eventually took that material and used it in our granulating and producing the magnesium for Plant 5 or 9 or whatever reduction whatever they were going on.

10:11:35
A:
Also just a little bit prior to that we went through, the government also had a number of uh raw magnesium ingots that hadn't been purified by putting them through a remelt step. And uh we, we

were able to grind that material and use it in Plant 5 as well. That was another test program that went on and I'm trying to think of what the name of that was. I'll think of it in a minute but I can't think of it right now.

10:12:10
A:
Uh, but then, then we place called Metal Sellings Ground, the majority of the mag in the early days and then there was another outfit. They were actually up in uh Connecticut I believe, Putnam, Connecticut. And then there was another outfit got involved that was in a town in Pennsylvania and I helped them actually. They had made the bid and didn't even have a process.

10:12:45
A:
That was all through our procurement system so I got a quick call from the procurement director he put me on a plane and we went over there and started coming up with a process. And they were actually able to uh it was Heart Metals. And uh forget the name of the, it was outside of, I forgot the name of the town. I never thought I'd never forget that.

10:13:09
A:
Old coal mining town. Anyway, uh and he was able to perfect come up with a grinding process which was successful to us.

10:13:18
Q:
Was that Allentown?

A:
It was near Allentown. But it's off about 50 miles from Allentown off in the mountains and it'll come to me eventually. It's a Indian name but I can't think of it. But it was near, fly into Allentown then go to this place, Heart Metals.

10:13:38
A:
Uh and then there was Metal Sellings who was out of the business for a while and then got back in it in later years. And then they actually got the contract back for several years toward the end of production. And he and Heart Metals were on a bidding war. They would bid back and forth to see who would, would get the work.

10:13:59
A:
Uh, we used also magnesium uh well originally it all came out of the stockpile primarily. And then there was another chemical company that we used some but it wasn't very successful. And then we actually used some made out in, out of Salt Lake City which it was a little town. The plant NL started in private industry and then it was brought out by someone else. And then we were, I can't think of the name of that either. Should know it but I can't think of it.

10:14:44
Q:
Now all this experimentation was that to try to, to hone the process down even further? (Response – right, right, right) To make it faster or?

A:
Well better, purer, keep the purity. We had a problem with the magnesium at very times with the iron level. We had to control the iron level very closely. And silicon was another problem we had. And that's the problem we had we the one type of crown, the crowns. The magnesium crowns was that process.

10:15:13
A:
We had a slight problem with silicon there because in the depleted and natural production for Savannah River and the one out west (Response – Hanford?) Hanford. Uh they added, they added to Paducah, not Paducah, they added to the ones for Savannah River and the early days they added some to the materials for Hanford.

10:15:45
A:
However, in later years Hanford had a 100 specification on the ingot for silicon. And some of the magnesiums you couldn't use or you would go over the silicon level. So that was one problem with silicon. And then iron was a problem also in the I and E type material and the high purity material we were producing for the penetrator program and for uh the Y-12 production, derbies for them. Uh.

10:16:23
Q:
Now the penetrator program, was that 4-A, was that the 4-A?

A:
Later it was. We started out as a penetrator, making penetrators, where we done all the fabrication of uranium and someone else put them together. And then that was given to the people down in Tennessee, which was Aerojet. And then they had that, and they were in competition with another company up in New England somewhere.

10:16:49
A:
I forget the name of that company. But we actually done all of the experimental work and getting the uranium into the forms for the penetrators. Then in later years we the 4-A project was where we made flats. I didn't talk about that in Plant 5. We took this high purity derby metal and made high purity ingot flats which were I forget the dimensions.

10:17:15
A:
They were 4-inch. We made some two but mostly 4-inch flats and they were about 20 inches across and I forget the length, what they were cropped to. And then those were sent to Denver to Rockwell in

national out there that run the Rocky Flats plant. I think they were running it at that time, that changed hands too.

10:17:40
A:
But anyway they went to the Rocky Flats plant and that ingot then was rolled into sheet. And that sheet is what was used in the M-1 tanks that were used successfully in the conflict we had over in the east.

10:17:57
Q:
Is that why they call it the Rocky Flats plant, because they produced flats?

A:
No, it was Rocky Flats long before that. (Response – okay) They done a lot of work over there too but it was a lot of that was in the higher enriched areas than what we were involved with. See the higher enriched material was done at Oak Ridge, Rocky Flats, Savannah River some. But, and at that Los Alamos out in California. But we were in the, the normal, depleted and the recycle chain for Hanford primarily what we did.

10:18:36
Q:
Tell us the difference between depleted and enriched and the different uses for it.

A:
Okay, depleted, depleted is anything that is lead, that's depleted in U-235 content. It is anything that is less than .711 percent U-235. We used all different levels of depleted. We started out at about .2 percent depleted as I remember. We did .18, we did .14. Very depleted material because that's the green salt they had sitting as tails or hex they had sitting as tails which we made into green salt.

10:19:15
A:
And that was for all of the depleted programs in the last 20 years we were in operation or maybe more than that but at least the last 20. And then when you get, then going the other direction, anything above .711 was considered to be slightly enriched. And our products were primarily .86 which went to Savannah River, .947 which went to Hanford and Savannah River and 125, 1.25 percent which went to uh Ashtabula Ohio for the upset forging which then went to uh Hanford.

10:19:56
Q:
And uh you mentioned criticality. A lot of people don't understand criticality, can you uh explain that to us?

A:
Well uh if you talked to Don Dunaway, he should have told you all about that because he was the criticality expert for a number of years. It's a matter that you can't get too much of enriched uranium together because you can have a reaction and cause a nuclear incident.

FERNALD LIVING HISTORY PROJECT
Transcript

10:20:21
A:
I don't know, I know what it is but I don't remember the amounts and uh what controls it really. And of course you can use a poison to poison it with which was lead.

10:20:40
Q:
To hold down the criticality? Wow. So they had to uh store this material in certain ways to make sure that didn't happen?

A:
Right, right, right. All of the, when we first started producing enriched to show you how tight things were, every movement of enriched material wherever it was going, there was a supervisor and fork truck driver and a tow motor driver was assigned to that operation.

10:21:14
A:
And if it went from the Pilot Plant to Plant 9 or the Pilot Plant to Plant 5 they transported it on this special group of dolly cars uh to their destination. And then someone signed for it before it went into the plant and there was certain areas it could be stored in and uh there's certain dimensions depending upon the enrichment.

10:21:41
A:
And we started out at a lot tighter rules than we ended up with eventually because they learned that uh it wasn't quite as critical as it had been in the very beginning. But it was very, very tight and controlled very well in those days. And you didn't make any mistakes on that or you could have a big problem. They also made in the Pilot Plant which is another sidelight.

10:22:07
A:
I wasn't involved in it but they made some, some uh, I believe it was 3.8 percent uranium metal. Uh which was then sent to Oak Ridge for some forms of criticality tests. And at one point in time they sent all that back to us and I was given a job of preparing that so we could use it as sweetener. Or send it to Portsmouth as black oxide.

10:22:48
A:
And what we actually done there, there was an enriched oxidation furnace in the Pilot Plant and first thing I done was took an ingot and cut it in about inch wafers. And uh it didn't work. Uranium metal, these were about, I forget the diameter anymore but they were inch wafers and I'm going to say maybe.

10:23:12
Q:
(Train blowing horn)
Is that real loud? Hang on –

FERNALD LIVING HISTORY PROJECT
Transcript

A:
Okay, okay – so they were inch wafers uh, and I forget the diameter, I believe they were 10 inches but I ain't gonna say for sure. No they weren't they were maybe eight. Anyway, we then – it didn't work. So then I sent the ingots to Plant 6 and they actually machined the ingots down in turnings and then it was fine. We were able to produce the black oxide.

10:23:40
A:
And then we took the black oxide to Plant 1 and screened it, analyzed it, packaged it in 15-inch high by 6-inch, or 5-1/2-inch I believe it was in those days cans and that was all sent to Portsmith, the plant down there for recovery. We later got it back but that's another sidelight. Also another project I had in the Pilot Plant in later years was, Oak Ridge had taken an x amount of green salt and put it into paraffin blocks of different sizes which they were using for criticality tests down there.

10:24:18
A:
And we got those back as a residue and I was given the job of separating the green salt from the wax and so we came up with a process where we actually heated the bricks and in uh, kerosene and we used a centrifuge to discard the kerosene and the melted wax and you'd come out with the green salt. Which had some moisture in it and we took that and actually dehydrated it in the same thing, containers we used to dehydrate the thorium in and produce the green salt and then that was sent to Portsmoth after being analyzed and all that sort of stuff.

10:25:06
And then the wax and kerosene that came from that, we took that up to the oil burner which was an outdoor unit up behind the boiler plant and we produced a lot of black smoke. When you, when you, well all you did was burn it, to burn, get any, get any uranium that was left in it – out of it. And uh, there was a number of drums of that that we burnt up there. That was another project that I had –

10:25:35
Q:
I was gonna ask you about that because somebody else I had interviewed mentioned green salt and paraffin. He was the only other one I had ever talked to – I asked a few people.

A:
Who was that?

Q:
George Bassitt.

10:25:46
A:
Yeah, George was a Chem-, well George done the work. I was the technical backup and he was the actual operator that, that done, uh that done, we done it under, at that time we had, it was like a pad with a roof on it, it's now in, it has three sides on it, or did have by the Pilot Plant. But it was open at that time, and that's where we did it at – in that open area. George did, uh primarily the most of the

work as far as the operator personnel was concerned. We had the technical backup and I was actually involved in the process and then I was told to get rid of the residue, the kerosene and the wax, which we did.

10:26:29
Q:
Now with all these special projects that you worked on, all these sort of top secret projects, how did you communicate anything about your job to your family?

A:
You didn't in the early days. Now those weren't top secret there, by any means. That was later in years, you could talk about it then. But for the first, I don't really know. When the security slacked off, but I'm gonna say, probably the first fifteen to eighteen years of the plant, I don't remember exactly but uh, however, I've got a little sidelight for ya.

10:27:03
A:
I hadn't been there but about two years and was told about all this hush-hush and you couldn't tell anybody anything, and of course I uh, Cincinnati Enquirer one Sunday and they had about a three page layout of everything we done. But, we still had to keep it secret, I mean we still had to not tell anyone, even, and uh, that was very early on in the game. But.

Q:
Man. Uh, in about 1984, (Response - Yep!) um, there was a dust collector release in Plant 9. (Response - Yep!) That kinda started a whole bunch of media attention (Response - Yeah, it did) the media. How did you deal with that?

10:27:45
A:
How did I deal with it? I wasn't involved at the time. That was just prior to my production days or I probably would have. Uh, what happened was they got a bad, uh somehow, a bag got a leak in it. And uh, they uh, let some uranium oxide, what it was, was actually the dust collector for the uh, re-melt furnaces in Plant 9. And uh, they got a leak in the bag and it sent some black oxide out into the atmosphere.

10:28:27
A:
Which, according to the monitors it was all retained within the perimeter of the site. But, uh, I'm, I was on the outskirts of that, I knew it happened. I was heavily involved in all the production phases as far as backups and so forth and so on. But I didn't really have any part of that particular operation. Or wasn't involved at the time up there.

10:28:56
A:
So therefore other people that were involved as far as figuring it out and knowing that happened, they shut it down of course and uh, people from Oak Ridge came up. And I know Ray Hanson was in Oak Ridge at the time and he uh, eventually wound up as the DOE head there at uh, our place for awhile.

He came up and he was involved along with another guy who was the uh, ah, uh, top of the DOE at that time uh, what the heck was his name, you probably know it but I can't think of it. Thought I'd never forget that either.

10:29:36
A:
But, anyway, they came up from Oak Ridge and uh, sort of uh, helped our management in deciding what to do. And that's what finally shut us down, was that particular incident, otherwise we might still be running today – I don't know. That's what did the deed. And then also we had another uh, problem which I didn't mention.

10:30:12
Q:
Before you get into that, let's switch tapes. (Response - Okay.) Hold that thought. (Response - Okay.)

Tape FLHP0127

11:01:00
Q:
Okay, so what were some of the other problems that.

A:
Okay, what we, what we, that really didn't lead up to that problem but as a sidelight which came along a little but after that did. That's the problem that really uh, got all of uh, the media hype and the attention from Oak Ridge and uh, Washington, and etc etera. Prior to that time we were kind of a, uh somebody that they needed but uh, they didn't pay of a lot of attention for a number of years, probably eight, ten years.

11:01:40
A:
They had moved their office after Clarence Carl, who was the head of DOE retired, why we had a liaison man out of uh, Oak Ridge which came once a month or something like that. And uh, and anyway that started drawing all the attention to us. Well, then after that actually occurred uh, we had the green salt, well really what happened was the UO_3 that we produced in that 76 time frame it went to uh, Paducah, they had made green salt out of it, but they really hadn't used all of it. So they sent some of it back to us and it had some uh, uh, minor plutonium in it.

11:02:29
A:
And we had always analyzed everything very heavily for plutonium. All the tales coming back from Hanford were less than 1 ppb. But uh, that material, all we were shooting was a target of 3,000 disintegrations per minute as we ran it through the refinery. And I forget what that relates to, what the calculation is to get to ppb, but it's something like, I believe around 50 ppb or something, somewhere in that neigh-, I ain't gonna say for sure, but it's something like that.

11:03:04
A:
Anyway, we had taken this uh, uh, material to, that was in hoppers, and we had taken it to Plant 4 to remove it from the hoppers in that system and re-drum it so that we could then transfer it to Plant 5. Plant 5 didn't have anyway of taking a hopper, so it was re-drummed and then packaged in Plant 4 to go to Plant 5. And it had some elevated levels of ppb of plutonium in it which some of, lots of green salt runs as high I believe uh, as maybe 20 ppb or uh, maybe even some up a little bit higher, I can't remember those numbers.

11:03:55
A:
But uh, that became a problem later on in all the media hype, and etc etera. Soon as we found out what the levels were, why uh, that process was shut down and it didn't run much material. And most of that was sitting there when I left and it went to somewhere, I'm not sure whether they buried it or whether they're still trying to sell it, or what happened to it. But it went uh, maybe some of it, naw – I don't think it's, I think it's gone.

11:04:24
A:
But, anyway, that was another problem that came along not to long after that uh, incident. But uh, of course, things become much more critical then, and with all of the uh, influx of the uh, various media and this committee and that committee and the senators and representatives and the uh, brass from uh, Washington.

11:04:56
A:
And I toured most of 'em at one point or the other through various parts of the plant, whatever they wanted to see. From after Westinghouse got there in '86, until we shut down in '89 and I still done a lot of it even uh, from '89 until I left there in January of '92.

11:05:22
Q:
Now if all the material that went through uh, Fernald and its mission for 30 some years, how do you think that what Fernald did day to day contributed to America's goals?

A:
Oh, we were a tremendous part of the uh, Cold War effort and the production of eventually plutonium and also uh, the, that material is also used in a lot of private reactors or we were the start of it where we took the basic materials, the uh, concentrates and then the recycle materials coming back from Hanford and Savanah River and was able to keep that in the stream and then the gaseous diffusion plants.

11:06:11
A:
Of course they're the ones that produced the higher U-235 but they had to have feed for that system and we were a critical part of that whole process. And we were instrumental in uh, in the development of

the penetrator program, and we were also instrumental in developing the armor plate for the tanks which is what we used the flat ingots for.

Q:
Great. And uh, how do you feel about the clean-up efforts that are going on at Fernald right now?

11:06:55
A:
Well, I mean, it seems to be progressing very slowly, wasting a lot of money in my estimation. But that's just uh, there were a lot of things done that you probably wouldn't have had to have done, but, a lot of it's like wearing a belt and suspenders both.

Q:
So you don't loose your pants. (Response - Right.) Right now they're getting ready to start some really big projects we can clean up and one of them is digging up those waste pits. (Response - Yep!) Now you've been mentioning those waste pits all along, what kind of surprises do you think they might find in there?

11:07:30
A:
Well, they shouldn't find many surprises if they've read their reports. I went back and worked for a group under Fluor Daniel uh, after they took over where we went through and dug up all of the data on all of the materials that went into the pits, uh, or everything that was documented at least, and that's probably 99 percent of it. And they should have a pretty good idea of what's there and what's there in various places if they paid any attention to the report.

Q:
So everything that was put into the pits and that was put into the silos was that pretty well documented all along?

11:08:11
A:
Yeah, yeah! The silos what an entirely different system. I mean that's where they were taking pitch blend and refinery, which was a very high percentage of uranium in the ore concentrate, and they called it pitch blend, and that was actually run through the refinery and then that raffinate was dry and then deposited into the two tanks out there.

11:08:38
A:
Also we received some material back from Mallinckrodt, they were working on the same thing in those days and they went into those two silos. The third silo, my understanding is and everything that I've read about it is that that's natural uranium it has no, none of the problems that is associated with the K-65 silos.

Q:
Do you know why they called K-65?

11:09:06
A:
Well, that was the project. That was also secret at that time I believe. The number might have been K-65. I'm not real sure but you weren't, when that first started of course that was very secret. And those residues were still owned by the Belgium government up until the late 70's somewhere.

11:09:24
A:
And they traded under some negotiations, they traded, or we traded for that in place of a site we could put something over in their country. It was a bad deal – we should have let them had it. It primarily remained there because of the precious metals that's in it – gold, etc., etc.

Q:
Now a lot of people have mentioned that some of the Niagara Falls materials came down and was put into the silos (Response - Could be, could be.) And that was supposedly Manhattan Project materials – is that true?

11:10:03
A:
Probably could be. Because the Manhattan Project was the thing that controlled everything in the beginning. A lot of the work was done at Argonne which is up around Chicago, but they also had that spread out in various places. I'm not real familiar with those things but I know a little bit about 'em, what I've read primarily, because I wasn't involved in them. That was, we were still under the Manhattan Project in 1955 when I came to Fernald. But that later changed and Oak Ridge picked us up.

11:10:39
Q:
Now they're tearing things down pretty quickly and uh, eventually there ain't gonna be buildings on that site anymore. What would you personally like to see done with that ground?

A:
Make a nice golf course.

11:10:57
Q:
(Laughter) That sounds like a plan.

A:
I don't know why you couldn't use it, once you've proved that you've decontaminated it to the point that you need that you couldn't put industry in there or whatever you wanted to use it for. But, whether they'll ever get to that point or not I don't know, to satisfy all of the critics.

Q:
Generally, how do you feel about your years at Fernald?

11:11:23
A:
Oh I had my good and bad days, just like everybody else. But in general it was a good place to work. And a lot of the hype about they didn't have safety and uh, that's just not true in my mind. Because you had all, for the time we had all the available protection equipment that was needed, but under today's standards may we wouldn't have had, but nobody had 'em.

11:11:53
Same thing was going on at Mallinckrodt, I remember they used to dump those big ingots reduction vessels out on the floor, they didn't have any vis-, vacu-, visible vacuum anyway. I never really got out there to see it happen first hand but I used to see pictures of you know what was going on. Our liaison people between them and us. One of them was my boss.

Q:
Is there anything we didn't cover that you wanted to cover?

11:12:27
A:
Not that I know of. I tried to go through the prim-, I'm sure that I missed lots of things but uh, uh, we got most of it. After that incident in '84, uh, just prior to that why DOE had started to take a little bit of attention and had given us some money to start renovating uh, the project and I was highly involved in a lot of the new projects that were either gonna replace or remove the current processes we had going on there.

11:13:03
A:
We never got to use any of 'em. But we got the new breakout in Plant 5 built but we never got to use it. And several other things that were finished and completed under the renovation projects that we never got to use. But I've made many, many trips to Oak Ridge and talking to engineering companies and the Oak Ridge people and etc etera, etc etera.

Q:
How do you feel about this opportunity to be able to tell what you did at Fernald?

11:13:31
A:
That's fine with me. I've told it to thousands of people. In interviews, not interviews but in the tours I used to take through the place. As I told you personally a while ago, I had a group of Japanese in there which didn't speak Japanese. They had an interpreter with them and I talked and they listened. I had a group of east Germans in there and we were primarily looking at the metal reduction and the residue situation at the time.

11:14:07
A:
And they had the same problems, I was able to understand enough of them to that, that they had the same problems we do, in East Germany. The same kinds of residues and things discarded in to their waste areas.

Q:
Anything else?

A:
Nope! That's fine, I've said, I think I've talked long enough.

11:14:25
Q:
Okay. We're gonna do what we call now, its called nat sound, it just means we need to stay quiet on the set for about 30 seconds. This is nat sound.