



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Meeting Date:

March 28, 2007, 12:30 p.m.

Meeting with:

Former Hanford workers from the DuPont era, 1942 to 1946, in Richland, Washington

Attendees:

Name	Organization	Name	Organization
[deleted]	Hanford (retired)	[deleted]	Hanford (retired)
[deleted]	Hanford (retired)	[deleted]	
[deleted]	Hanford (retired)	[deleted]	Hanford (retired)
[deleted]	United Steelworkers of America (USW) Local 12-369	[deleted]	
[deleted]	Hanford (retired)	[deleted]	
[deleted]	Hanford (retired)	[deleted]	Hanford (retired)
[deleted]		[deleted]	Hanford (retired)
[deleted]		[deleted]	
[deleted]	Hanford (retired)	[deleted]	
[deleted]		[deleted]	
[deleted]		[deleted]	
[deleted]	Hanford (retired)	[deleted]	

NIOSH/ORAU Team:

Sam Glover, PhD – National Institute for Occupational Safety and Health (NIOSH), Office of Compensation Analysis and Support, Health Physicist

Laurie Breyer – NIOSH/OCAS, Special Exposure Cohort (SEC) Petition Counselor

Fred Duncan, Oak Ridge Associated Universities (ORAU) Team, Task 5

Ed Scalsky, ORAU Team, Task 3, Document Owner of the Hanford Site Profile

Mark Lewis, ORAU Team, Task 3, Worker Outreach

Mary Elliott, ORAU Team, Task 3, Worker Outreach

Mary Jo Zacchero, ORAU Team, Senior Advisor

Proceedings:

Mark Lewis opened the meeting at 12:30 p.m. by thanking the attendees for taking the time to come to the meeting. Mr. Lewis explained that representatives from the National Institute for Occupational Safety and Health (NIOSH) were present to get information for the Special Exposure Cohort (SEC) evaluation petition from former Hanford employees who worked at the site in the early 1940s. He stated that representatives of the Department of Labor (DOL) Resource Center were also present to field questions. Mr. Lewis introduced Sam Glover of NIOSH.

Dr. Glover stated that the meeting would be informal and its purpose was to hear the former workers' input. He stated that he works for the NIOSH Office of Compensation Analysis and Support (OCAS). Dr. Glover asked his NIOSH colleagues and members of the Oak Ridge Associated Universities (ORAU) contractor team to introduce themselves. He then asked the representatives from the DOL Resource Center to come forward to speak briefly to the workers.



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Steve Beeler introduced himself as the Manager of the Hanford DOL Resource Center. He explained that the Center is actually a contractor to the Department of Labor. Claims are handled by claims examiners in the DOL District Office in Seattle. The Resource Center is available to help with the initial claim filing process and to get any additional information to the Seattle DOL office. Mr. Beeler explained that there had been many changes in the law since its inception. The biggest change to date for workers who filed in the earlier years of the program is the abolishment of Part D of the law and the creation of Part E. Eligible claimants who have already filed a Part B claim that has been approved are automatically also covered under Part E of the law. However, in order to be considered for impairment compensation or wage loss, the claimant must notify the Department of Labor that he or she wants to be considered for those. Mr. Beeler stated that he had made Resource Center literature available for anyone who might need help with a claim.

Dr. Glover thanked Mr. Beeler. He stated that the handout includes contact information for Ms. Laurie Breyer, the NIOSH SEC Petition Counselor, and Mr. Mark Lewis, the Worker Outreach union liaison.

Several sites were written into the Energy Employees Occupational Illness Compensation Act (EEOICPA) as SECs, including the three gaseous diffusion plants. Since then, additional sites have been added to the SEC. To be eligible for the SEC, a worker must have worked 250 days and have one of 22 specific cancers. If the worker meets both of those criteria, the claimant is paid without the need for a dose reconstruction. If the worker has not worked for the specified time or does not have one of the 22 cancers, then a dose reconstruction is performed to determine if the claim is compensable.

Dr. Glover explained that three SEC petitions have been filed on behalf of three different classes of Hanford workers. To simplify, they are being merged to form one petition with two distinct classes: from January 1, 1942 to September 1, 1946 and from September 1, 1946 to December 31, 1990. Some of the issues identified by petitioners for the class from 1942 to 1946 were that DuPont employee records were lost and that environmental release studies were flawed. In addition, other issues are being considered by NIOSH because of recommendations from the Advisory Board on Radiation and Worker Health (ABRWH). All of these issues will be evaluated in the SEC Petition Evaluation Report. The classes for the three original petitions are:

- SEC Petition 0050: All workers from January 1, 1942 to September 1, 1946. The principal issues are that the DuPont employees' records are lost and that environmental release studies are flawed. This class of workers will be evaluated as Part 1 of the merged petition (Petition 57).
- SEC Petition 0057: Originally proposed for all workers in facilities and all areas at the Hanford Reservation from January 1, 1942 to December 31, 1990. The class being evaluated is all employees in all areas and facilities from September 1, 1946 to December 31, 1990. The principal issues that have been identified are that several employees listed in the petition did not have monitoring records for all periods. This class of workers will be evaluated as Part 2 of Petition 57.
- SEC Petition 0078: All roving maintenance carpenters and apprentice carpenters that worked in the 100, 200, 300 and 400 Areas of Hanford from April 25, 1967 to February 1, 1971. The principal issues identified are that carpenters and other construction workers were not monitored for internal exposure during this time period. This class of workers will become part of Part 2 of Petition 57.



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Dr. Glover explained that the goal of the meeting was to hear from the workers who have first-hand knowledge of the work practices at Hanford in the 1940s. NIOSH understands that practices in the early days were not the same as modern work practices. A follow-up meeting will be held at a future date to discuss practices from the 1950s through 1990. After the workers from the 1940s are finished, anyone from the later time period would be welcome to speak since one of the issues being evaluated is how practices changed over time. Individual claims would not be discussed during the meeting due to Privacy Act issues.

Dr. Glover stated that NIOSH is interested in hearing about the practices of the radiation protection program during the early DuPont years, including monitoring practices for internal and external personnel exposure, monitoring in the reactor and plutonium separation facilities, and the frequency of the bioassay and dosimetry badging programs. The mobility of the workers within the facilities, as well as information regarding incidents and/or accidents, are also issues of interest in the evaluation. NIOSH also appreciates hearing workers' stories about the daily work environment at Hanford.

Comment from Former Worker #1 (unidentified):

There was nobody here in 1942. I was living here. There was nothing before 1943. In February 1943, the government took this over. We lived here, had property here. I just want to clarify. They started building houses in Richland in the summer of 1943, and anybody who tells you that they were working here in 1942 is a damn liar. We lived here. I went to grade school here. 1943 is the time they took it over and in the summer they hadn't done any hot stuff. So it was from 1943 on.

Response from an unidentified attendee:

Can I be more specific? That work started in February 1944 – early 1944.

Comment from Former Worker #2:

I'm [deleted]. I came to Hanford on [deleted], 1943. I was the clerk issuing the welding gases for the project and was part of the dismantling of the construction camp. I took care of the dispersion of the railroad cars out of the camp. When construction was over for me, I was a laborer around town, mowing lawns and spraying trees and shrubbery.

When I turned 21, I went to work in Fuels until 1948. We handled uranium billets and made the rods and straightened them and machined them into slugs. We handled uranium chips.

You wanted to know what we knew about radiation protection. We had a radiation physicist come over with his CP one day and sit down on a stack of uranium rods trying to calibrate it. He said that the instrument was no good and that he would have to go back and get another one, so we took him outside and measured his hind end for him. He was just about as hot as the uranium was. That was what you ran into.

We developed the oxide burners and took care of the chips from the fuel pieces. We got the slugs canned. We had all kinds of cleansing materials and degassers. That relates to one of my current claims. They gave me a list of the chemicals that we worked with. I took it to my doctor and he said, "We can't claim that you got cancer from any of this. We don't know that much about all these chemicals."

It's pretty hard to tell about what we did out there in that part of the functions. We handled all kinds of experimental metals and when you go out to the reactors, it's a whole different story there. We had the contaminated areas and the radiation zones – high level radiation zones and low radiation zones. We had extremely hazardous areas. If anybody heard anything about a reactor rupture, that was like an incident nowadays. Plutonium particles were all over the work areas where we worked and it spread and you had to clean up the irradiated materials that came out of the reactors. The design of the reactor is unbelievable as far as I'm concerned, but it was still experimental. Have any of you



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

ever seen a plutonium-producing reactor to know what we're talking about? No answer? I guess not. I'm talking about you people – NIOSH.

Sam Glover:

I have not been to the facility – the initial reactors. We have a lot of documentation, but I have not been to the 100 Area reactor facilities.

Response from Former Worker #3:

I've been to them all – all the 100 Areas. I started in the radiation areas in 1950. In 1961, I went down with cancer. I've been fighting cancer ever since, but they did pay me. They did make a payment. I worked in those areas from 1950 until [deleted]. That's when I retired.

Sam Glover to Former Worker #2:

Sir, when did you start working in the radiation areas?

Response from Former Worker #2:

I started in the radiation areas on [deleted], 1945.

Sam Glover:

Do you remember what the air sampling programs were? There was no bioassay program until 1948.

Response from Former Worker #2:

No, there was no air monitoring program that I knew of. I went to the Hanford doctor several times because I was trying to figure out if all that black stuff that I was blowing out of my head was what was causing me any problems with my lungs. He said, "Oh, no. That uranium won't hurt you." I still don't believe that, but that was the answer that I got.

Response from Former Worker #3:

I don't remember that they did any air monitoring in the 100 Areas – in the reactors.

Response from Former Worker #2:

They did start monitoring around 1949 because I was out in the 300 Area. When I got out to the 100 Area there was some air monitoring, but the air flow around the monitors was that everything went up and out the top of the stack and from around the building and over the top of the reactor. That was after it had gone through you. Then they put in big filters and monitored the filters, but that was also to purify the air before it went into the atmosphere.

We experienced a lot of things, such as escapes from the 200 Areas. We had to go out and round up the "hot" tumbleweeds and dispose of them. There are lots of things that happened at Hanford.

Maybe it would be a good idea for some of you people who are making these decisions to come out and join one of our tours of the Reactor Museum to see the reactor and get a feel for some of these questions that you are asking. Thank you. That's all I have to say.

Comment from Former Worker #4:

Hello. I'm [deleted]. I came here in 1944 with the DuPont Company, so I've been around a long time and I've seen things happen. DuPont found out that I had a top secret clearance, so they sent me all over. But in 1948, I quit and I came back to work again here at the Hanford Project. That is when the DOE hired the Jones Company because the operations people – and I've seen most of you here that I know – were getting burned out. Do you remember the pencil tubes that we used to have to stick in our pockets? They hired the Jones Company and some other subcontractors to pick up this radiation work that had to be done because so many, many of the operations people were burned out already and they really did know it. They started the Jones Company and the subcontractors to do a lot of the radiation work. We finally found out what the score was. They wanted us to take a lot more radiation than what the other boys had been taking, so we made new



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

rules and the unions all made good rules. We could take 300 mR (milliroentgens) per week in a 40 hour week. It was difficult and we had to hire a lot of extra people because we got into some of the reactors where the radiation was terrifically high. Anyway, that's why I'm sitting down here today instead of standing up. I'm one of those guys who took too much. But we did this, when we went to DOE and the Jones Company and said that 300 mR per week was all anybody was going to take. That upset the DOE. The Jones Company made sure that everybody who went into the radiation zone had his name and any radiation that he took registered with those people. So it meant that the Jones Company had to hire a lot more people because of that 300 mR per week.

In 1978, just before I retired, we had to replace 400 valves in N Reactor. We didn't know – and nobody told us – that some of the fuel elements that they were using in the N Reactor were made out of cobalt-60. The reading on cobalt-60 is 550 R (roentgen). Now, the last time we were here with the Labor Department, the guy they had here didn't even know what 550 R meant. It meant 550 R will kill you right off the bat. At 550 R, it only takes 3 seconds to get 330 mR. There were a few big 550 R valves that had to be taken out, so it was difficult. The Jones Company did all this radiation work to help out the people that went to work everyday on our federal place. That is one of the reasons. Most of the people that I see in here today are people that I worked with in the radiation areas, and they were people who worked on operations. This is just a little of it.

As I said, I'm sitting here today because of all this stuff that I've been talking to the Labor Department about. They don't want to pay me, so that's it. I thought that I would tell you that everything that the Jones Company did was registered. I know that when I retired in 1979, I had a filing cabinet with 3 drawers full of logbooks. Every time we did a job, it was put into a logbook. It wasn't looseleaf; it was something that you could use in court. The DOE can't seem to find them. If DOE could find those logbooks ... I know the subcontractors gave them to Jones, who gave them to DOE. If DOE ever came up with those logbooks, it would satisfy an awful lot of those people who have radiation. It would give them something to hang their hats on, but they can't seem to find them. I would imagine that they are over here in the Federal Building somewhere, if somebody would find them. I just wanted to add here that the Jones Company was hired because all of you operations people were burned out, or pretty close to it, and you couldn't take the radiation that had to be done. That is the reason that I went with NIOSH before. If anybody has any questions, just holler.

Sam Glover:

Thank you, Sir. We are trying to find the original logbooks. We want to locate the monitoring records to look at the neutron dose that was being delivered, to look at the photons, to try and better understand the amount of uranium at the reactor facilities and the conditions that existed. We would like to have your contact information so that we can try to find those logbooks, perhaps. Some people asked what he meant by "burned out." He meant that they had exceeded their photons, so they couldn't take any more radiation dose for a given work period. They would be work-restricted.

Response from Former Worker #4:

Thank you very much. I hope that I haven't said something that was out of line, but still at the same time, I'm here. I live down in Kennewick and if anybody wants to get hold of me, I'm in the phonebook.

Sam Glover:

Thank you, Sir. Those early practices, when we are talking about the uranium facility and the contamination events at the reactor areas, understanding what the conditions were would be of great assistance. Certainly, if you are interested in talking about that, we would appreciate your input. If you want to talk to us in a different format, one-on-one, we would be happy to do that, too.



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Comment from Former Worker #5:

My name is [deleted]. I started working in the 200-West Area in 1950. I never worked in the 100 Area, so I know very few of you people here. I worked in 234-5 until 1965, and then I went to work in the Tank Farm until 1987. As far as our dose rates were concerned, I think we were at 300 mR. I've forgotten so much of that. There were a number of our people who went over their yearly dose rate in our work in the 234-5. They made an effort, when we were getting high on our exposure, to try to put us into work areas that wouldn't require as much exposure. But sometime, in the course of getting our work done, we would go over quite often, and some of them took quite a bit. I guess I should talk one-on-one with somebody about it, because it would be easier for me. I think that will be all I will say right now.

By the way, we kept our own exposure record. We marked it on a card every day. I see [deleted] over there, [deleted] worked there. I was in one incident there, but as I said, I'm not too (inaudible) on that now. I got a report back that I had 18 percent of my exposure used up and I guess that was my lifetime exposure. I was in an incident in which I breathed some of the plutonium powder. The [Transuranium Registry] has something going on where they would like to have my body at the end of my life to check me, which I have approved. This is all that I can say at the present time. Thank you.

Sam Glover:

Thank you, Sir. We will make ourselves available to talk with you one-on-one after the meeting. The program he is talking about is the Transuranium Registry. They have a tissue analysis program where people who have been exposed will donate their whole bodies or just certain tissues to better understand things like how plutonium behaves in the body. They have a number of different goals. The Registry is located here in the Tri-Cities at Washington State University. Thank you very much, Sir.

Mark Lewis:

Don't be shy. When I talked to you on the phone, you all had something to say.

Comment from Former Worker #6:

I'm [deleted]. I came here in 1946, right out of the Army. I was lucky. I had a new wife. I got a job painting houses. A year or so later, I got a job running the paint crews (at Hanford). From there, I became the maintenance foreman for all of the crafts in the higher areas here. In 1956, I went out to B Reactor and I know what ruptures are. I worked on all the reactors up and down the river because we loaned crews out.

I've had prostate cancer and that doesn't count. I've had a melanoma in my head and that doesn't count. I've had a benign tumor on my appendix and they had to take everything out. That doesn't count. I'm going to be 89 on June 1, and I can't say a thing. I'm in perfect health. That's all I have to contribute. I'm the happiest man in the world.

Sam Glover:

One thing that does come up... You have experience in the 1950s. The Advisory Board on Radiation and Worker Health is looking at the Hanford Technical Basis Documents, the documents that we use to do radiation dose reconstructions. One of the issues is that, as the reactors aged, they also were increasing the power levels. The degradation of shielding is an issue. You don't have to stick to the discussion topics, just because we are talking about the 1940s. You certainly don't have to come back to talk if you want to talk about the conditions and how they changed over time. If you saw them running these reactors at different operating levels, what were the exposure changes – the neutron ratios, the photons? What did you see? We certainly appreciate any input that you can give



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

us – the exposure monitoring, the people who were doing the exposure monitoring.

Comment from Former Worker #3:

I'm [deleted]. I came to Richland in 1944. I worked at the 300 Area until January, and went to the 100 Areas. I worked in all the 100 areas until I retired in [deleted]. I feel pretty good. I'm 98 years old.

Question from an unidentified attendee:

When did he start working?

Response from Former Worker #3:

I started working in [deleted] 1944.

Comment from Former Worker #4:

Just in case you were wondering, I'll be 90 on my next birthday.

Comment from the wife of Former Worker #7:

I'm speaking for my husband, [deleted]. He's 91 years old. He's had a lot of skin cancer. He's had nerve problems, hearing problems, and eye problems. He's had a lot of skin cancers. He came out as a control chemist with DuPont from Kankakee, Illinois, in [deleted] 1943. He was handling pure uranium in Kankakee. He is of sturdy mind, except for memory. We did file sometime ago on skin cancers and we have been paid, so, fortunately, it has worked out with us.

Sam Glover:

I want to point out that we want to hear from you, whether or not you have been paid. We certainly appreciate your input because we want to the best we can for everybody. Your input is greatly appreciated.

Comment from Former Worker #8:

I don't have much to say. I'm here for my husband, as well as myself. He was [deleted]; maybe some of you remember him. We both came to Hanford in 1944. We met and married here. I worked in the labs in 1945 for a while. He worked in the 100 Areas and then in the 200 Area. He came from Kankakee, too. That's why I wondered if some of you remembered [deleted]. He's up in Heaven looking down at us.

Comment from Former Worker #9:

My name is [deleted]. I came here in 1946. I immediately went to work destroying the old Hanford buildings out there. There was no radiation monitoring, so I didn't know what I was getting in out there. In [deleted] 1946, I went to work for DuPont in the 200 Areas and I remained there until 1981. During that time, my job was Instrument Technician and, later, Maintenance Manager.

My jobs took me all over the 200 Areas, extending as far as Eagle Mountain. We went to check the instruments there. I can remember, specifically, going out to check some of the outlying monitoring instruments one morning, probably about 1950. The area monitor had an unusually high reading because the Soviet Union had exploded some nuclear devices and that was recording. Later in the 1950s, or maybe early in the 1960s, I came to work one morning and was met at the gatehouse by the monitoring people. They told us that we had to put on our protective clothing because there was contamination all over the grounds. It later developed that China had blown up something that was all over the place. But, in that first couple of years that I was there, I was outside walking around underneath these stacks that were emitting all of this radioactive iodine out of the dissolvers where they dissolved the slugs.

There wasn't even a very crude filtration system until about 1948. You've heard all about these down winders, I know all about it from walking around underneath those stacks. I also was used for high exposures to go out to the 100 Areas to work on the backside of the piles during some of their



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

outages. Of course, those exposures were very short-lived in a matter of minutes. I also spent a lot of time in the canyon buildings in the 200 Areas and picked up a lot of high exposure in a very short time there. They kept what records they have.

My daughter, who works out there now, recently got a whole stack of my radiation exposures through the Freedom of Information Act (FOIA) – just as thick as the Seattle telephone directory. I haven't had a chance to go through them, but in those journals it shows my exposures. From all the contamination, I've lost about 30 percent of my lungs and I have also had skin cancer.

Mark Lewis:

The handout lists some of the things that we really need to know. This would be a good time to let us know if you have information about the monitoring practices in the reactor and plutonium separations facilities, the monitoring practices for external and internal personnel exposure, how often you were badged or gave samples for urinalysis, and any incidents or accidents that you may have been involved in.

Sam Glover:

There is something that I would like to add to that. If you were a reactor worker and you were working when they were shut down during outages versus doing maintenance on them when they were operating when there would have been neutron exposures. Understanding some of those practices would also be of help.

Comment from Former Worker #5:

There is just one thing that I think I should mention. At the time that I was working out there, the Jones people were allowed quite a bit higher exposure than we were, as someone has mentioned here. I think that they were allowed 5 R (roentgen) and we were allowed 3 R for the amount of exposure that we could take a year. This was what most things were based on, as far as our lifetime limit and how long we would be working there. The Jones people would change over more often, so they got less exposure year after year. They might just work a year and be gone. I thought this was important for me to mention.

As far as shielding was concerned, we had badges that we wore. For special jobs, we wore a ring or had a pencil. Different jobs called for that stuff.

Question to Former Worker #5 from unidentified attendee:

When did they start monitoring you?

Response from Former Worker #5:

I think they monitored us right from the start, but it became a lot more prevalent in later years. When I started out there, the instrumentation then was quite bulky and it was hard to get around to where we needed it. I did receive an exposure where I breathed some plutonium. We were out there changing a filter and we thought it was safe to take our masks off. I ended up getting quite a bit more than I should have. They tried to... Well, I guess I'd better quit there.

Question – Mr. Beeler to Former Worker #5:

During the time that you were working there, did the workers during that era feel that the monitoring was effective? Was the stuff that you were being exposed to being monitored and measured accurately? And were monitors in the right place? Did they do what they were supposed to do, based on what they knew at that time?

Response from Former Worker #5:

Yes. I would have to say that they did, but the instrumentation changed quite a bit during that time. There were several things that they did. There were several hoods where we were working where there were neutrons, but there were a lot more, so we had some exposure. Some of them had more



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

lead around the inlet (?) in the glass that we worked through. We were working in several different areas and one area was not nearly as bad as the others. The airflow was such that everything had to go through the hottest area to go up the stack. They did quite a bit while I was working there. When I started working in the 234-5, it was just opening up then. Some of the people got quite a bit of exposure there. But, as I said, they put lead shielding around all the hoods and they did what they could to try to cut our exposures. We were allowed more exposure to the extremities, to our arms and our hands. Thank you.

Comment from Former Worker #10:

My name is [deleted]. I worked here at Hanford since 1954. In 1962, I was charged with the task of upgrading the quality of the radiation protection program for all Hanford workers.

We were the first site in the country that met the new ANSCII (American National Standard Code for Information Interchange) standard, which came out in 1963 or 1964. That standard was chaired by [deleted] and I helped write that standard. On the committee that wrote those standards, we had people from the Oil and Chemical Workers and a representative from a labor organization in Washington, D.C. The records were described as being necessary to provide good support, good knowledge of what people were receiving, and to provide data that could be used in the future.

I might say that the DuPont employees were fortunate because they were working for an organization for which safety was, and continues to be, their prime task. If you ever had the opportunity to go to Savannah River, which was run by DuPont until recently, there were (safety) requirements there – for example, you couldn't walk stairways without using the handrails. That was the level of safety that they required. Was the radiation safety – radiation protection – what it might be if we were to start up a project today? The answer would be no, because now we know a lot more.

It was DuPont, and General Electric, and the employees who were brought in ... And it was [deleted], an Englishman who insisted that we learn everything that we could about a new science, if you will, that we now have the models we can use to do a lot of the modeling that is being done after the fact. The extension of those kinds of studies has led to the use of a lot of beneficial radionuclides that are used in the treatment of cancer and other things. I listened to a couple people... I think that you have got to be very careful and you have got to look at the timeline.

If you are looking at the so-called radiation workers that worked for DuPont, then some of the facilities that are being mentioned don't count because they were not started up until after General Electric took over. I can tell you this, the radiation workers at Hanford, irrespective of whether they were DuPont and transferred, or whether they were General Electric, or whether they were Los Alamos and transferred, the total exposures for those individuals were entered into the record as required by this new ANSCII standard.

I personally had my hands on the records of the DuPont workers. When I took the job over from [deleted] in 1963, I was charged with looking at what was available and to make sure that it was maintained so that it could be used in the future. At that time, there was a complete history for the DuPont workers, for both those who stayed in Hanford and those who transferred back to DuPont in Delaware. Subsequent to that time, there were DuPont workers who went to Savannah River when that plant was built and there were General Electric employees who had been DuPont employees who transferred to Savannah River. That kind of information is in there. It may be difficult to locate, but it is there.

If there is any interest in doing a quality study, and not something that is going to be politically correct or politically acceptable, or interesting to the politicians, then I think that a good study could be done. But I do not believe, because of the requirements of the various sites and, later on, when the



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Nuclear Regulatory Commission came in, I do not believe that any radiation worker, if they continued past 1946, that the DuPont exposures were not already in their records. Thank you.

Sam Glover:

There is a discrepancy in the records. We do want to resolve that analytically correctly. We want to make sure that the records are in there. There are differences, and they could be as simple as a Social Security number mismatch. There is a discrepancy versus the type of ...

Question/Comment from Former Worker #10:

Are you saying there is a discrepancy or a major discrepancy? If you're saying that there could be an individual case or two, then you could be correct. If you look at the Mancuso study – and I was responsible for generating the data that went to Mancuso and Allen Bronsky and Mr. Sanders down in Los Angeles – they selected workers, using a statistical method, by payroll number and, in some cases, those workers were DuPont employees. If you look at the report, they were able to obtain the individual film dosimeters and the individual results – and I mean the original film – with a high percentage of recovery. They took those back to the University of Pittsburgh and, using modern techniques and modern calibrations, they reread those and the doses were very, very much the same as what were in the records for those employees. There is an assumption, there is a big vacancy here and I think that you are incorrect if you go in and really look.

Sam Glover:

There has been an allegation and we want to review it. I was at Pitt. I know Dr. Wald. I taught at Pitt. We have the paper tape records that you put together for verification. We are going to work with DOE to make sure that data is properly validated and to make sure that we have everything that we need.

Question from an unidentified attendee:

Where are those records now? Where are the ones that you created at DuPont?

Response from Former #10:

What I'm telling you is that DuPont employees who continued to be radiation workers – and let's take first the ones who stayed at Hanford – those records are here and their DuPont exposures are included in those records. They were basically treated as General Electric employees. When we transferred records from General Electric to the new contractors coming on board, we put in summary data of the exposures that the workers had received up until that time, and that was all that was required. It started out, for example, I worked for Battelle ... My Battelle records started out with a block of dose that was received here at Hanford and elsewhere because I was in the service. I also worked for Lockheed Georgia Division, so all of those exposures were in my records. They were transferred in 1965 along with all the rest of my information to Battelle, whereas all of my Battelle exposures are identified individually. That was a requirement all over the country. If you are talking about DuPont employees who went to Savannah River directly from DuPont on the East Coast, those doses would have been picked up either from the records here at Hanford or from the information that DuPont took with them. There was a duplicate set of records. If you are talking about DuPont employee that remained here and then went to Savannah River, that dose was transferred. I can tell you, for example, there were plutonium workers who came up from Los Alamos and a complete history of their exposures and the evaluations that had taken place. Those were all transferred. Some of those documents that came to us were quite large and they became a part of that individual's occupational exposure record here.

Mark Lewis:

Does anyone else have something that they would like to add? Do you know of any incidents or accidents?



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Sam Glover:

We will make ourselves available. Some people have said that they would like to stay and talk one-on-one. We will be here. We appreciate your input. Some folks have identified themselves as reactor workers in certain areas. I think you still have a lot of information. We may contact you to get some additional information from you.

Mark Lewis:

If there is anyone else here that is not a former worker, if you're a survivor or anyone else who may have something to say, you can certainly speak now. We wanted to make sure that we heard from the former workers as much as we could. So, now I am going to open up the meeting to anyone else who wants to say something.

Comment from a current Hanford worker:

My name is [deleted]. I work out at the (sounds like high?) Hanford Site. I've been there for almost 30 years, but for the last 20-some odd years, I've been doing a lot of studying of the Hanford histories, particularly for the 200 Areas and also some of the work that took place down at Los Alamos in support of the plutonium operations at 200-East and 200-West. I would have to agree with the gentleman over in the corner that the radiation protection program tried to be the best that it could be in all aspects of the operation. [deleted] was a very staunch advocate for that. There is no question about that. However, what happens is that usually the devil is in the details.

For instance, I've got a photograph here of a woman working in the 222-B Laboratory. What she is doing is drawing a sample from a device they called the Goldberg device, which was apparently named after Rube Goldberg, a famous cartoonist of the time who drew very intricate machines that performed very simple tasks. There are two things that I want you to look at in this photograph. Look on the wall behind the sampler, where the woman is working. You will notice a dark spot across there. The reason that the dark spot is there is so the technician who is performing the initial dilution of the material from the D Plant or T Plant is actually trying to get a good idea of how much material is actually in the pipette. I've got a pipette that is very similar to the one that they used with that device. You can take it out of the holder if you like. If you think about it, you are trying to get an idea about where that sample lies inside that pipette, so you have to squint to take a good look at it. It was very important to get that dilution correct, because you had to make four of them. All four of those dilutions had to match within a certain percentage or it would be considered an invalid analysis. It can be difficult to see the measurement on the pipette, especially as we get older and need glasses, so you have to lean closer to see what you can see. What you end up doing, defeating the purpose of the Lucite shield that you can see in front of the woman's face, is looking behind the shield so you can get a better look to see if your dilution is correct so that you don't have to redo the work. One of the common practices early on – and actually past December 1944 when they began dissolving the fuel from T Plant that was from the B Reactor, the chemists were charged with doing this dilution, because they had the most experience from their work in Chicago. They used to use a device called a Beckman. Now, the highest range on the Beck was 2 mRem or 2 R. So what one chemist would do was to hold up the Beckman near the doorstep where they were taking the sample. Typically, especially with the very first sample, or the very first hit into the process, it was not unusual to find the Beckman would go past 2, but they would just continue because the work had to be done. The dilution had to be done four times and, depending on how well the process ran, they would see anywhere from 3 to 20-some odd samples from the process. Fortunately, as the material moved through the facility, decontamination factored into play so there were less mixed fission products involved. So you can understand that there were exposures that these chemists had to deal with and through leaning closer, they would begin to see a reaction where their film badge is still attached to



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

their coveralls because they're leaning in close. I'm sure that they probably did some kind of correction for any dose that they may have expected from doing that kind of thing, but what would you do if you were getting more than 2 R at six or eight inches and you have this pipette filled with this solution that essentially is a line source? What kind of dose can you possibly expect, if you are this far away and you are trying to see it? Of course, once the dilution is made, they put it into a sample holder with a Lucite shield in front of it, mostly for the high-energy betas and certain lower-energy gammas. They took that to the benchtop and performed another analysis. When they were doing this, they were barehanded. The laboratory technicians were very well-drilled in making sure that they were very careful with the solution that they were dealing with. But occasionally people would have to clean off their hands with either water or successive decontaminating agents to remove the material. Another detail from the photograph that I want to point out: She is wearing a second-generation finger ring (dosimeter). You will notice that it is turned so that the film is facing away from the work. For any of you that ever wore a finger ring, you know that the radiation monitoring people would say that the film should be worn close to the source. But, as I said, the devil is in the details. You really can't control everything that is going on out in the field. The young lady is wearing the dosimeter incorrectly. Was that corrected for her? Perhaps, but we can't be sure. That may be something to think about. Another thing that you have to understand as you look at the initial dilution device, you will notice that it is not in a hood enclosure. The doorstop, as it comes from the process facility, has to be pretty clean so if you were in any kind of loose contamination, as you are moving your hand back and forth, you begin to create some kind of an air action, if you will, and you could possibly breathe material in. Granted, they were very careful about those things, but there was a study that they did in 1946 or 1947 where they found that they had an issue with the air moving contamination around. If you look back to the photograph, you can see where the lady has the primary sampler in front of her – the Goldberg. Behind her, she would have had a series of ductwork and registers. What you would see in the schematic that is in the report is the air coming out of the registers and swirling that primary sampler and coming back toward the individual performing the analysis. They found this out with devices that they called Little Queenie and Big Sucker. The health instrument people also regularly did routine smears of working surfaces. In the report, it shows that they found 2.5 micrograms (μg) of material on benches, gloves and other surfaces. So it wasn't like plutonium wasn't out there. In fairness, one of the things that they did as they were performing the analysis, as the batch went through the process, they used a device called a trombone to take the sample and applied a vacuum to suck the sample from the trombone into something called the bayonet. It was actually a bayonet sampler with a trombone inside of it. So the sample was collected down below there and then they performed the analysis.

The ones where you have less fission products and more availability of plutonium, if that is the right word to use, those were actually done inside of the hoods. There was a hood that had a fan that exhausted out the roof of the 222 building, creating a reverse air flow to keep the material away from the technician. Unfortunately, I do not believe that was not filtered air. I have some air sampling data from the 221 and 224 Buildings, as well as some air samples from a nonprocessing facility. They had 13 incidents of greater than 10^{-11} μg of plutonium, so apparently something was getting out into the air and this stuff was being breathed in.

Another interesting thing, depending on where this building is located, where the patrol shack was located near the separations facility, because in the 200 Area they made the initial badge check and then went to the building and then went through another patrol station to go through. If the patrolmen were going around doing door checks and found the plutonium concentrations were low, and probably were low most of the time, but what would they know if they got into it. They didn't survey



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

going in and out, because they didn't come out of a zone. These are early operations and they really tried hard to make sure that they could reduce those things. They really did. But they had a mission, also. They had to get the plutonium out. There was a fellow from Chicago that was a health physicist for the Chicago labs, and he was constantly telling everyone, "Do you know how hot that is?" but the reply was "I know how hot it is, but nobody is shooting at me to do the job." The mindset was that there were people in greater danger out there so they were moving forward with it.

As far as incidents, they are numerous. Every one of these people who worked out at the site had something happen to them, or were involved, or stumbled into something. I talked to a fellow just last year about an incident in the 108-B Building. Some guy walks in and checks the hand and foot counter, which is hot. He calls up the 105 Building and says, "Why are your people crapped up? Our people are fine, but we found nothing on our smears." There had been a release from the 200 Areas and it was falling down on peoples' heads and that is why they were contaminated. It was not unusual for contamination to leave these facilities, but they did their very best with what they had to keep these things from happening.

I have a multitude of things and I really don't want to take up all of everyone else's time. I suppose that it sounds like drivel. I think it is important. The details aren't always in the reports. You read the monthly reports, but when you take these back to the people who were involved, they say, "This is what really happened."

I have one story relating to the work in the laboratories. The HI workers were doing a dose survey of a building perimeter and noticed that they were getting a reading through the wall. The women's changing room was on the other side of the wall, so they went inside and checked one woman's shoes. She had a reading of 80mR on the bottom of her shoes and it had been there for some time and had been missed. On the monthly report, they just noted that they had found a hot shoe and didn't describe how long it had been that way. I talked to [deleted] and she said that she had been wearing it around for awhile. If you looked in the newsletter, it talked about "Hot Foot [deleted]." Well, that was [deleted]. I'm sorry to have taken up so much of your time, but I've got other information. More than likely, you already have it. I've got photographs. I've got stories. I've talked to a few of the people that are here. I would like to emphasize that all of the reports that I have are publicly available documents. I would not comment on anything that is not publicly available. I have a clearance, so I have a responsibility to maintain that.

Comment from Former Worker #10:

I just can't sit here and not make a comment on that. There are two types of report that you will find that are associated with radiation protection records at Hanford. We were forbidden to put peoples' names in the type of report that he is talking about. If the level of accident or incident was high enough, there might be a Class A, B, or C investigation and the details were contained in the second section. He doesn't have access to the occupational exposure records unless he has a need to know. DuPont started it, General Electric continued, and it is still the situation out there today that if there is some sort of minor incident, it was reported to an exposure evaluator. It was written up on what we called the "half sheet," and there was a half sheet for every one of these things. If there were three or four people included in that half sheet, there was a half sheet included in each of these individual's records. Later on, it became more than just a half sheet, but an investigation was undertaken by the field radiation monitoring group. They had to fill this report out and certify what they had found. The report went into the occupational exposure records and became a record of the history for that organization, whether it was DuPont, or General Electric, or Battelle, or Westinghouse, or whoever. The details for the individuals went into their individual exposure records.



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

Sam Glover:

When we get the records for the Hanford employees, there are sometimes five or six hundred pages, including detailed incident reports. There are certain circumstances where we have to talk to the individual for more details, but we certainly do have some very detailed reports.

Response from a current Hanford worker:

I would certainly have to agree that the incident reports that I read that were publicly available did not contain any of the names of the individuals. I never seek to find out the names of the person, because that is none of my business. I never make it my business. It was just happenstance that this lady was telling me about what happened to her and I told her that I had read about her in the newsletter. She said, "Oh, yes, and here are the details." I don't try to locate the person in each report. That is not right. But the gentleman is right. They really worked very hard because they didn't want anything to happen.

If anyone has ever read Glenn Seaborg's book, The Plutonium Story, he relates how it occurred to him that there had to be procedures in place to handle the plutonium because of the amount that was going to be produced. More than likely, that is why they brought in people like [deleted] and [deleted]. They tried very hard not to sacrifice people in the nuclear program.

Mark Lewis:

I hope some of you have rekindled some of your friendships with coworkers from years ago here today. Please remember that we will stay here to speak to you individually after the meeting. Does anyone else have something that they would like to add?

Comment from an attendee:

I'm glad that [Former Worker #11] is so certain that there are records. I do not share his certainty. My name is [deleted]. I have done FOIA requests for my father and there were very few records. We have filed a petition. We have taken affidavits from numerous people. There are huge gaps in the records. We have affidavits that there were records for Workers' Compensation and those records are not to be found anywhere. We also have affidavits from a few years later that say those records are gone. We have requested records and have not been given records. I am glad that you acknowledge that there are discrepancies. When the gentleman stated that there were logbooks and if they could find those that would help satisfy a number of people. I'm sure that there were a lot of records, but a lot of those records are no longer available and I don't see how everybody can say that they are going to rebuild the records when they are not there. To reconstruct something from nothing does not seem very logical to me.

Sam Glover:

For those of you who would like to provide written comments, or whatever is easiest for you, we would appreciate that. Thank you for coming.

Question from an unidentified attendee:

I would like to know what you have been doing for the last five or six years.

Sam Glover:

Do you mean as far as the dose reconstruction efforts? Would you like to talk one-on-one?

Response from the attendee:

The whole thing... I filed five or six years ago. Now all of a sudden, there are these meetings with the workers.

Sam Glover:

Let me emphasize: There are several SEC petitions. In addition to the information that NIOSH collects for the Technical Basis Documents from the workers and other site experts, we also want to



NIOSH Dose Reconstruction Project SEC Worker Outreach Meeting with Former Workers from the Hanford Site

get additional worker input to talk about these timeframes to make sure that they are evaluated in the SEC perspective. Can we do dose reconstruction? That is why we are here.

Question from the attendee:

Is that what you are saying? Can you do dose reconstruction?

Sam Glover:

That is the whole point of what an SEC basically is. Can we do dose reconstruction?

Comment from the attendee:

I have paperwork this thick where you've been doing dose reconstruction.

Sam Glover:

The criteria for the SEC are slightly different. We are talking about whether we can put what we have found on the worst exposed worker.

Comment from another attendee:

What she is saying is this: We have looked at your dose reconstruction. We know the incidents when our family members came home and had a mental breakdown because they had been left in a hot area too long, under running water or whatever. We can't find a copy of that incident. We cannot find when exactly that happened. We know that our parents were sent home on administrative leave with pay because they were overexposed. My father worked for J. A. Jones. We cannot get those records. All the records that we have do not show a maximum exposure or an overexposure. You are telling us that you are doing a dose reconstruction based on your computer model and we are saying that it is incorrect.

Sam Glover:

It's not based on a computer model. I don't want to get into individual dose reconstructions here.

Response from the attendee:

What we want to know is how you can do dose reconstruction without the old logs. How you have access to old logs and we can't get the records. I guess that's our question.

Sam Glover:

There are a number of resources that we use to do dose reconstructions, including worker records. We do get a lot of records. Some of the records have five or six hundred pages.

Question from the attendee:

Do you have [deleted]'s records that he is talking about?

Sam Glover:

I couldn't speak to that in a public forum. As far as other records that we are seeking, we had discussions with radiation protection personnel who were there in the 1940s and 1950s. We know that they had badges. We have the dosimeter readings. They did not measure neutrons until 1950, at least not on badges. So we have been talking with the people in order to get the measurements. We had some evaluation regarding what the neutron exposures were compared to the photons. We are also seeking to validate that by going back to the original logbooks kept by the technicians who would have been present with the workers. Those are the logbooks that I am talking about. There are 250 million records at Hanford. If we identify certain personnel, even if we were doing facility monitoring, they can help us find specific records that can assist us in validating that so we can do this evaluation in a proper fashion. I hope that helps. I really appreciate you coming to meet with us today. We will be here as long as you want us to be.

Mr. Lewis thanked the former workers and other attendees for their time and encouraged them to speak with Team members after the meeting. He adjourned the meeting at approximately 2:00 p.m.