Meeting Date:
March 22, 7:00 p.m.

Meeting with:
The Society of Professional, Scientists and Engineers/University Professional and Technical Employees/Communications Workers of America Local 9119 (SPSE), in Livermore, California

Attendees:

Name	Organization
Wyman Martin	LLNL
Marylia Kelly	Tri-Valley CAREs
M. M. Fulk	LLNL (retired)
Thomas Chatmon	LLNL
Francine Moran	LLNL (retired)
Wayne Moran	Spouse
Anne Quinn	LLNL
William Smith	LLNL, SPSE
Genia Hale	LLNL
James Brown	LLNL (retired)
Sue Byars	LLNL
One attendee, identified only as Paul, participated by telephone.	

NIOSH and ORAU Team Representatives:

Grady Calhoun – National Institute for Occupational Safety and Health (NIOSH), Office of Compensation Analysis and Support (OCAS)

Paul Szalinski – Integrated Environmental Management (IEM)

Vernon McDougall – Advanced Technologies and Laboratories International, Inc. (ATL)

Mark Lewis – ATL

Mary Elliott – ATL

Proceedings

Ms. Sue Byars, Executive Secretary of the Society of Professionals, Scientists and Engineers/University Professionals and Technical Employees/Communications Workers of America (SPSE/UPTE/CWA) Local 9119 (SPSE), opened the meeting at 7:00 p.m. Attendees included current and former workers from the Lawrence Livermore National Laboratory (LLNL), including members of the LLNL Sick Workers' Support Group. A representative of Tri-Valley CAREs also attended the meeting.

Ms. Byars read a news item regarding the fate of medical records of current and former employees of the Los Alamos National Laboratory (LANL) that are being stored by the Los Alamos Medical Center. Representative Tom S. Udall of New Mexico is seeking assistance from the Department of Energy (DOE) to see that these records that are essential for Energy Employees Occupational Illness Compensation Program Act (EEOICPA) claims are retained. Ms. Byars emphasized the importance of workers keeping records of their own to support proof

of employment and radiation exposure history should the need arise to file an EEOICPA claim. She stated that it is very important to stress this to current workers, since many of the sick workers who have filed for compensation have struggled to gather records for their claims.

Ms. Byars requested that the attendees and the representatives of the National Institute for Occupational Safety and Health (NIOSH) and its contractor, the Oak Ridge Associated Universities (ORAU) Team, introduce themselves and briefly describe their backgrounds.

Ms. Byars turned the floor over to Mr. Lewis, Advanced Technologies and Laboratories, Inc. (ATL), who briefly described his union background, his work experience within the nuclear weapons complex, and his involvement in working with fellow union members for the passage of the Energy Employees Occupational Illness Compensation Program Act (EEOICPA). He explained that his function on the team is to help get "the rest of the story" to ensure that workers are properly represented in the Site Profile.

Mr. Lewis explained that the Site Profile is a tool used in reconstructing radiation doses for claims filed under Subtitle B of the EEOICPA. Since the Site Profile Team uses records from the DOE and its contractors during the development of the site profile documents, NIOSH and ORAU need information from former workers that may not be included in these records. The workers' perspective is important because the "official" records do not always accurately reflect the work practices and radiation safety issues that workers actually faced in their workplaces. Mr. Lewis asked Mr. Calhoun of NIOSH to say a few words about the program.

Mr. Calhoun stated that NIOSH is responsible for the radiation dose reconstruction for EEOICPA claims. He observed that there is a great deal of confusion regarding which illnesses are covered under the Act. NIOSH only conducts the radiation dose reconstruction for Subtitle B for radiation-induced cancers after the employment and medical diagnosis of the covered employee is verified by the U.S. Department of Labor (DOL). Subtitle B claims for beryllium disease and silicosis are administered solely by DOL, as are all Subtitle E claims for illnesses related to toxic chemical exposure. Mr. Calhoun encouraged anyone with an illness other than cancer to file a Subtitle E claim.

Mr. Lewis explained that although the LLNL Site Profile is considered complete, it is a "living document" that can be revised as new information becomes available that could impact the claimants' dose reconstructions. He turned the meeting over to Mr. McDougall of ATL for the presentation of the LLNL Site Profile.

Mr. McDougall thanked the attendees for taking the time to meet with the Worker Outreach Team. He explained that Ms. Elliott, also of ATL, was taking notes and making a recording to produce minutes of the meeting that will be posted on the NIOSH website. Mr. McDougall stated that handouts of the presentation were included in the information packets that were provided to the attendees.

Question:
Since we are all very familiar with EEIOCPA, is there any reason why we need to go into depth on the Act? What we are really interested in is the Site Profile and its use in the NIOSH dose reconstructions.

Vernon McDougall:
The presentation will be very brief. Mr. Lewis and Mr. Calhoun already covered the first few slides, so we will be getting to the Site Profile very quickly.

Mr. McDougall expanded on Mr. Calhoun's statement regarding the two EEOICPA Subtitles, saying that Subtitle E provides for compensation for workers who have any illness that could be attributed to toxic chemical exposure in the workplace. Subtitle E claims are handled by DOL. NIOSH and its support contractors do not work on those claims. Subtitle B compensates workers who have beryllium disease, silicosis and radiation-induced cancers. DOL handles the silicosis and beryllium cases. DOL forwards only the claims for radiation-induced cancers to NIOSH for dose reconstruction.

Question:
How do they ascertain what level of dose you got before they issued the dosimeters?

Vernon McDougall:
That is what the Site Profile is all about. It tells the people who do the dose reconstructions how to interpret the information from the dosimeters and the internal dosimetry. It tells the dose reconstructors what to do if there is no dosimetry data. If you will bear with me for just a few more slides, we will go into that in greater detail. That is really why we are here.

Mr. McDougall stated that the LLNL Site Profile can be viewed on the NIOSH Web site: http://www.cdc.gov/niosh/ocas/llnl.html. He reiterated that it that can be revised when new information comes to light. NIOSH anticipates that there will be input from people who know the site well that can strengthen the Site Profile. The final section of the Site Profile was approved in November 2005. Site Profile meetings are arranged after NIOSH approves the entire document. The Site Profile is sent out for review by the labor organizations representing workers at the sites prior to meeting with the Worker Outreach team. Worker input improves the accuracy and completeness of the document.

The Site Profile has five main parts: the Site Description, the Medical Dose, the Environmental Dose, the Internal Dose and the External Dose. These are used by dose reconstructors as technical handbooks to help them to interpret the data in the radiation dose records provided by DOE and to "fill in the gaps" in the records when information is missing.

The Site Description is an historical overview of the activities that took place in the buildings and areas at both the Main Laboratory in Livermore and Site 300. It discusses the radioactive materials that were handled at the site and how that changed over time.

Question:
Are building changes and building history considered in the Site Profile? For example – and I'll just make this up because I'm not familiar with the Lab buildings – let's say that Building 12 at one time housed nuclear stuff. Now let's say that the nuclear stuff was moved to Building 14, but people assigned to Building 12 after that were never told about the switch and that information got lost over time. Is there a way to go in and say what the building was used for over time and up through present date?

Vernon McDougall:
That is a pretty good description of what should be in this chapter. It is there to the extent that the Site Profile Team had the information. This is a good example of where you can help. We were given some direction at the afternoon meeting about where to look for additional information for this section.

Comment:
To illustrate your point, Building 251 is the Heavy Elements Facility. The Site Profile talks about it as an inactive facility. It is a storage facility. I was the Facility Manager in that building for five years when it was an active building. There are gaps in the information that they were probably provided. That is where they need help from us – to fill in these gaps.

Question:
Is this all above ground information, or did they also address the underground information?

Response:
That is where they need worker input.

Paul Szalinski:
What do you mean by underground information? Do you actually mean below grade?

Response:
Yes. Just from going through and reading it, the current history may be there but not what it was used for before.

Question:
What about the chemical dumps at the site?

Question:
If the Site Profile Team didn't work at the site, apparently someone took you around, who gave you the information for the buildings?

Vernon McDougall:
This Site Profile was compiled by reviewing paper records. That is why we're here. The document was put together using records from the site and from DOE. A team of health physicists spent considerable time collecting records from the site. I understand your skepticism, but that is the way it works and that is why we're here.

Comment:
I'm not going to live long enough.

Comment:
I think that one of the comments that needs to be written down – and tell me if I'm characterizing this wrong – the Site Profile, just in terms of the description of LLNL, is so deficient and incomplete that it is beyond the possibility of a single worker or even a small group of workers to fill it in for you. It really needs a major effort. There are buildings completely missing. There are buildings that are inaccurate. There are processes that are missing, descriptions that are missing.

Comment:
The history of the dumps is completely missing.

Comment:
I'm sure that there are contamination issues that are missing

Comment:
I appreciate that you are say that you want to hear from the workers, but this isn't a remodel job. This isn't a simple remodel. This is a structural adjustment. You need to write that down and deal with it at that level, not at the paint and curtains level.

Comment:
This house hasn't even been built yet.

Question:
Were you taken through the hot cells?

Response:
They weren't taken anywhere. The hot cells are hardly even in there.

Comment:
Let me clarify for *(attendee name withheld)*. I'm not part of the NIOSH team. I'm with SPSE, the union. We met with the team a couple years ago, when they met with SPSE and Tri-Valley CAREs and others. I'm not part of the team that helped write the Site Profile. I'm part of the team that is helping to critique it. These people had never been to the Lab before today, when they came to give the presentation to Lab employees.

Question:
Did you learn anything about the hot cells from your literature search?

Comment:
… The cooling towers?

Question:
… Hot cells – the big cells?

Paul Szalinski:
No.

Grady Calhoun:
Did workers wear dosimeters when they were working in the hot cells?

Response:
Everyone at the Lab wears dosimeters.

Response:
Those dosimeters are useless.

Comment:
That is one of the topics that we should take up – the function, the accuracy and the meaning of the dosimeters, especially the thermoluminescent dosimeters (TLDs).

Grady Calhoun:
NIOSH takes that into account. We look at the minimum detectable levels (MDLs) of the dosimeters, which are based on the model of dosimeter being used.

Question:
They are about all the same, aren't they? I'm talking about the TLD – that has serious errors in it.

Grady Calhoun:
Many people have "zero" readings when they turn in their badges. But let's just say that the MDL is 20 mrem/cycle. NIOSH will assume that there was some dose more than "zero" but below the 20 mrem level that was received every single time that badge was cycled. A "zero" in your dosimetry report becomes a positive number in the dose reconstruction.

Response:
So that means that you need to get a frequency for the reading of the badge.

Grady Calhoun:
Correct. Absolutely.

Response:
… And it varies.

Grady Calhoun:
If we don't know the exchange frequency for sure, we may say that it is weekly.

Vernon McDougall:
I'm going to skip ahead in the presentation. Remind me to come back to the Occupational Medical Dose, but I'm going to come back to it for that reason.

Comment:
I just want to point out that the version of the Site Profile that I read does not acknowledge problems with the badges, and it specifically says, "The external dose reconstruction implementation guideline identified dosimetry records as the highest quality records for a retrospective dose assessment." I would definitely like it (the minutes) to say that you heard that statement challenged. We want it out of the site profile. We would like to see the acknowledgement of a number of things:

1) Not all workers who were exposed wore them (badges) all the time. Speak to *(name withheld)*, she didn't wear one and she took people on tours of the most contaminated areas all the time. (The attendee commented that even in 1985, she didn't wear a dosimeter, stating, "We didn't wear them. We were secretaries."
2) People wore them wherever they wore them, if they wore them.
3) Livermore Lab is a site that has different kinds of processes, with different radionuclides. Not every one has a gamma signature, let alone a strong gamma signature. Employees were very contaminated with alpha and beta emitters that did not, and would not, show up on a badge. You cannot just make an adjustment from "zero" to a small positive number and appropriately and properly, in any way, manipulate those numbers and come out with a dose assessment that matches what they really got.

Grady Calhoun:
You have to take into account the internal dose as well.

Response:
There are not often records of that.

Comment:
The extrapolation process for the dosimeter reconstruction "sucks." There's no other way around it. Your data is incomplete because you've got years where people didn't have them. How can you say to this person, "For five years, we're going to give you a 20 millirem reading." That's not right.

Grady Calhoun:
I will tell you that from my look at the data, a huge proportion of Lab employees had dosimeters, beginning in 1958.

Comment:
I have friends, and everyone here has friends and stories, where – when there was an incident, say, drop something with tritium in it, or if you had an uptake of plutonium-239 – you did not tell your team leader or your manager. You wouldn't have a job sometimes if you did. So there is no record of your internal exposure, whether there was one (exposure) or not. The only record you're using in doing dose reconstruction, as long as the Site Profile relies on it as "the highest quality of record," is going to be completely inaccurate – not just slightly inaccurate, not just slightly understated, but completely inaccurate for entire classes of workers.

Grady Calhoun:
But you're confusing the external dosimetry results versus internal.

Comment:
I'm just telling you that if nobody took the test, there is no internal result.

Grady Calhoun:
That is a fact. But it is also a fact that we can apply huge hypothetical intakes, and we do that as a matter of course to cancers.

Question:
Does that mean that your answer is hypothetical, period?

Grady Calhoun:
Yes, the answer is hypothetically high.

Question:
How do you address the tritium exposure for the workers?

Grady Calhoun:
I don't know the particular Technical Basis Document requirement, but I know…

Question:
What would be the acceptable exposure amount for one of your family members?

Grady Calhoun:
… A family member of mine? It could be me. I worked in the modern times, so I'm confident that my exposure records are fine.

Question:
Don't go around the question. What is an acceptable exposure amount for you or one of your family members?

Grady Calhoun:
I don't know how to answer that question. What is acceptable to me is that NIOSH assigns a dose that is at least as high as the radiation dose that could have realistically been received by that person doing that job, if not higher. That is what is acceptable.

Question:
I want to know – what would be the acceptable exposure amount for one of your family members? You are sitting here looking at cancer victims who have been exposed. My dosimetry reading (dose reconstruction result) was 43.977. That is unacceptable. Seven years of cancer – 43.977 is unacceptable. I am not going to see my grandchildren graduate from high school. That is unacceptable. My government needs to take care of me.

Comment:
You still have not answered the question.

Grady Calhoun:
I can't give you a specific number. What has got to be acceptable is that we assign a dose that is at least as high, or higher, than what was actually received. That would be completely acceptable to me, my wife, and my kids. It's the highest dose that reasonably can be given.

Comment:
I'm sorry. I think you're really, really off base here. What does the regulation say is acceptable?

Grady Calhoun:
We assign doses much higher than regulatory limits.

Comment:
We are not asking you about assigning doses according to data. We are asking you about your personal…

Vernon McDougall:
In all fairness, you're basically asking Grady an unanswerable question, and that is not why we are here.

Comment:
He is giving us an unacceptable answer.

Vernon McDougall:
That is not what we are trying to do here. We are here to ask for your help. We are trying to get constructive feedback from those of you that have information that – if you can get us that information – will make this a better document. It may not make it a perfect document, but it will make it a better document. And the better this document gets, the better your former colleagues will benefit from it in terms of getting their dose reconstructions.

Question:
How can someone know the dose number to give you? I can't tell you the exposure of the dose limits in the hot cells. I can tell you where the thing is, it's near the fire station. They can't give you a dose. As a matter of fact, aren't most of the badges at the Lab, and most everywhere else, the TLD-100? That makes a difference. It has been used for years. If I use the hundredth rad (0.01 rad) as the lower limit of that thing, an electron volt is 10^{-12} ergs – isn't that right? – and

you and I weigh about 10^5 grams, that gives about 10^{15} electron volts per body that is not even registered coming in under the radar on those badges.

Grady Calhoun:
The minimum detectable levels (MDLs) are about 20 millirems so you don't even have to go through all that.

Comment:
The millirem is dirty pool.

Comment:
I'm sorry, and I have to apologize. I think I got the group off on the numbers and I understand, now that I have calmed down a little bit, that they want information on the site. I think that maybe we should stick to the site information – buildings, dumps, etc. Am I right?

Vernon McDougall:
The Site Description is just one part of the Site Profile. There are others…

Comment:
But if they want to document our concerns about making the "living document" changes correctly, the dose reconstruction is very important.

Comment:
That number is ultimately whether someone receives compensation.

Comment:
That is why we are here.

Grady Calhoun:
You are talking about the probability of causation (POC) number. First you have to have the dose data.

Comment:
Those things (dosimeters) have changed so many times over the years. I was working on a very massive D-38 piece for many months on end – in fact, two groups of them. A health physicist came up while I was working on it, and said "Hey, we've got a new dosimeter. It's lot more sensitive. Since you've been working on this stuff regularly, we are going let you wear the first one." That says to me that the previous ones weren't cutting it. Back in the 1950s – even the 1960s, 1970s, and even the 1980s – the dosimeters weren't anything compared to what they are now. From personal experience, from working six years straight in one area and not seeing any numbers come back, period, when I'm standing right next to the material for years – that just doesn't cut it. That is a blatant exhibition of how falsely secure they are. The dosimeters are not doing their jobs and, therefore, there is a complete loss of faith in any numbers that are or are not assigned.

Comment:
I want to argue that there are two problems here. If you put one problem on top of the other, what you get is a wrong answer on a different order of magnitude. One problem is the one we are talking about, which is the problem with dosimeters – the problem that they didn't pick everything up, the problem that people didn't have them, the problem that they didn't wear them

properly, the problem that they don't register certain doses, the fact that the doses that are underneath their radar screen can be significant in causing cancer. All of those. If you grant for a moment, that I would say that these are not the highest quality records for a retrospective dose assessment, then you are left with "What is?"

Let's take the case of tritium that was mentioned earlier. It is a beta emitter. I know people who were severely dosed with tritium at the Lab. It did not show up on their badges – period, ever. One of them is sick. This person goes to apply and the dosimeter reading doesn't come up with any particular dose that would lead to his cancer. Then you look at what are the processes and types of accidents that could happen with tritium at the Lab.

LLNL had two of the largest tritium accidents in the United States of America. Collectively, they are larger than the largest one, which was at the Savannah River Site. One was 300,000 Ci, according to LLNL and the other was 350,000 Ci. That may be undercounted; we don't think it is overcounted. We acquired some of the reports through a Freedom of Information Act (FOIA) request which stated that there was employee error and very severe employee doses. Those accidents, which were in the environmental impact reports and other documents in which the Lab gave its own description of the accident, are not in the Site Profile – even though your data collection people were given those documents at our office. If those accidents, which are among the largest in America of their type, are not in the Site Profile, what about the hundreds of day-to-day accidents to which these folks were subjected? There is no way that you can get justice if the Site Profile is deficient on top of the fact that the dosimetry and the records are deficient. You put one deficiency on top of the other and you're off by orders of magnitude, not just a little bit.

Question:
Did they do, at the time, a reading of the dosimeters to see how many of them registered or failed?

Response** (from previous commenter)**:
I honestly can't say.

Grady Calhoun:
The exposure would probably have been internal. There would probably have been a urinalysis done to check the exposure.

Response:
Interestingly, they probably did urinalysis too early or too late.

Comment:
I was in an area working with radioactive materials for three years before I found out that I should have been on a urinalysis program. It wasn't until a D-38 fire at a cut-off saw. The whole shop was exposed when a worker caused the fire and opened up the enclosure for the saw and blew a fire extinguisher in there. He blew radioactive smoke and particles onto himself and into the shop. The dosimeter is not going to be picking up the air that he breathed, or the firemen that responded not even knowing that the NC shop worked with radioactive materials – so they came in unprepared. It wasn't until later, when I found out that two other employees' urinalyses

showed exposure, that I started wondering, "Hey, I'm supposed to be on the program. What about me?" At which time the supervisor ran off saying, "I'll take care of that right now."

Question:
What year was that fire? I have a uranium fire that is not in the Site Profile, and I bet that it is a different one.

Response:
I'm going to say that it was in the late 1990s.

Comment:
Since you haven't been to the Lab, and you have information about the Lab, what we need to know is what you are listing that goes on in those buildings. There are only a few buildings that housed radioactive materials. If you went to the Library and out around there, you wouldn't find any radioactive material out there. There are only a few buildings that housed and worked with radioactive materials. We need to know what they told you those buildings were doing 20, 30 years ago.

Vernon McDougall:
Please read that chapter and see if you're satisfied with the way it was treated. Somebody has to read it, and you are the experts. We need you to tell us if it is wrong, and how it is wrong.

Comment:
Like I keep saying… How did you get documentation? That's a joke. We can't get documentation. It has all been destroyed. Were you told what is underground, where the chemical dumps were, where the end of the runway was where I sat for five years and then found out that was where they dumped all the used spent fuel in 4181.

Paul Szalinski:
That is chemical exposure.

Comment:
I'm still a Lab employee. I'm in Facilities. In the last ten years, the Lab has demolished 160 buildings – 500,000 square feet or so. As they have gone through the demolition process with the buildings that were office space or lab space or some kind of space that you would assume that there had never been radiation, they've found a lot of contamination. When you say that there were only a handful of buildings where the work was done – what they are finding as they demolish these buildings is that there is a whole lot more than any of us that are working there suspected.

Response:
I think I know where all of them are, because I carried it there and I picked it up from there. It is not a secret to me.

Response** (from commenter)**:
There are a whole lot of buildings… This is one of the things that I have pointed out to the Team. SPSE intends to give written comments on the Site Profile. Because this is my background, I have a little bit more knowledge of it. The Site Profile did not include any references to the D&D program at the Lab, nor did it detail the contamination that was found in the buildings that had

been torn down. We are going to work with the Site Profile Team to follow up on these issues. I can't give them the information, but I can sure tell them who to talk to.

Response:
Building *(withheld)* is a huge building. In the Site Profile, it says that it was used for some kind of development. But at the rear of that building, there was a vault that housed radioactive material – uranium, enriched uranium, and plutonium.

Question:
Can they use classified information like that in the Site Profile? Do any of them hold a clearance?

Grady Calhoun:
Yes, I have a Q clearance.

Mark Lewis:
Secure interviews can be arranged. One thing we definitely don't want to do is to create a classified document.

Response:
I don't care anymore. I'll take three hot meals and a cot.

Comment:
I would like to mention again another issue that was brought up earlier. Both LLNL and Site 300 are Superfund sites. There was no acknowledgment of this in the document – no reference to any document about it. The LLNL site was mainly hazardous materials, but at Site 300 there was a lot of radiation. There were some tritium waste pits at the Livermore site. I don't know what all there was because I'm not that familiar with that site. I'm more familiar with Site 300. Two sections in the document did talk about surface soil and air, but we felt that it was a very limited discussion. We thought that the Site Profile Team could come up with a really good history of the contamination found, what has been decontaminated, and what still needs to be decontaminated by going through the Laboratory Environmental Restoration Activities. There is a pretty good history of the dumpsites, the pits at Site 300, and all the underground storage activities.

Question (to commenter from another attendee):
Does it tell about the underground laboratory – the one with the elevator that went down? Wasn't that the non-destructive testing facility? Will that be addressed?

***Response** (from commenter):*
I'm just talking about the Superfund site issues that deal with the dumps related to specific areas. The activity that took place wasn't related to a building or an experiment, it was related to how waste was handled and exposures that were made that weren't building-related. There are many references to those – in the S&H (Safety & Health) manuals and the Environmental Protection Agency (EPA) Regional Quality Board reports. There are a lot of references out there.

Vernon McDougall:
This is the kind of input that we can go back and see how we covered it in the Site Profile, and then see if we can get more information. The information you gave us about that building – that's something that we can go back and look at more closely. The information about the tritium

releases and the hot cells are things that we can take back with us and check into more thoroughly.

Question:
Do you have anything on Building 222? You should look into that. I don't know how long it took them to figure out how to tear it down. That's a clue – ask them how long it took them to take it down.

Response:
Building 222 is in the Site Profile, but there is not much detail. The Lab has kept really good records of the demolition of that building. You should be able to get them.

Response:
That was the Chemistry Building, where they had radioactive material and hydrogen.

Comment:
There is a structural problem here. I want to give you a chance, but I want to express some frustration. Riasp Medora of the ORAU Team came to our office several times to collect documents for the Site Profile. We have an extensive collection of documents – the Lab comes to us when they can't find documents. We gave Mr. Medora all of the Environmental Impact Reports and Environmental Impact Statements that the Lab has ever produced. We gave him all of the environmental monitoring documents. We gave him boxes full of Unusual Occurrence Reports and recommended that these should all be appended to the Site Profile as a class of documents. We gave him years worth of DOE Operating Experience Weeklies to look through. We gave him a number of documents – not just individual documents, but whole classes of documents. There are descriptions in Environmental Impact Reports and Environmental Impact Statements that DOE did on LLNL that are more complete than the Site Profile, so there is no question that they are classified. The Unusual Occurrence Reports are really good records that give you some idea of the types of accidents that happened, so that when an employee reports something that happened, you have some idea of the types of things that happened at a facility like the Lab. The fact that those are all missing – he copied some of what was in our office – but it is certainly available to you if Tri-Valley CAREs can get it. The Site Profile will remain incomplete until you append these documents to it in a searchable, checkable way. I agree that the Environmental Restoration documents will fill in a lot of soil and subsurface contamination information.

Comment:
I can't believe that you haven't heard some of these comments already, and still haven't addressed them all – or some of them at least to some satisfaction.

Comment:
I think that we need to have some understanding of what your budget is. Do you have a budget to go through these documents? What is the budget situation?

Response:
The project is funded by Congress.

Response:
They keep cutting benefits. They've got to have money.

Question:
I have a question about the Site Profile. This helps the dose reconstruction. Is that right? I read a paper when I first started coming to these meetings that said if you have a certain type of cancer, you didn't have to go through all of this.

Grady Calhoun:
You have to have certain types of cancer and be a part of the Special Exposure Cohort (SEC). When the Act was passed, there were four sites that were deemed by Congress to be part of the SEC – Paducah, Portsmouth and K-25 Gaseous Diffusion Plants and the Amchitka Island nuclear test site. If you worked at any of those four sites during a certain period, for a cumulative period of a year and had one of twenty-two specific types of cancer, compensation would be automatic. The case did not have to go through dose reconstruction because the dose reconstructions could not be done with sufficient accuracy and the radiation to which they were exposed could have harmed the class of employees. An individual worker, a specific class of workers, or even an entire site can be considered for addition to the SEC through a petition process administered by NIOSH. The Iowa Ordinance Plant is now part of the SEC, as well as the Y-12 Plant at Oak Ridge (prior to 1948), and Mallinckrodt. Other sites are in the petition process.

Question:
Is the Fernald plant part of the SEC?

Grady Calhoun:
No, sir, it is not.

Question:
How long have these other sites been under consideration?

Grady Calhoun:
We have some timelines built into the process. I would estimate six or seven months from receipt of the petition to final decision.

Question:
…Just months – not years? NIOSH has taken years to complete some of the dose reconstructions. I spoke with NIOSH a few months ago and was told that they would have 15,000 cases completed by March. Is that correct?

Grady Calhoun:
That is correct – 15,000 as of the end of this month.

Question:
How many have been compensated? How many denials?

Grady Calhoun:
Just based on dose reconstruction, it is somewhere in the twenty-five percent (25%) range for compensation.

Response:
That means that there is a seventy-five percent (75%) denial rate.

Response:
For LLNL, the numbers are worse. There were over a 1,000 claims and only 17 have been paid.

Grady Calhoun:
We haven't done that many dose reconstructions yet for LLNL. I think you're around 15%.

Vernon McDougall:
I have some figures here. As of this morning, 585 LLNL claims have been forwarded to NIOSH from DOL; 201 of those have been completed. I'm not sure of the breakdown of what has been compensated and what has not. Approximately 375 cases are still pending. One of the reasons they are still pending is that NIOSH was waiting on the Site Profile to be complete. It was only recently completed, so the dose reconstructions are easier to do now.

Comment:
Theoretically, NIOSH could recommend, since one of the triggers is that the records are inadequate to do dose reconstructions, that LLNL should be a Special Exposure Cohort.

Grady Calhoun:
That is partially true. If NIOSH cannot do a dose reconstruction – we actually have to find a case – we contact the individual and work with the individual to get them to file the petition, which goes through the "83.14" process. That is one way to get people into the SEC.

Comment (continued from above)**:**
LLNL is very different from the production sites. I have toured the Paducah and Portsmouth Gaseous Diffusion Plants. Most of the workers I talked to at those plants did the same thing with the same materials every day. When you start introducing technetium into the processing, then you have this extra problem – but they were doing the same thing every day. The workers at LLNL mostly are not doing the same thing every day. So where you have atypical work being typical, and you have not very good records, it makes it nearly impossible to do a good evaluation and a good dose reconstruction. I have always thought that LLNL should be part of the SEC because of the matrix system and the fact that so many of the workers did such completely different things over time, and that there are no good records on that.

Comment:
A lot of our job descriptions and profiles had nothing to do with what we were doing day to day.

Comment:
LLNL workers do one job, work it out, and then it goes to production. The first time around it is always dangerous. Since much of the work is experimental, there is no way of knowing ahead of time how it will turn out, so it is worked out here. The guys that work it out the first time are always more seriously exposed than the workers who do the same job after the experiment is complete. These one-time experimental jobs are a risk, at best – and there are no records.

Grady Calhoun:
Are you saying that when most of these experiments were done, that there was no monitoring being done? No dosimetry monitoring?

Response:
I'm remembering about a long time ago – I've been retired for 20 years. I'm talking about when things were done that had to be done. I'm talking about the people who did things like the pipetting of small samples. Pipettes used to be just hollow glass tubes that were calibrated, and you just sucked on them to draw the material into the pipette. Many of these guys got it right

down their throats. They didn't have the fancy equipment you have now. Workers today would be fired for doing it the old way, but not back then. I know the scale – these things have to be taken into account. Some of these guys are dead now, but it did happen to them.

Mark Lewis:
That is a good example of information about work practices that can make this Site Profile more accurate.

Comment:
My father was a maintenance mechanic at Site 300 for 15 years. I'm not quite sure what he was working on – what machine, or what he was doing – but his supervisor told me that he left the room with no soles on his shoes. I'm not quite sure what it was, but I had to get all of his medical and personnel records from the Lab, because his EEOICPA claim was denied. There was no mention of that incident, and his supervisor told me about it.

Comment:
There were incidents, back in the 1980s where the secretaries would be in their street clothes taking notes standing right next to the scientists and the technicians who were conducting experiments in the gloveboxes. The scientists and technicians were fully dressed out in protective gear.

Question:
I would like to get back to the dosimetry. As long as I worked there, I never got a reading or anything that came back to say I was overexposed. I can't tell you what they were now, but it was "normal." I had whole body counts that always came up clean. What about where you actually worked? My office was in Building 231. I would sit in one room and in the next room there was radioactive material. The only time we left the office was when we went out to make deliveries or pick ups. We ate lunch there. I worked in the plutonium building where there was plutonium, enriched uranium, D38, everything. Why I never got a reading, I don't know. We just did our jobs. We did what we had to do and we didn't question it. We didn't know how to read the badges anyway. Maybe every three months, or every six months, we sent them in and they gave us new ones. Where we actually worked, things we were doing – to me, this means a lot. I don't know what it means to you folks, but we worked there. Now we are sick. It means something. I worked in a group of 14 people. Eight of them had different cancers. A health physicist came down and told us that 100 out of 100,000 people are going to get sick. But we're talking about eight out of a group of fourteen people getting sick.

Comment:
We had the same thing happen in the shop where *(name withheld)* and I worked. I started working at the Lab in 1968. We were machining a lot of tantalum and tungsten. We were using lots of perchloroethylene with no ventilation. The tube shop, which was just north of us, had ventilation. There was a push on it and we worked with this stuff for a long time. Out of our shop, which had a relatively small number of people, there must have been about seven or eight of them pass away. *(Name withheld)* passed away from lung cancer. *(Name withheld)* had pituitary cancer and was blinded during treatment. Several others became ill and passed away, too. How can we prove this? There is a big perchloroethylene cleanup out at the Lab that they

blame on the Air Force or the Navy. But it came from those shops because of the chips and the fluids that were discarded.

Question:
Did you see the tank farms? They don't exist anymore. Do you know what I mean by tank farm? That is where they kept the solvents in 50-gallon drums. We would take a clean beaker out there and get what we needed. I'll bet you haven't seen one tank farm out there. They're all gone. I know that is not radiation, but I can remember when I would walk through all the buildings and all the secretaries had bottles of carbon tetrachloride or trichloroethylene right by their typewriters. They would leave the corks out, and they got accustomed to the odor. But when you walked into the buildings, you could sure smell it. When they did a clean sweep of the Lab, they all complained, "How am I going to clean my typewriter?"

Comment:
There were lots of different solvents.

Comment:
I worked with toluene without the appropriate ventilation and that is not on the record. I also worked with massive amounts of alcohol and acetone. In 1991, when the first Tiger Team came through, we were told to cooperate with them. When they came to my area, I showed them what I was doing and they said "We have got to get this guy a chemical hood." When that group left my area, my supervisor proceeded to chew me out. I have since learned that toluene can cause asthma, which I now have. What these men are saying about these solvents is absolutely true. We all had acetone and alcohol, at a minimum, on our rollaways to use daily. Back in the mid-1980s, the use of some of these chemicals started to slow down. They started to restrict the chemicals being kept in our toolboxes, but they were still available. Perchloroethylene was used up until about the mid-1990s. The main reason for stopping it didn't seem to be over concern for our health, but I was told by one supervisor that if one drop of perchloroethylene was found in the tank where coolant was stored for reprocessing, it would cause the whole 55-gallon drum to be labeled as mixed waste and that would cost the Lab a lot of money.

Comment:
That is one of the connections where you are hearing about chemicals, but these chemicals had depleted uranium chips in solvent, or were used as heat exchange fluids. Often there was a chemical and radioactive exposure at the same time. There is a synergistic impact that isn't fully accounted for.

You asked a question, Grady, which is "When these accidents happened with these experiments and these workers, weren't there alarms or monitors?" The answer is sometimes no, so I will offer you an example from the very recent past. In 2003, in the plutonium facility, there was a routine, temporary power outage. There was a glovebox being used that had a worn-out seal that they had been aware of for some time. There was a fan in the glovebox, and they were depending on the negative air pressure to keep the plutonium particles in the glovebox. Workers still work on this type of thing to this day. However, the building is in temporary standby for the Defense Nuclear Facilities Safety Board (DNFSB). The alarm should have sounded in the room, but it didn't.

Grady Calhoun:
Do you mean that it should have sounded from the airborne plutonium?

Comment (continued from above)**:**
Yes. The reason that you can extrapolate that there was certainly enough airborne plutonium for it to set off the alarm in the room – if the alarm had been either properly calibrated or working or on – is because eventually the alarm in the hallway was set off. The elevated reading on that alarm was not noticed right away, so some days went by. So there were 12 people, five of which were security people and the rest were plutonium handlers, who were in and out of that room in that period of time. In 2003, they probably swabbed them and that kind of thing. That gives you some idea of the type of accidents. No, there aren't always alarms. No, there aren't always records. In this case, there is a record or none of us would know about it. But there are other accidents for which there are no records, except for the employee telling his or her story.

Grady Calhoun:
What I am most interested in is not that the alarm went off. What I am most interested in is that the employee was given a urinalysis after they found out that the event happened. That is what I am most interested in, or that the worker was wearing a TLD when it happened.

Question:
Have you found the Criticality Excursion List? How many occurred here?

Grady Calhoun:
I haven't looked at it, but we have a list of all the criticality accidents in the United States.

Comment:
(Name withheld) mentioned the Tiger Team, and you just mentioned something that goes back a point that we made earlier. The Site Profile did not mention any of the results from the ES&H (Environmental Safety and Health) audits that have taken place. There was no mention of the results of the many audits and findings that have been performed on the building safety systems, the radiation monitoring systems, and the radiological controls at both the Livermore Lab and Site 300. Two of the sections do address the possibility of calibration and processing errors with the dosimeters, but they do not address the actual negative findings of the ES&H audits with those systems. In the 1990s, the Tiger Team found many deficiencies. I was in Facilities Management back then, and I knew what was found when we got hit.

Comment:
It amazes me that we got such a bad report. As an administrative support person, we were put on two years' alert that the Tiger Team was coming. We had a budget to make changes, put our best foot forward for two years, and still got a bad rap.

Comment:
Many deficiencies were found, and the Tiger Team findings triggered some very serious changes in the way that maintenance and repairs were performed on the radiation monitoring systems and the methods of calibration to sources of exposure in the workplace. We found gauges that had never been calibrated from the date that they were installed. They had been in the building 20 years and had never been calibrated. That was part of the Tiger Team findings.

So we are saying that if you want to verify the validity of the measurements and records of occupational doses, you will have to go back and look through the audit findings and see where there have been documented deficiencies. The reference on that is the ES&H Manual, which talks about how DefTrack (the LLNL Deficiency Tracking System) was used to track and analyze findings from both external audits and internal self-assessments. I think you will find these huge gaps when radiation monitors may have even been turned off. They found cases where they were not even turned on where active experiments were happening. I think that the records will show that there are huge gaps that are documented.

Comment:
We have the draft and final Tiger Team reports.

Comment (showing a picture)**:**
This thing went off with about 6-10 pounds of dynamite and blew itself apart. It was a criticality accident. All of the people who were there, and those who cleaned up, should be pursued. I don't think all of them have applied. I wanted to get in touch with one of them who I knew was still alive. I saw another one that was involved in it just the other day. He's going downhill pretty fast. I know he has not applied, because he had two illustrious elevations at the Lab so he is not going to apply. I have given this thing to people who were involved in incidents of severe exposure. Some of them are deathly sick. Some of them have not filed. When I handed the application to them, it was like handing them a hot potato. One of them was a guy who got terrible exposure. I met him a few months later and asked about it. He said, "Well, I filled it out." That was his attitude – he would have to think about it before he did it.

Grady Calhoun:
Everyone should apply.

Comment:
In 1989, we were working on a nuclear weapon and there had to be a modification. They brought in the warhead, which was pretty good-sized, and put it on the bench in front of me. The first thing we should have done was to check it with the meter, but we didn't. After about two and a half months, we finally did check it. It pegged that meter – BANG! That's a lot of alpha radiation.

Our shop actively supported the Test Site. We had a small trailer with a shop in it at the Test Site. If an engineer or physicist or anyone else needed a part made in an extreme hurry, we had to do the job. The Firestorm Series had four or five shots within about a 1,000-yard diameter. They were all in essentially the same place. We were just northeast of the Sedan Crater, which is still emitting plenty of dust, day in and day out. A lot of men that I worked with supported these shots, and there's no record. They don't even know we went down there.

Grady Calhoun:
When you say Test Site, do you mean the Nevada Test Site (NTS)?

Response:
Yes.

Grady Calhoun:
If during a claims interview, someone tells us that they traveled to another site to work on a project, NIOSH requests that data. This morning, I looked at a handful of cases from LLNL and half of them have accompanying data from NTS. NTS data is good, especially from an external dose standpoint. They were very meticulous. They must have had funding to keep everything electronic because they are one of the better sites from which we receive data. Like I said, about half the cases I looked at had data from NTS, and I don't know whether the actual employees claimed that they worked at NTS, but when I looked at the files, it says that the employees worked at NTS and the time periods completely overlap. In the LLNL cases I looked at today, the LLNL employment period may have been 15 years, and the NTS period is four years within that 15-yr time period, so it looks that the person worked two jobs at the same time.

Comment:
The Lab owns a commuter plane that has a regular schedule between LLNL and NTS. When these guys talk about working at the Test Site, they're not talking about working there for six months or a year. They are talking about going over for sometimes a day or sometimes a few days. Most of the time, the Lab does not have good records of that.

Comment:
I spent a lot more than a few days.

Comment:
One of the things that Electronic Engineering did for the secretaries was, when you supported a shot – and I was one of the ones who were privileged to have this wonderful reward – to fly us down on "Amy" (the plane) for a tour of NTS. We stood at the edge of one of the craters for an hour to hear a lecture. We took a tour of all the tunnels and saw where the shots had been successful that we had been documenting, and then they flew us home on "Amy." That was just a regular workday. We showed up at Livermore Airport in the morning, flew down to NTS – I think we might have stayed overnight one time – and then they flew us home. We stood on the rim of that crater and were exposed. If we would have had a Geiger counter, I think it would have been running. That was done a lot in Electronic Engineering.

Comment:
That's an LLNL workday. It doesn't show up on your record. Even if you were there to do actual machining to support a shot, it doesn't show up.

Vernon McDougall:
Did your dose reconstruction show all this information about what you did when you went down to the Test Site?

Response:
I'm not sure if it was included in my records.

Vernon McDougall:
Did you tell them in the telephone interview?

Response:
I'd have to go back and look at my records. I think I did.

Response *(from another attendee):*
(Name withheld) wrote a letter.

Comment:
(Name withheld), with whom I worked quite a bit, passed away of lung cancer. This guy was down at the Test Site, actually all over the nuclear complex – Y-12, Kansas City, Pantex – all over. His wife filed a claim and it was denied. She wanted me to write a letter regarding my knowledge of his work experiences. His last shot with his co-worker *(name withheld)* was mighty potent. If you check Mighty Oak, you will find that it was the last tunnel shot that vented.

Comment:
That is the shot in which *(name withheld)* got the burns on his neck and his face – and his dose reconstruction came out lower than mine.

Comment:
The radiation from that shot tracked all the way to Canada. The Canadian government complained.

Comment:
His (referenced above) was 33.6%, mine was 43.97%. I was never near a vented shot. That's accuracy?

Comment:
There was another guy, who I worked with at LLNL, who volunteered to go into the tunnel after the shot to try to retrieve some of the instrumentation. I know that he's had to have a heart bypass.

Comment:
I see your X-ray chapter up there. You should get someone that worked in X-ray and see how they used X-rays on crucial parts. It is ionizing radiation and it should be investigated. X-rays are underrated for the damage they do.

Vernon McDougall:
The Medical Dose section is not about the X-ray testing.

Question:
When you give a rem, would you not include the biological quality factor that you use when you transfer rads to rems?

Grady Calhoun:
It is included. That's what defines the rem.

Question:
What do you use for the biological quality factor for tritium?

Grady Calhoun:
Tritium is a whole body dose. I don't know the exact factor.

Question:
What is the factor that you use for beta rays?

Grady Calhoun:
That would depend on the energy of them. We get our read-outs in rem.

Response:
Rem is a fudged number. I think you should not use that fudge factor.

Grady Calhoun:
That is what the scientific community uses. The input for the computer program that we use – IREP (Interactive Radio Epidemiological Program) – must be entered in rem. That is how the program was developed…

Response:
That program is 50 years old and should not be used. It's dirty pool to use that.

Question:
Where can you get a copy of the whole formula for that?

Grady Calhoun:
Do you mean for IREP? Actually, there are some very detailed algorithms on the NIOSH website.

Question:
Does it have the whole formula?

Grady Calhoun:
It has more than you would want to see.

Response:
Not me – so a reputable scientist would be able to calculate the formula. I'm still trying to figure how you can take 0.00 and multiply it by any number and come up with 43.977.

Grady Calhoun:
You keep saying 43.977. That is your probability of causation (POC). That is not your radiation dose.

Vernon McDougall:
The probability of causation is the calculated probability that your cancer was caused by radiation.

Question:
How accurate is this probability?

Grady Calhoun:
Statistically speaking, it is done at the 99th percentile.

Question:
Can you tell me how you use statistics to generate a number on a specific case? How do you take statistics and tell me a specific number for her?

Grady Calhoun:
It is all based on National Cancer Institute (NCI) epidemiological tables. That is the only way you can do it.

Comment:
The other way you can do it is Special Exposure Cohort.

Grady Calhoun:
It is all based on that.

Response:
My point is that it is not the only way to run the program. If you have sick workers and you're trying to compensate them justly, maybe the program isn't structured quite right yet.

Grady Calhoun:
That is one way, yes. But he asked about probability of causation.

Vernon McDougall:
We are not the decision makers. You can tell us that a Special Exposure Cohort is warranted for Lawrence Livermore Lab. The only way you're going to find out is to file a petition.

Response:
That's partly true, Vernon. You are doing a Site Profile. If the conclusion of the Site Profile is that you cannot adequately, with the records given, calculate…

Vernon McDougall:
That is not what the Site Profile does.

Response:
It is used in calculating the dose reconstruction.

Grady Calhoun:
If, during the development of the Site Profile, NIOSH finds that it cannot do a certain portion of the dose reconstructions, then that would be included in the Site Profile. As of now, the conclusion of the Site Profile (for LLNL) is that we can.

Question:
That you can – c-a-n? But you have no way of knowing about all the various things that aren't reported, such as a super hot billet of D-38 – I'm not even sure it was D-38 because of how hot it was – but giving the benefit of the doubt, because it was maybe a fresh melt, and the shop helper cut slabs off with a cut-off saw, the same one where the fire was. I had her under my wing because management just told her "Hey, this is your job," and she didn't know anything about hygiene. That night, when I was leaving, I noticed that the hand swoop counter on the east end of the SE shop was broken. I walked over to the inspection area to use theirs and both of my feet lit up. I called the control guy and told him about the situation and what came in that day – and I had actually measured it. I had just learned the number that is the most that D-38 should ever read in my effort to learn how to know if it was D-38 coming in the shop. My measurement was way above on that particular piece. I spent four hours on a Friday night with this guy backtracking everywhere the shop helper had been, and there was contamination all over the shop. The hand and foot counter was contaminated with large chips, down the ramp was contaminated. It was all over the place. He had to call people in to clean up. I suggested that they phone all the workers and tell them that they should put their shoes in bags. Not one phone call was made. I'm the only person who made one phone call to a machinist who I knew walked past there. He is the only one who was contacted. This Hazardous Control Tech who responded was

completely unhappy with the way the incident was handled and basically smoothed over. When I came in on Monday, there was no mention of that there was even a problem. They had told the shop helper that there was even contamination up the stairs to the men's restroom and that maybe I had spread it. So they were basically painting me to be bad, yet she was there cleaning down the ramp wearing the same shoes she had on – still contaminated. It was all smoothed over.

How can you possibly say what you can use and reconstruct when even our families may be contaminated? They are not wearing dosimeters. Our floors at home are not being checked. The dosimeter should be at the very last point where the employee leaves, but it is not. As a matter of fact, when any parts came in that were radioactive – they had a foot counter, and when it went off, management would just unplug it. I found that unacceptable, so I just moved it on my own out the back door. Sometimes that helped. But the story about the Lab storing radioactive material in paint cans is true. They stuck something about the size of a gallon paint can in a small fenced area outside where the high vacuum pumps are for the house vacuum system. That thing emitted so much radiation that it set the hand and foot counter off and you couldn't use it. That happened on a daily basis, months and months on end – maybe over years. I can't remember how long that was, but if you pushed the reset button and you didn't step on the counter right away, it just started climbing up. That is not being reflected by any dosimeter.

I don't know if you have heard of 321A complex, which would have been considered the machine area. In the spin press area, a person who worked there over the years, and is now a tour guide – if he's still doing it – he would put D-38 plates in an oven then slide them over to this press and form them. That place is hot – extremely hot – oxides all over the floor, and you know that guy is breathing it. As a matter of fact, he has serious problems with his lungs. Are you aware of that area – the spin press area?

Grady Calhoun:
I don't know right off the top of my head. Is D-38 uranium, or are you allowed to tell me?

Response:
Yes – depleted uranium.

Response *(from another attendee):*
Before that, I believe there was a plating facility there.

Paul Szalinski:
We will look into it.

Comment:
One of the guys who worked as a plater passed away. His wife sued the Lab and, lo and behold, no more plating jobs.

Question:
I want to ask an important question. Have your statistical methods and data been put through the Bayesian theorem?

Grady Calhoun:
It was peer reviewed when we first put it out about five years ago. I am referring to the IREP program that calculates the POC and ultimately determines whether or not you are compensated.

Question:
Has that statistical data that has been used to make these judgments been put through the Bayesian Theorem process?

Grady Calhoun:
I cannot answer that. I do not know.

Question:
Can you look into it and tell me? Talk to your best statisticians about the way they process this data that you are using to make a life and death decision, and then let me know if it has been put through the Bayesian Theorem process. Please. Otherwise, you will need to look at the whole thing over again.

Grady Calhoun:
If you'll give me your contact information after the meeting, I will let you know. Is it on the sign-in sheet?

Response:
Yes.

Grady Calhoun:
I have the information that I need then.

Response:
This is a serious question. I find that even the drug companies have failed to do this properly. As it turns out, their data is terrible. They are waking up to the fact that they really have to do that.

Grady Calhoun:
I'll find out.

Response:
You are making serious decisions with these people, and if this has not been considered on some of the stuff that is fifty years old, then that is bad news.

Comment:
I'm somewhat of an outsider, just sitting and listening, but I want to point out the different classes of people that we have even in this small room. We have machinists, who have been exposed – and machinists, I think need to be a Special Exposure Cohort. We have people who handled waste. We have people who transported radioactive materials from one place to another. We have physicists who were conducting the experiments. We have administrative support personnel. We have a wide array of job titles represented here, all of them with some degree of exposure. Rather than putting many tens of millions of dollars into theoretical constructs based on faulty and sometimes nonexistent data where – literally – you have to jump data gaps in a single bound, it is much better to just compensate the workers.

Mark Lewis:
Grady, she was talking about her POC being 43.977%. Will you please explain to them that when there is a change in the profile, some of these cases are looked at again?

Grady Calhoun:
If there was a change in the profile that would result in more claimant-favorable probabilities of causation, NIOSH would reopen the affected cases and reevaluate them. Sometimes profiles

might go the other way and we don't go back and look. The most common thing we get back from DOL is skin cancers. Additional cancers can reopen the case, resulting in a higher POC.

Comment:
Here's something that won't be in any Site Profile. *(Name withheld,)* a former supervisor in Machine Tool Services, came into inspection talking about the "good old days." He mentioned that they would put D-38 chips out on the floor and set them on fire and stood around and watched it burn.

Comment:
They used to do uranium-238 experiments at Site 300. I have some pictures of these explosions. It is like strafing because you get those light streaks when the depleted uranium goes off. The explosions at Site 300 – and I have pictures at the office from the Lab's archives – you can see that the buildings are dwarfed by the explosions. These are big explosions. I have a friend who worked out at Site 300 that said that stuff would just hang in the air for hours.

Grady Calhoun:
Was it a hydrogen explosion? Is that what it is?

Response:
Site 300 is the high explosives testing range. If you had a bomb design that you wanted to change something and wanted to test it full scale, you would take it to Site 300. They now have a closed-air firing facility, but they still use open-air tables to this day. You would place the device with the high explosive and the depleted uranium (used in place of plutonium) – and other toxic and radioactive material sometimes, even tritium in certain years – on an open-air firing table and then detonate it. The FXR machine would take pictures of the implosion.

Grady Calhoun:
I thought you were talking about an accident. That is why I asked if it was a hydrogen explosion.

Response:
No, this was routine – part of a program.

Comment:
I always thought that my dad babysat the bombs – that was his description of his job. He worked nights.

Comment:
A lot of equations of state were done at Site 300. When you need to talk to veterans, there is where you need to go.

Question:
How would you reconstruct the radiation dose for someone who was on the business end of an accelerator?

Grady Calhoun:
NIOSH will always look at the dosimetry first.

Comment:
They need to change that. They need to look at the story first and the dosimetry second.

Grady Calhoun:
The dosimetry has to be looked at first. The rest of the case is built around it.

Question:
How do you get the dose?

Response:
You had to look right up at the quartz plate to see that the beam was focused – one had to look at the quartz plate on the business end.

Grady Calhoun:
…So that the beam came right down at the face?

Response:
You had to look through the window to look at the quartz plate to see if the beam was focused. Then you yelled back up the channel – up the magnetic field, or the electric field – to get the beam focused.

Grady Calhoun:
I don't know how you'd get it. They looked right down an operating accelerator? So they are getting electrons or whatever there was. The particles are going right into their eyes.

Response:
This is long before they had the videos to do this. Now you wouldn't imagine going down to look at the accelerator. But back then, many people did, including me.

Grady Calhoun:
Are you saying that you had protons or electrons or whatever was being accelerated coming right straight into your head?

Response:
Sure – five mega-electron volts (MeV) coming right at that quartz plate – protons and electrons.

Paul Szalinski:
Were you looking through a window at that point?

Response:
Yes. That is how you did it. How would you do it if there was no video camera to use to focus the beam? That is the way that it happened many years ago, to many people. You are not going to find that in those buildings out there. It's the history.

Grady Calhoun:
That would be something that would be really important for eye cancer, brain cancer, something in the head.

Response:
No, it would be all over you, because the blood flows through the body.

Grady Calhoun:
We actually calculate the external dose to the part of the body or the organ. The radiation that gets inside of the body would be figured in the internal dose.

Question:
What about gamma radiation and X-rays?

Grady Calhoun:
That would be part of the external dose. I'm sure that you made isotopes from whatever the accelerator was impinging upon. I'm sure that the whole point of the accelerator was to throw particles into targets to see what came out, and airborne particles were created in some cases then – probably short-lived most of the time.

Response:
Typically, it was the quartz plate.

Comment:
If you want to have the best Site Profile, I would suggest that you get a number of people from different areas and those that worked together and have them talk about their experiences and some of the accidents that have happened. Most of us have a hard time remembering everything on our own. Once we get in a group, we could stimulate each other's memories.

Vernon McDougall:
Actually, Mark Lewis led an exercise similar to what you describe at the Iowa Army Ammunition Plant. He put together small groups of retirees, and as a result of that, the Site Profile was much improved. You're exactly right. The positive input we get from people who have that kind of experience can greatly improve the Site Profile.

Response:
But the Iowa Depot then became a Special Exposure Cohort – the point here being that you could get people together who could help fill in the record. But as long as you're going to depend upon the dosimeter readings to tell you if somebody got a dose, you're going to come out with the wrong answer.

Grady Calhoun:
The dosimetry is the starting point.

Comment:
I had a friend who worked in the area where they brought the dosimeters back, and he said that most of them came back with no film in them. They had to remake the badges because the film was often dislodged.

Question:
You don't remember what the tritium biological quality factor is that was used?

Grady Calhoun:
No, I do not. Everything is computerized.

Response:
So much junk is on those. I need to know. For instance, some of the codes at the Lab have been worked on for umpteen years – and they are still being worked on and tweaked. I'm just curious to know, as an example, what the factor is because there is so much tritium out there that these people are being exposed to so much of it. These that she mentioned, year after year after year, were only the big jobs. Every so often, you would hear the fans turn on in the Tritium Building. The ionization chambers tell you to turn the fans on, or the concentration of tritium is going to be so high. That's dirty pool, because all it does is dilute it. It doesn't change the amount of tritium that goes up the stacks and out onto the people.

Comment:
I have a document that says that during the 1980s, the routine releases were in the neighborhood of 3,000 curies (Ci) per year. There are many 300 Ci accidents, 100 Ci accidents, 1,000 Ci accidents. There was monitoring, but it was not adequate.

Comment:
If they're admitting to that, you can count on it being bigger.

Comment:
I know that when I worked, the ionization chamber uptakes would get turned on.

Comment:
Some programs now use "1" as the quality factor for tritium, as if it were an X-ray, which vastly understates the calculation by the time you get back to rems.
Grady Calhoun:
It is a whole body dose, because it goes through the body rapidly. The tritium attaches to the water.

Question:
Could you include that number on your phone call? What is the biological factor for tritium?

Comment:
Many scientists are beginning to not use rems, but those who still do are beginning to use a different quality factor for tritium. They are using rads.

Comment:
When the President's Advisory Board met here in December 2004, were you there? One of the best lectures given was how inane it is to use the rem.
Grady Calhoun:
Who was the speaker? Surely, it was not one of the Board Members.

Response:
No, it was one of the speakers that the Board had invited. Most of the members of the Board are – pardon my language – part of the cult known as Health Physicists. I'm curious… Where did you study – get your training – in Health Physics?
Grady Calhoun:
I received my degree in Health Physics from the University of Cincinnati.

Response:
I don't know any of the faculty there.

Question (from another attendee to previous commenter):
(Name withheld), would you mind expounding on your theory about the tritium cycle?

Response:
I would, but it's kind of late – perhaps another time. Tritium is a wicked, wicked material because they think that the only thing that happens is that the electron gets regurgitated, which is nonsense. Tritium isn't a water molecule; it should be multiplied by, say, a factor of five – not one. When I do arithmetic, with a serious rate to consider, I put a five in front of it. If you want to use an honest figure, where that tritium originates is a serious item. That tritium is attached to

a water molecule, and that whole system has to be taken into account – the whole water molecule. Once over lightly, the beta ray gets regurgitated, the tritium turns to helium-3 and has 0-3 electron volts (eV) and kinetically it is like a cannonball. It has enough energy to do damage to the information system of a cell. Let's take the worst case, 3 eV. If you do the arithmetic on what one would think would be the information quantity, that's a hell of a lot of information that is destroyed in the cell. Furthermore, once that thing has lost one electron, it needs two, and it has a hunger of about 14 eV, to the best of my memory. It absorbs the electrons, which means it is one of the world's worst free radicals to start with. It leaves the OH structure behind, which is a free radical with enough energy to break both strands of the DNA (deoxyribonucleic acid) if it is in the right place. That's the reason that thymidine has tritium on it. (Tritiated thymidine [^{3}H-thymidine] is used in DNA labeling research.) Tritium is more liquid than water. It is sitting right there in place of uracil on the genetic code. All of these things have to be taken into account. Furthermore, that helium – even though there are 2 electrons in neutral helium, there are 3 eV, which is equivalent to something like 10^{4} kelvin (absolute temperature) coming out of the box. That is enough to change the structure of the molecule.

Comment:
Excuse me, I don't want to interrupt but it is getting late and people are getting tired. Does anybody have any more comments about the Site Profile that they would like to get on record? Also, I don't think we got to the slide about how you can follow through with providing input and the contact information for following through. SPSE intends to give written comments on the Site Profile, and possibly the Support Group will provide comments, too.

Comment:
Tri-Valley CAREs is preparing comments. The Support Group is preparing its own comments. The Support Group had a meeting of some of the members to kick around various things that they thought should be in the Site Profile. That is being typed up and integrated from numerous participants' notes and will be forwarded separately.

Question:
Is lithium hydride on the list?

Response:
It should be. It was synthesized for fuel in some of the shots.

Comment:
Let's allow them to finish the presentation and then we'll see if anyone has anything else to add.

Mr. McDougall concluded the presentation, stating that comments could be sent to NIOSH by mail, fax, or e-mail as shown on page six of the presentation handout. He thanked the attendees and the meeting concluded at approximately 9:30 p.m.