Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
Sandia National Laboratories Working Group
Monday, April 11, 2022

The Work Group convened via Video Teleconference at 11:00 a.m. EDT, Henry Anderson, Chair, presiding.

Present:

Henry Anderson, Chair
Genevieve Roessler, Member
Josie Beach, Member

Also Present:

Rashaun Roberts, Designated Federal Official
Nancy Adams, NIOSH Contractor
Tim Adler, ORAU Team
Bob Barton, SC&A
Ron Buchanan, SC&A
Grady Calhoun, DCAS
Nancy Chalmers, ORAU Team
Joe Fitzgerald, SC&A
Eloy Giron, Petitioner
Rose Gogliotti, SC&A
Joe Guido, ORAU Team
Pat McCloskey, ORAU Team
Chuck Nelson, ORAU Team
Stephen Pittman, ORAU Team
Michael Rafky, HHS OGC
Lavon Rutherford, DCAS
Mutty Sharfi, ORAU Team
Matthew Smith, ORAU Team
Dan Stempfley, ORAU Team
Tim Taulbee, DCAS

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(11:00 a.m.)

Welcome and Roll Call/Instructions

Dr. Roberts: Good morning. Welcome to the Advisory Board on Radiation and Worker Health. This is the rescheduled meeting of the Sandia Work Group. I'm Rashaun Roberts. I'm DFO for the Board. There is an agenda for today. It's on the NIOSH website under Scheduled Meetings for April 2022.

Since Board members who have conflicts with regard to this Site can't sit on this Work Group, there are no conflict of interests for the Work Group members. As I do roll call, however, other staff need to state any relevant conflicts as I move through the roll call. So let's go ahead and start with the Work Group chair, Anderson.

(Roll call.)

Dr. Roberts: Thank you everybody, and welcome again. I just need to go over a couple of additional items before I give the floor to Dr. Anderson, who's the chair of this Work Group. So let's keep things running smoothly, make sure that everyone can be clearly understood by keeping your phone or Zoom on mute when you're not speaking.

The mute button for Zoom is in the lower left-hand side of your screen. If you're attending via telephone, a *6 to mute if you don't have a mute button. If you need to take yourself off, press *6 again. The agenda, the presentations and background documents that are relevant to today's meeting can be found on the NIOSH/DCAS website, and all of these materials were sent to the Board members, the Work Group members prior to this meeting. So with that, I will turn the meeting over

to Andy.

Dr. Anderson: Well, I want to welcome everybody, and I'm glad to see the whole complement of NIOSH folks are here. The last time when we tried to meet, there were some problems going on, and I'm glad. It sounds like everything is pretty well resolved. So today we're going to review the Sandia Laboratory report, and we'll begin. This is on the overview of SEC-00188, and NIOSH is going to begin their presentation with the overview.

NIOSH Presentation: Overview of SEC-00188 Sandia National Laboratories Petition Evaluation Report and Description of Post-April 2019 Activities with Timeline

Mr. Nelson: Yes Dr. Anderson. This is Chuck Nelson. First of all, I'll apologize. I had a family medical emergency the morning of. It was like an hour and a half prior to, but that person is doing well and I do apologize for that, so I'll go ahead and try to share my screen here. Can everybody see that? It should be coming up.

Member Beach: Yes.

Dr. Anderson: Yes.

Mr. Nelson: All right. What I thought I'd do is I would go back over the initial presentation that we did some time ago. It was April 17th, 2019, as it was at the Advisory Board meeting. So I'll go ahead and move through this presentation. I think I might take myself off so you can see me too, just for this part anyways.

Okay. Here's a summary of the SEC-00188 petition history. It qualified as A-313 October 21st, 2011. The Petitioner proposed a class definition of security inspectors, clerks, firemen and many other officers

and personnel at the Site for the period of January 1, '63 through May 21st, 2011.

During the evaluation process, NIOSH proposed that the following class be added as a SEC on February 21st, 2012, and that would have been all personnel that worked in any area at the Sandia National Lab in Albuquerque, New Mexico for the period of '49 through 1994. So that SEC was in fact granted. The basis for the '49 to '94 class was insufficient monitoring and information to reconstruct internal doses from January 1, '49 through December 31st, 1994, and that was due to a lack of internal monitoring program documentation as well as lack of internal monitoring data and were also lacking some process information for that period of time.

As I mentioned in the previous slide, the evaluation report was published on February 21st, 2012, and it concluded that external doses including medical X-rays performed on site, as conditioned upon, it can be reconstructed for the duration of the evaluation period, which was again January 1, 1949 through May 21st, 2011.

NIOSH continued the evaluation since the publication of the 2012 evaluation report. We've not identified any information that would contradict our conclusion that external doses can be reconstructed. I got behind guys. Let's see. Apologize. Okay. There was an addendum to SEC-00188, which covered the time period of 1995 to 1996.

In its addendum, NIOSH proposed the following class be added to the SEC on July 26, 2018, and that covers all personnel that worked in or near Sandia National Lab, Albuquerque, New Mexico for the period of January 1, 1995 through December 31st, 1996. The basis for this additional class for the 1995 and '96 period was that there were internal monitoring concerns and what we called air

monitoring data deficiencies.

We had some uncertainties associated with the transitional and developmental nature of Sandia National Lab-Albuquerque internal monitoring program. We found evidence that the Site was making several improvements in the internal monitoring program, including the increased use of personal and air monitoring. However, the program seemed to be lacking formalization and that we did not find adequate evidence in that '96-'97 period due to some key implementing procedures didn't seem to be fully in place until that time period.

Our most current evaluation report is SEC-00188, Addendum 2. The focus of Addendum 2 was determining if internal dose reconstruction was feasible for the 1997 through May 21st, 2011. The evaluation report focused on the suitability of the monitoring program and associated documentation and monitoring data sufficiency. In addition, the evaluation report addressed security guards' force monitoring concerns. Is my slide showing up there everyone?

Dr. Roberts: Yes they -- yes, they sure are.

Dr. Anderson: Yes.

Mr. Nelson: Okay, thank you. My screen changed a little bit and everybody kind of disappeared. So I wanted to make sure that I wasn't out there by myself talking. Okay. The following are some data sources the NIOSH team reviewed for SEC-00188 Addendum 2. We performed 21 interviews with 17 people. There was one additional site data capture effort trip since the last SEC designation. We had four data capture requests and there were over 900 relevant documents captured or reviewed since SEC-00188 was issued in 2012.

To date, we have over 5,500 total documents in our database pertaining to Sandia-Albuquerque including internal procedures and memos, 10 C.F.R. 835 compliance self-assessment reports, and those memos associated; facility process information; radiation work permits; incident data; air monitoring data; internal and external radiological program audits and assessments.

We also had extracts from Sandia's WebDose database. This is what the Site uses for bioassay monitoring results, as well as their radiation dose reporting tool. We have internal/external monitoring records, breathing zone and air sample records and derived air concentration records.

Okay. This slide here shows the available internal monitoring urine bioassays in WebDose. So the first column is the non-tritium bioassay results. That would include uranium, plutonium, americium, thorium fission and activation products. You'll see that the totals to about the 2020 results. Total people is 317, that's the next column.

If you add all those columns up, it's not going add to 317. It will be a higher number because many people were monitored for, you know, each year. So the total number is going to be less than the sum of those columns. The next column is the tritium sample results. We have 7,209 tritium results and the persons sampled were 362. Okay. This slide here shows the number of whole body measurements and thyroid counts. They total about 1,115 measurements with 207 folks monitored.

Again, the last columns aren't going to add up to 207. As I mentioned before, some of those same people are sampled for each year. Now the following is an overview of the Site's internal monitoring program. Of note, Sandia shifted their emphasis of internal monitoring from reliance on bioassays to

the use of breathing zone samples as a primary benefit of internal monitoring that started in 1995.

It was Sandia's position that no individual is likely to receive the exposure of 100 millirem in a year, and that's stated in CEDE, in both the internal technical basis document. It was also concluded in some external assessments before 1996 and 1997. Sandia used what was called a confirmatory bioassay monitoring program.

As I mentioned previously, BZ monitoring was a primary method of internal monitoring, but the Site didn't rely solely on bioassay to assess the potential for internal dose. The Site stated they focused on engineering controls, the use of personal protective equipment including respiratory protection, as well as contamination and air monitoring of the workplace to provide an indication of potential exposure.

So if they saw an upset condition, be it from a breathing zone sample or air monitoring or something unusual at the work site, then that would indeed trigger bioassay monitoring. We saw that looking at some incident reports. The Site changed their emphasis from internal dosimetry to internal radiation protection and reliance on other types of monitoring to be indicative of the need for bioassay to ensure workplace controls were adequate.

I mentioned earlier about the assessment in '96 and '99, where they came to the conclusion that the Site, it was an internal dosimetry expert that came on site, evaluated the Site and said that are not likely to exceed 100 millirems CEDE in a year. If you might remember, 10 C.F.R. 835 requires that rad workers under typical conditions are likely to receive -- that are likely to receive a committed effective dose equivalent of 100 millirem in a year are required to have an internal monitoring program.

So moving on to the next slide. During our review of Sandia's radiological program, we found evidence of implementation of Sandia's internal dose monitoring program. There was a February 3rd, 1998 document. It was a summary document from the Rad and Mixed Waste Management facility regarding the routine bioassay, where they stated the RCTs of the Rad Waste and Mixed Waste facility are on routine bioassay.

If a trend develops indicating internal dose, those people would undoubtedly be asked to -- the other rad waste/mixed waste personnel will undoubtedly be asked to submit special bioassay to determine the scope of the problem. It went on to say that if trends develop indicating elevated air concentrations or increased surface contamination levels, special bioassays would be requested from the appropriate facility personnel.

Additionally, as stated, job-specific RWPs require bioassay as appropriate for those workers involved with tasks, where significant levels of radionuclides or where certain radionuclides are handled. So we're seeing that Sandia was performing some routine bioassay samples for specific groups of workers based on their work activity and job category for confirmation purposes, that the rad protection was adequately protecting workers.

Incidentally, as a refresher, the Rad Waste/Mixed Waste facility was completed in 1995, and it was used for repackaging waste, characterization of waste, treatment, storage and in some case shipments of waste. Looks like I'm off one here. Let's see.

Okay. Additional -- make sure I'm right on track on here. Okay. Additional evidence of field implementation, there was a May 30th, 2001 memo documenting a routine bioassay program for RCTs

at the TA-V, and it said the current schedule calls for annual whole body counting and submitting urine samples for uranium, thorium, americium and plutonium. The Sandia bioassay program is confirmatory in nature. The bioassay program confirms the results and the effectiveness of contamination control and other personal protective activities.

It went on to say since RCTs must be present in all work activities where the possibility of meaningful intakes is credible, the bioassay serves as a good proxy indicator for potential exposed personnel.

Okay. The NIOSH team reviewed RWPs, work planning documents for indication of airborne radioactive material. We wanted to look at the respiratory protection if assigned, personal and area monitoring and bioassay requirements. What we found were indications of surface and airborne rad materials were noted. We also found the use of respiratory protection, personal and area requirements and bioassay requirements.

Our review of RWP supports Sandia's rad program was adhering to the procedures in place at the time.

As I mentioned earlier, Sandia National Lab-Albuquerque shifted the emphasis of the internal monitoring program of reliance on bioassay to the use of breathing zone sampling. We performed an analysis of the breathing zone data that we have on hand. We evaluated the internal dose associated with each of these BZ filters in our holdings by calculating the intake quantity associated with each BZ filter.

The committed dose associated with the internal, the intake quantities were then calculated based on the stochastic ALI, annual limit on intake for the limiting radionuclide of the analysis type. So we did

each for gross alpha, beta/gamma and tritium analysis results. Committed dose was analyzed to determine the distribution of data grouped by an event, and we defined an event as a rad work, radiological work task at a given time on a given day or all radiological work tasks on a given day.

Now the results of our analysis of breathing zone data was that the median quantity or rad material available for internal uptake to individuals in the unlikely event that they were located alongside of personnel performing higher risk radiological work can correspond to an internal dose of .5 millirem per work event or work day.

So this dose quantity assumes that an individual is present within the work area, and not wearing respiratory protection although we did find that respiratory protection is typically used in the work areas when the radiological work was being performed. So we didn't take into account individuals would have a significant reduction in take potential by the separation of the actual work in the area that could be occupied by the same level of radiological controls, which is PPP and engineering controls.

And that considering these conservative assumptions, we concluded that it wasn't likely for an individual to be able to receive 100 millirem per year of internal exposure CEDE under these conditions. This table right here the assigned committed dose in REM by year. These values are the internal doses of record. They are provided in WebDose for the time period of '97 through 2011.

So the first column is tritium. For the total 15-year period of '97 through 2011, there was a total assigned dose of 4 millirem for tritium. For the next column, it represents breathing zone samples and dose associated with those, and for that 15-year

period there was a total of 26 millirem of record assigned for that period.

The next column is urine bioassay, and for that 15-year period there were 42 millirem assigned. Next column is thyroid. There were 5 millirems assigned from the 15-year period. So the total effective dose equivalent for the 15 year period from all those add up to 77 millirem. NIOSH included the feasibility of internal dose reconstruction from the 1997 through May 21st, 2011 evaluation period.

Based on our review of the reactive materials used at Sandia in associated rad programs, we concluded the intakes for unmonitored workers with access to controlled areas were unlikely to have resulted in a committed effective dose equivalent in excess of .1 REM or 100 millirem per year.

Our conclusion was that based solely upon the implementation of 10 C.F.R. 835, but rather on the review of exposure monitoring records for individuals involved in radiological areas with the highest risk at the Site during the evaluation period.

The feasibility of dose reconstruction. In summary the total dose, the total assigned internal dose for all employees combined for this 15-year period from my previous slide, from '97 to 2011 was 77 millirem. Our review of breathing zone data indicates, and this is basically a summary of our review, that the median quantity of rad material for internal uptake to individuals located alongside personnel performing higher risk radiological risk result in a -- would correspond to an internal dose of .5 millirem per work event or work week.

Again, this assumes individuals present in the work area alongside of another worker. It also assumes that no respiratory protection should be in use, so there's no respiratory protection factors being

applied to that raw data. In either case, it's our conclusion that a total recorded dose of 77 millirem is not -- supports that it's not likely that an individual will be able to receive 100 millirem per year of internal exposure per year under these conditions.

Our assessment of potential internal dose concludes the individual has to be present for 200 events, based on our calculated median dose of .5 millirem to receive an exposure in excess of 100 millirem per year.

As previously identified in SEC-00188, the original evaluation report in 2002, NIOSH finds it's feasible to reconstruct medical doses and principal sources of external radiation and exposure including beta, gamma, neutron radiation for Sandia National Lab-Albuquerque was of sufficient accuracy. As previously identified in SEC-00188, the principal sources of internal radiation for members of the proposed class include exposures to plutonium, tritium, uranium, americium in fission and activation products.

Potential exposure pathways could have involved the handling of these radionuclides during waste burial or handling, or exposure or air contamination associated with reactor or accelerator work. Considering the potential exposure scenarios, program policies and procedures, modern data available, NIOSH finds it able to estimate these internal doses with sufficient accuracy for this period.

In conclusion, based upon its analysis of available resources, we found no part of the class under evaluation for which we could not estimate radiation doses to a sufficient accuracy.

The next slide is a standard slide showing that we

believe dose reconstruction is seasonal for internal and external doses. And again, we see no health endangerment for this period of time.

The next table, after the ER was presented evaluation or Addendum 2 was presented in April 2019, we received some additional breathing zone data from the Site to supplement our current BZ data. We did share this with the Work Group in March 20, 2020. As you can see, the first column was the prior available alpha results. That's the most important. Alpha results drive -- they constitute the highest dose to an individual.

So looking at that table there, the first one on the left, the additional is the additional breathing zone results that we captured. We got a big boost in 2003, 2009 and '11. So we added 1,200, over 1,200 available BZ results, alpha results, beta results from 1,900, and we got additional tritium results of 138.

These additional BZ results did not affect our conclusion. The analysis really didn't change much at all, and while the BZ data provides more complete coverage of the period analyzed, the conclusions for each are still the same, that we can bound dose and that the individuals are likely to exceed 100 millirem per year of internal dose.

I thought I'd fill in this timeline, just to show what happened since the April 2019 Advisory Board ER presentation. During that meeting, SC&A was assigned to perform a review of Addendum 2. They set up, at request of the Site folks, is they'd like us to come out and visit the Site and we did that in January 2020.

The Site visit included a focused tour and we had interviews in a conference room following the tour. In March 2020, we got all of our interview notes together and we sent them out to the Site for

review. As you may remember, that was the beginning of the pandemic, so there was some delay in getting some feedback from the Site, because they obviously weren't at full force.

So we did get comment back on August 24th, 2020, that the Petitioner and the participants had no comments on the interviews and tour notes. During the week of 11/9/2020, SC&A provided a report, their evaluation report. On December 4th, '20, SC&A submitted an OUO copy of the review to NIOSH and the Advisory Board. On March 1st, '21, Sandia National Lab provided an unclassified unlimited release of SC&A's review, and SC&A had one finding and seven observations.

On 6/30/21, NIOSH provided a response paper titled "NIOSH's response to SC&A's review of SEC-00188, Addendum 2. Then on January 3rd, '22, SC&A submitted the reply to our response, and to DCAS and the Work Group, and that's all I have for this presentation.

Member Beach: I guess we're waiting --

Dr. Anderson: I guess I'd better unmute.

Member Beach: There he is.

Dr. Anderson: Yeah. Are there any questions that Board members would have before we move on here?

Member Roessler: I have no questions. That was a very nice thorough report, Chuck.

Mr. Nelson: Thank you, Gen, Dr. Roessler.

Member Beach: I agree, thank you.

Mr. Nelson: Thank you Josie.

Dr. Anderson: Just a question Chuck. Were there any measurements for the security folks? I think you have --

(Simultaneous speaking.)

Mr. Nelson: We'll let y'all answer, but with regard -- when you say measurements, I don't believe we have any breathing zones because I think for the most part they weren't working in those areas where the activities were taking place.

There was some earlier bioassays I think in earlier 90's, where there was a bit of an upset condition that resulted in I think a couple of millirem being assigned. That was, correct me if I'm wrong Joe, you know, but I think that was in the early 90's.

Mr. Fitzgerald: That's correct, yes.

Dr. Anderson: Yeah, and thank you. The other is during this particular period, were there any major upsets or events that would have brought in the security folks or others on a kind of emergency that might lead to other exposures?

Mr. Nelson: We didn't identify any. We did go through some of the incident reports and what we saw were if there were upset conditions like high air samples or maybe a breathing zone result that might have been higher than they expects or an upset condition, we saw that they sent people for bioassay, but no particular one that I'm aware.

Dr. Anderson: Okay, thank you. Any other questions people may have? Okay. Shall we move to SC&A's --

Mr. Giron: Chairman? Chairman? My name is Eloy Giron. I am the Petitioner for 00188. Am I allowed to address the Advisory Board?

Dr. Anderson: I think we have you on the agenda later on. Is there a specific question? Rashaun?

Mr. Giron: Okay, sorry about that.

Dr. Anderson: That's okay, yeah.

Mr. Giron: Okay, I jumped the gun. I'll wait til my turn. Sorry.

Dr. Anderson: Yeah. It won't be long. Thank you.

SC&A Presentation: Review of SEC-00188 Sandia National Laboratories Petition Addendum 2 (Jan. 1, 1997-May 21, 2011)

Mr. Barton: Okay. I guess that means it's our turn. Let me share our presentation here and then I'm going to ask Joe Fitzgerald to sort of kick us off here, and then we can get into the breathing zone data, which I think is sort of the long, long haul intent here. So let me just go here. Does that look good to everybody?

Member Beach: Yes, that looks great.

Mr. Barton: All right, excellent. Okay.

(Simultaneous speaking.)

Mr. Fitzgerald: Let me jump -- yeah, let me jump in. Thanks Bob. Can everybody hear me?

Dr. Anderson: Yes.

Mr. Fitzgerald: Okay, yeah. I'm going to keep the picture off, just because my broadband is pretty suspect these days. At any rate, I'm not going to try to repeat what some of the details that Chuck mentioned, but just again SC&A was tasked April 2019. The report was actually issued December 2020, but keep in mind that unfortunately the review kind of spanned the beginning and depths of

the pandemic, so there was considerable, you know, delay I think that occurred because of just the interactions and difficulty in communicating with the Site and what-not.

We are fortunate to get the Site review done just before things got really bad, so that was a plus. At any rate, this was the -- actually given the 8314 reviews that NIOSH had completed before, this was the first time that SC&A actually had a chance to really dig in and evaluate Sandia in terms of the evaluation report.

So this is a bit of a hybrid assessment, where we were looking at the conclusions of the ER as they stood for issues like external dose, because this is again the first time that we actually had a chance to review those conclusions. And then looking more specifically at potential SEC questions, in this case involvement of internal dose as well as other issues that were raised in the course of the addendum.

So at any rate, on the first slide Bob. Can you flip to the next slide?

Mr. Barton: Yeah, I'm hoping it should be on the first slide.

Mr. Fitzgerald: Yeah, okay. There we go.

Dr. Anderson: We got it, we got it.

Mr. Fitzgerald: Okay, good. This is essentially an overview of where we came out, and we'll get into the specifics here shortly. But on external dose, again we went back and looked at the conclusions, this being the first opportunity, and we agreed I think with NIOSH's conclusions that we really didn't see any issues that would preclude dose reconstruction with sufficient accuracy.

In the course of our review, we did, did pick up on

some issues though, that in the end we decided were of -- what's kind of called Site Profile significance. One of these in particular was the, the severe radiation gradients at the Sandia Pulse Reactor, and we'll get into more detail on that. But that was identified during the Site Profile assessment, and it involved some real differences in potential exposures, depending on where the worker was located relative to the reactor itself.

We thought that issue needed to be addressed, at least from the standpoint of more information for the Site Profile and dose reconstructor. On the internal, internal dose side, again we spent some time looking at the weight of evidence argument that was provided by NIOSH in its ER, and the basis for the conclusion of reconstruction with sufficient accuracy for the time period in question, '97 to 2011.

And we concluded that it was feasible. However, we felt there was some questions revolving around -- and we do this for every site now in terms of verifying or -- V&V, verifying, validating the completeness of the data. Even though the weight of evidence, I think, was pretty clear to us and persuasive, we had some difficulty finishing the V&V in terms of the available records.

We didn't think it impaired the dose reconstructibility involved, but we felt it was a loose end for which we needed more information or clarification from NIOSH. That was the basis for the one finding that we provided, and Bob will get into that particular issue here in a few minutes, and we had six observations.

The next one, please. Okay. How we structured the SC&A review is a little different than we've done in some other ERs. We wanted to focus on four key lines of inquiry, which we felt were the central

questions that needed to be answered for Sandia.

The first of these is -- it's just a lot of this revolves around weight of evidence. Is the weight of evidence sufficient for feasibility, in terms of external and internal dose assessment?

As I indicated before, we thought that was a yes for external, and we also felt it was yes for internal, but again the validation process for some of the BZ data we think left some questions that we felt needed clarification. So that's how the response to the first came out.

That may sound a little contradictory, but in a sense there were a number of factors, and you heard some of these from Chuck, that were involved in this so-called weight of evidence assessment of what data was available for Sandia. We felt there were enough BZ samples to reach a conclusion of feasibility, but there were still some gaps that made it difficult to complete the validation.

So again, I think that's maybe one key question that we want to unpack for the Work Group, and Bob will be doing that here shortly.

The second line of inquiry was the question of 835 implementation, which is a question that is raised at a number of the sites. If you recall with the promulgation of 835, it required radiological monitoring for any potential exposures of 100 millirem or up, and that was the threshold that NIOSH highlighted in its evaluation, and what was being used for monitoring purposes at Sandia.

So the question there was in the timeframe of in this case the end of '96, did the evidence point to not just the planned and programmed implementation of Part 835, but was there actual evidence manifest in the documentation and these

self-assessments, and DOE's response that would indicate that the 835 requirements for monitoring were actually implemented.

I think in this case, you know, our review across the board, implementation plans, site verification plans, self-assessments, enforcement reviews and DOE and in correspondence with DOE and the Site office, we looked across all of that and felt that by the end of '96 that it was pretty clear that implementation was happening at Sandia relative to those requirements.

Next slide, please. Okay. The third line of inquiry was really relative to the usage of BZ sampling, personal air sampling as a prime basis for personnel monitoring. In this case, was that reliance in terms of the assigning 100 millirems CEDE dose, which was the dose reconstruction threshold or approach that NIOSH was following for Sandia, is this well-founded and does the weight of evidence support that assignment?

And again, we felt that the available records and the conservatism that was laid out in the NIOSH approach in the ER was sufficient in this particular case, and this comes again with the asterisk that we need, need a little more validation. But overall, we felt the weight of evidence was persuasive that one could assign an 100 millirem CEDE dose for workers that lacked monitoring records.

The fourth line of inquiry involved the security guards at Sandia, and this issue was similar to the third issue, which is could they likewise be assigned 100 millirem per year for unmonitored intakes, or was there evidence that there were exposure intakes that would exceed that level?

And we spent a considerable amount of time examining that particular issue. As you know,

security guards had pretty much free rein in terms of the surveillance at the Site. Certainly, the surveillance includes the whole spectrum of nuclear facilities and materials.

So we wanted to spend some time looking at not just the documentation but actually touring the physical locations, talking to the individual guards, checking incident reports, looking at the source terms that might be involved, looking at the dosimetry at the -- certainly the guards would be -- that you would be relying on in terms of dose assessments at the site, looking at non-routine exposures as well as routine exposures and what the history would tell us for that time period.

And where there were intakes, we wanted to look at what kind of doses were being achieved, and all of which would be done in the context of answering that question. Is there a likelihood that, or a potential that workers would be receiving intakes that would equate to 100 millirem or more per year.

Our conclusion was that no, we didn't feel, we didn't believe and we didn't come to a conclusion that that kind of level of dose would be likely given the exposures and the conditions at the site, and again I think this was one in particular that we spent probably most of the time on this evaluation examining, because again it's a somewhat difficult question because then you have to deal with, you know, the location of the guard force, the interface of the guard force with certain facilities and certain source terms, and looking at potential exposure as well as the source terms that might be involved. So it was, you know, probably a pretty challenging review.

At any rate, that is a fairly broad summary of what's in our assessment, without going into the specifics of the one finding and the observations that were in

that report as well. So this is more the overview of our conclusions. Before I turn it over to Bob, does the Work Group have any questions on the overview?

Member Roessler: No questions from me.

Member Beach: None here either, thanks Joe.

Dr. Anderson: Nope, maybe later. Joe, the only question I had is with -- is there's kind of two different issues. One is there's a qualitative, a qualitative assessment of the data, and I would tend to agree with this. The question then becomes well is there a quantitative assessment that can be done that is kind of a going forward when we address this at other sites, that might be a beneficial thing?

Mr. Fitzgerald: Yeah. I think that might evolve from some of the discussion that Bob's going to lead here right after this.

Dr. Anderson: Okay.

Mr. Fitzgerald: Because I think that was kind of what we were trying to deal with, was in the way of evidence, some of that is a qualitative balancing of what we have and the conservatism of all you have, and what we also try to do is our typical quantitative assessment of looking at the amount of data over specific years, and then trying to validate completeness.

Even though I think the qualitative was very persuasive, we did have some questions on the quantitative. Not questions that would undercut the conclusion but, you know, nonetheless questions.

Dr. Anderson: Okay, thank you.

Mr. Fitzgerald: Maybe we can circle back to that

after Bob does his presentation.

Dr. Anderson: Right, thank you.

Mr. Barton: Thanks, Joe. I'd just add that this SEC investigation is a little bit unique because we're not necessarily talking about formulating a co-exposure model based on all this data. It's really using this data as evidence for the exposure assignment of again the 100 millirem CEDE, and again that's only to unmonitored workers or partially monitored workers.

If you were actually on the bioassay program or submitting in vivo counts, those are what is typically used in your dose reconstruction. So keep that in mind as we go through, but I agree. I think some of that will become clear, but also when we talk about completeness it's sort of in a different context here, only because we're not relying on trying to get a full set of data to essentially create a co-exposure model. We're using the data to justify a bounding assignment of 100 millirem.

With that, let me move into -- so if there were further comments before I move forward?

Dr. Anderson: Well that's fine. Thanks, Bob.

Mr. Barton: All right. No problem at all. Finding 1. As we were just talking about, obviously the question of completeness comes up in every SEC investigation, and typically what we look for is some sort of secondary reference, which could be a health physics report, an industrial hygiene report, and these things would usually come out periodically at different sites, you know, quarterly, monthly, that type of thing.

Usually we report things like how many smears were taken, how many bioassays submitted and

what we were hoping in an ideal situation, the number of either readings on samples that were issued during a given period or at least the number of workers who wore them during a given period.

So if we had that secondary reference, we would kind of take a look at the captured data set that NIOSH has and have a sense on where we're missing data, how much is missing from different periods of time and how does that affect the conclusions regarding again 100 millirem, not necessarily any conclusion about actually creating the traditional co-exposure model.

So that was Finding 1, which was the sole finding of our review, that we believe that that data is incomplete and as you'll see NIOSH agreed with us. We have a number of observations directly related to the completeness of these BZ samples. But those issues, as we'll get to the end, we don't feel obviates its use in justifying the 100 millirem for a number of reasons which we'll get into, that are quantitative reasons rather than necessarily qualitative.

So NIOSH's response to this finding was that, right there in the first bullet, is that they agree the data set that we have is incomplete. Now that's not a game-stopper by any sense, and what we do and as you will see as we go through this evaluation, is we try to inform ourselves well, we're missing.

We're missing data on a lot of sites. What can we investigate to get a sense of what that missing data might represent? Is there any evidence that the missing data actually represents a group of workers who were in a higher exposure category, at a high exposure potential?

One of the -- and then in NIOSH's response, they noted they did a comparison between what's known

as DAC-hour tracking logs (phonetic), and these things somewhat regularly. Essentially, they were identify the breathing zone results during that period that came to a certain level that needed to be tracked by Health Physics for compliance purposes.

So NIOSH had these DAC-hour tracking logs, which is in a sense a secondary source because it represents the people who had breathing zone samples that needed to be tracked by Health Physics. So this would be the higher end exposures during any given period. These DAC-hour tracking logs were available from 1997 through 2002, with a few missing months in there, and we've got at least almost 1,000 samples in the DAC-hour tracking logs to compare with the raw data that NIOSH had compiled and captured.

And based on that, close to 99 percent of the ones found in the DAC-hour log books, which again would be considered the higher end exposure categories are available in the raw data set, which we're using as the basis or NIOSH is using as the basis for the 100 millirem dose reconstruction approach. So the conclusion there is that even if we're missing data, there's no indication that based on this DAC-hour log book comparison that we're missing higher end exposures. In fact, it looks like we pretty much had almost all of them, which would indicate that even though we're missing data, it's not likely that it is biased low. In fact, it's even logical that it could be biased high in some groups.

So a lot of this I just said, but again we reviewed the DAC-hour tracking reports in a similar manner that NIOSH did, and we agree that when you do that comparison, and again it is somewhat limited in scope in that we don't have any of these secondary sources to check after 2002. Overall, there's a little

over a third of the applicable SEC months that we can make comparisons.

But nevertheless, it's again part of a weight of evidence that the missing data don't, do not in fact represent a different exposure potential that would certainly warrant an SEC discussion. However, since completeness is, you know, obviously such an important part of any SEC discussion, we obviously needed to bring this to the Work Group's attention for discussion, and that is why this final bullet here says it should remain in progress, because it really hadn't been brought in front of you all.

So that discussion will hopefully happen today, and hopefully we can close some of these out.

Moving on to Observation 1, and this really has two parts to it. In one part we had identified that in the data set there were some duplicate samples included, and the reason this happened is there were essentially two different references that really had the same data in them, and this was for 2002.

But they were in slightly different forms and it was certainly difficult to tease out the fact that these were actually representing the same breathing zone samples. There were about 150 of them.

So we pointed that out as an observation due to the low number and the fact that it was only one year where we found that many. You know, we didn't think it rose to the occasion of being a finding, because if you simply remove those and redo the analysis, but you'll see it was done. That's the first part of the finding.

The second part of the finding has to do with a specific table in the ER that reports the number of readings about samples available for analysis. Now when we went through the raw data sheets that

NIOSH provided and compared it to that table in the ER, we were coming up with very different totals. So we tried to investigate what that was, and NIOSH provided their own spreadsheets where they did their own compilation of the data.

What we found was that in certain cases, and I have a theory on how this happened, but in certain cases you might have a single breathing zone sample for an exposure event, in which it was measured for alpha, beta and tritium, and now it appears as a single line in the data set. For another one, gross alpha, beta and tritium might appear on separate lines. That's what they counted three times towards the total, again in a specific table.

And NIOSH's response to this, for the first part, the duplicate samples they confirmed there were duplicates in there. So they correctly removed them, re-ran the analysis, and it had very little impact on the end result, which was very to be expected, one because there's a lot of no detect breathing zones in the data set, and also because, you know, 150, 148 is not a very large portion of the overall data population.

With regards to the second part about how they're reporting the breathing zones, again in that single ER table that we were trying to match up against the raw data, NIOSH in the response noted that a more appropriate comparison would be to a set of tables that appeared further down in the ER report, where they broke it out specifically into alpha, beta/gamma and tritium. Those totals more closely reflect what data there is to analyze.

NIOSH reiterated that analyzing each component separately is appropriately. As Chuck had indicated in his presentation, really alpha's the driver here by several orders of magnitude, compared to beta/gamma and tritium.

So moving along, and so here's where SC&A is at. While we agree the duplicate results were removed, re-ran the data and it had little to no effect on the end results, so that's good. It cleans that one up. Let's see here. So as far as that first part, we really think that first part can simply be closed. It was there were duplicates contained in the data that was analyzed, they were removed and the new numbers don't change anything.

On the second part about how these things are recorded in the original ER, the table that -- I'm getting a little feedback.

That is G-I-R-O-N. I think that's where the noise is coming from.

Mr. Nelson: That might be Eloy Giron. If you could hit *6.

Mr. Barton: Okay. That seems like it's gone, so let me continue. So this second part about how the total number of breathing zones available for analysis was reported, and the specific table is Table 6-1e, and it's title is "Available Breathing Zone Air Monitoring Results for the SEC Period 1997 Through 2011."

Now in response to this observation, NIOSH said the tabulation for 6-1e is related to the number of line items of data available to NIOSH which -- with each line item potentially containing more than one result type. So we understand where this came from. It's really I think an artifact of how the data was taken from those PDF files, put into a database file for analysis, and that you might have a breathing zone result where the alpha result is on one page, the beta result is on the next page and the tritium result is on the page after that.

So a lot of times that was input as three separate

lines, whereas in another format it might be, have all alpha, beta and tritium on the same PDF page, unless they're put on the same line in the database.

I think when the ER was constructed, NIOSH has line items they put in a mixed bag of both of those situations. So it's not necessarily showing the total number of measurements sort of by alpha, beta and tritium, and it's not the single number of breathing zone events or exposure events either. So like I said, it's a mixed bag.

So I think when that happens, it's a little misleading and will actually overstate the amount of data. Certain breathing zones will appear in that table as a total of three, and some of them will appear as only one. And so that's something that I'm not sure if it's -- in the report we recommended that certainly for accuracy, it would be good to correct that, either to the total number of measurements or the total number of breathing zone evens, not really a mix of both.

So I'm not, and again this is an observation. It does not affect the end results of the analysis in any way, but it's just about the accuracy of reporting the amount of data available from which we're drawing these different conclusions.

Another note, as you'll notice from Chuck's presentation, there was actually more data received after the ER was published. So I'm not sure if that's something that would be updated anyway to reflect a second, essentially the second data set that was received to fill in some of the gaps as Chuck noted, especially in the later years.

Mr. Nelson: Hey Bob, this is Chuck Nelson. If I might add, what we intended to do for that if there were reasons, we would like to revise a table and put it in the Site Profile. It would take out, you

know, the duplicate issue that we had as well as all these other additional data points, and we would provide a clear, concise table making the summary of BZ results clear and consistent.

Mr. Barton: I certainly don't have any comment. That's one solution. I guess the only -- I don't know how easy it is to revise an ER. I'm not sure of that process. But I guess I would just be concerned that if someone was looking back on this, they might look at that table in the ER and say well, look at all these years that don't even have data or have very little data, some of the other totals might be a little inflated.

Mr. Rutherford: Well, I'd like to jump in. This is LaVon Rutherford. I mean typically we don't revise the ERs. If you think about the -- we go through this, the Board review process, and everything changes from that Board review process. There's a lot of things we learn and a lot of things that, you know, that shift gears and move around through that process, such that we don't always, you know, we definitely --

I think we've revised maybe one or two over the past. You know another thing we could do is issue a, you know, a one-page memo with that updated table, and make that clear that's what we were doing, or that we have updated that table and made corrections based on some of the things noted by SC&A.

Mr. Barton: That sounds like it's certainly a viable and a perfectly good solution to me. But I guess it's really up to the Work Group. I'm not sure if you want to discuss this now or wait towards the end of the presentation, or simply leave it alone for now.

Dr. Anderson: I think we can come back to it. I mean you've got a few to go. How do others feel?

You want to see about it and talk about it now or -- I think it would be better to do, just go through all your observations.

Member Beach: Henry, I agree with that, just to go through.

Member Roessler: Yes. I agree to, because there might be some other things too that we want to treat as a group at the end.

Dr. Anderson: Yeah, okay. Moving right along.

Mr. Barton: Okay. If we could -- but again like I said, this does not affect in any way the conclusions. It's really just the accuracy of reporting essentially to the public what we actually had for analysis as part of the data.

Okay, moving on to Observation 2. As Joe sort of intimated, one of the things you -- the very first thing that you look at from even a completeness standpoint is well, how do these things look at over time? You know, you wouldn't expect any Site to have a constant number of breathing zones, you know, by month or year or whatever.

So you expect some changes, but you wouldn't expect necessarily any gaps or just, you know, very large swings month to month. So that's what we looked at, and so our observation here is simply that, you know, when we looked at the -- on the data set that we do have, it certainly looks like it was not a complete data set, and this was sort of an observation to inform that first finding, because again we believe the data set is incomplete, but without those secondary sources of how many BZs were actually done at the Site in a given timeframe, we just have no way to know necessarily how many are missing.

But again, back to the DAC-hour log sheets, we can say at least for those years up to 2002 when doing that comparison, it was close to 99 percent of the NIOSH data sets. So based on those years and those secondary sources, it appears that the ones we have if anything could be biased high, and certainly no indication that they were biased low.

For example, if we had gone into those DAC-hour tracking sheets and found that a large portion of those were not included in the NIOSH data set, then that would certainly be of greater concern. But the fact that there was such a high percentage included in their data set is one piece of evidence that if it's not representative, it's likely biased a bit high by some degree.

And so SC&A and NIOSH agree on that, and again this was part of informing Finding 1 as to why we believe that the data set is incomplete. It should really just be -- we recommend that it be subsumed under Finding 1, however that is eventually decided. So that's what I'd recommend for now. Unless there are any questions on that, I'll move on to Observation 3.

Dr. Anderson: All right. Just keep going.

Mr. Barton: All right. This has to do with WebDose, which is part of Chuck's presentation as well, and it was again well, let's look at this electronic database we have from the Site, and let's compare that against the hard copy records that NIOSH has captured and are used to justify the use of the 100 millirem.

That's compared with the observation that yes, WebDose doesn't appear to be a complete source either, but that since WebDose's purpose was really as a Health Physics tool to track the folks that you'd want to make sue were in compliance with the

applicable dose limits, when you compared WebDose against the raw data, it really is quite good.

So again that's another weight of evidence that like the DAC-hour log books, what we have in the data set and NIOSH has captured for evaluation is either representative or biased high, and certainly no indication that it was biased low, which would be an issue for SECs.

So we looked at the WebDose and we compared it against DAC-hour and we agree, that those log book entries in the DAC-hours are in WebDose. So and the DAC-hour log books are often included in the raw data sheets. So there's really no indication from this comparison that we might be missing a population that we monitored via readings that we don't have the results, that they're potentially exposed at a higher level. This in fact would contradict that notion.

So again, like the previous observation, since it goes really to completeness and what does that incompleteness really mean in the SEC context, we recommend that Observation 3 also be just subsumed under Finding 1 of the discussions, because Finding 1, Observation 2 and 3 are really all brought together.

The next thing we looked at was let's see how many breathing zone samples do we really have among the individual workers that we can identify in the raw data, because as you recall from Chuck's presentation, part of this is well, how much dose are we really getting per event, per exposure event monitored by breathing zone, and then how many such events would it take to really surpass that 100 millirem threshold?

The answer from NIOSH is no. It says well you have

about a half millirem per event, and so it would take 200 events to surpass the 100 millirem. So we said all right, you know. Part of this question is what's the chance there are folks out there who were involved in more than 200 individual events? Which does seem like a pretty high number, but if you were doing it every day maybe it's not.

So we looked into the data. We found that eight percent of the total that we have are actually just for a single individual. So there was one individual that had the large number of jobs that involved breathing zone monitoring. But nearly four-fifths of the worker population in our data set had 20 breathing zone samples or fewer in a given year. So you apply that 20 to the 200 it would take to reach 100 millirem.

NIOSH concurred with the observation, and it does not affect the assumption, and we obviously agree on this one, and so we just consider this informative to the Work Group as to different ways we looked at this problem of incomplete data to convince ourselves of whether the proposed approach would truly be bounding. And again, bounding for unmonitored or partially monitored workers.

Observation 5. We wanted to compare. All right, well let's see these workers in the breathing zone database. Let's compare them against the non-tritium bioassay program, to see how many were also submitting bioassays. Is it a high number, is it a low number, is it none of them? We found out that let's see, 79 and 194, that are actually in the breathing zone records also participated in the bioassay program.

We also noted that the 11 workers that we identified that had the most breathing zone results per year and this includes the workers with the most BZ results per year and also the 11 workers with the

highest number over the entire period were also on the bioassay program. So that would suggest that those who were most often involved in jobs required the breathing zone monitored were often already on a non-treating bioassay program.

And so this method of 100 millirem really wouldn't apply to a significant portion of this population because you used their personal monitoring records, rather than the 100 millirem, which again is applied to the unmonitored worker. SC&A concurred, I'm sorry, NIOSH concurred with SC&A's observation here, that you know those workers, at least in the data set we have that have the most exposure events, also typically were already on the bioassay program.

The other thing is to look at the actual exposure potential, and this is where the .5 millirem per event comes in. If you wanted to look at how, well how does this look on a yearly basis, because you're going to expect if you have analyzed the data over a long period of time like 1997 to 2011, you're going to have fluctuations by year.

It's not like -- it's going to be lower in some years, higher in other years. Are there certain years where we should really be concerned about it? Are there certain areas in years where it looks like it's simply not going to be bounding for that particular strata of worker? I'm going to show a couple of charts real quick.

You know, we did do a pretty significant breakdown in the report. If you look at Figures 5 through 8, that's just the percentage of different metrics that we looked at, and this is -- that use that -- 5 through 8 are not necessarily exposure. But Figure 5 was we looked at how it was distributed by general work area by year. 6 was the test by year, 7 was radionuclide of interest by year and then 8

and 9 were respiratory protection used by year. So you can kind of get a sense of how these different things changed when we look at --.

There is one where this is actually using SC&A's evaluation of a dose. So the red line there, that's pointed out as a full SEC period dose value. That's where SC&A calculated from the entire data or the entire SEC period. That, I think, came out a little bit lower than NIOSH's estimate actually just because we used slightly different methods on how to deal with less than detection values and such.

But as you can see, like I said you're going to have fluctuations. Some years they're above, some years they're below, and I did this as a ratio for the very specific reason that there's a lot of factors that I'm going to go over at the very end of this presentation. So I wanted you to get a sense for how much it might go up by year, and as you can see, at the median level it can be as high as a little over a factor of two.

But again, just keep that in mind when we talk about how we did these exposure assessments and things like not including respiratory protection, which when you consider the protection factors that the different types of respirators will give you, it's much greater than two. And so we did not find these worrisome, although it's certainly an analysis that we wanted to point out.

If we found, you know, certain years where you're sitting at factors of, you know 50, 100, certainly it would be much more worrisome.

This looking at it by the area, and again that's SC&A's calculation for the entire period and again, this is a ratio. Now you can see that in those first two years, you can get up around a factor of six. And again, if you're thinking about respiratory

protection factors, that really is not very significant from that standpoint.

I can add, just for everyone's edification, I was -- I was looking specifically at those first two years and at 6580, and that's where the hot cell facility was. Especially in 1997, a very large portion of the breathing zone results were simply from that area. But the other thing I looked at was for those two years where it looks, you know, while you have a factor of six, is that something to worry about. Those work in the hot cells. Really, I think in the 97, about 96 percent of those breathing zone jobs involve respiratory protection of varying degrees. I think it was a little further down or 85 percent in the next year.

So you know, those two results look high. They don't consider any of that, whereas working in that hot cell facility, most of the work required respiratory protection. Now unfortunately I can't tell you much about what they were actually doing because unlike some other years in other areas, the actual work being done was either unspecified or would simply say "a job is in progress."

So I can't really speak based on these RWPs more about what was happening. But again, I think when we kind of look at these evaluations, as we get to the end and you put the whole picture together, you will see why SC&A recommends what we are.

So what are those mitigating factors? So there are fluctuations by the year. There's fluctuations by area. However, when you look at these, the actual exposure assessments that inform those two charts and the table in our report, plutonium-239 was assumed for nearly all of the calculations, though some RWPs specifically would call it different things, like a fission product, cesium, depleted uranium, which all would bring the estimated doses based on

all the raw breathing zone data down considerably.

And again, respiratory protection was never considered in those two assessments, and you've got typical protection factors of 40, and that if you were in the bubble suits, which were in use for some of your operations, you can have protection factors on the order of 10,000. So when you compare those to the sort of ratios I was just showing, you can see why it is certainly not that worrisome based on a lot of these say conservative built-in assumptions, when essentially justifying whether 100 millirem would be bounding for the unmonitored or partially monitored worker.

Also the number of probable exposure events per year, the ratio is likely much less than 200. There were a couple of people like I said, in I believe it was in Observation 4 or 5, that did have a significant number of events per year. But are those people who are already on the bioassay program, and that most of the people in this breathing zone population did not show evidence that they were likely to get above 200 and in fact we feel it's likely much less than that.

And as I said, the individuals with the most frequent number of BZ events were already on the non-tritium bioassay program. We call that non-tritium because again, it's the alpha component that's really driving this.

NIOSH concurred with this observation and I believe the 100 millirem is still a big number and SC&A, as we stated in our original review and also our response to NIOSH's response, that SC&A 2020 report and 2021, and the mitigating factors I just discussed concluded that dose assessment is sufficiently conservative, that the 100 millirem on an annual basis is appropriately bounding for unmonitored and partially monitored workers. So

we feel that this observation can be closed by the Work Group.

Moving briefly away from the internal breathing zone data, this was the sole observation concerning external dose, and if we have Ron Buchanan on the phone, he can describe this issue in greater detail.

Dr. Buchanan: Hi. This is Ron Buchanan, SC&A. Can you hear me okay?

Member Beach: Yes.

Dr. Buchanan: Oh okay. Observation 7 was concerned with the Sandia Pulse Reactor, radiation gradient dose. What this issue was was that the gradient was severe at the bottom of the reactor vessel. Now the radiation itself wasn't severe; it's just the gradient fell off very rapidly. This wouldn't be applicable to personnel working outside the immediate area, only at the bottom of the reactor vessel.

There was the potential that these personnel wore their badges on their chest, and therefore their head, eyes and hands may be exposed to a different radiation field than was reported on their dosimeter. And so that's why Observation 7 was concerned with this, and NIOSH agreed. They found further research was needed to do dose assessment for these particular workers.

Now there wasn't a large number of them, but they were monitored but they intended, they intend to do, conduct additional review and research to determine the need for adjustment factors. So they do have recorded doses, but the question is should the head, eyes and hands closer to the reactor vessel be assigned a different factor by a multiplication factor of some sort.

And they had looked at this some. We had looked at it with them also. But they felt that they needed to investigate this further before they made a suggestion, and that they would incorporate that into the Site Profile. So we concur with NIOSH's plan to conduct additional review and research, and to provide this update in the revised Site Profile.

I would like to emphasize this is not an SEC issue. The only interest is certain parts of the body that may require a multiplication factor of the doses already in the dose record. And so that's what Observation 7 was concerned with. I'll turn it back over to you Bob.

Mr. Barton: Thanks, Ron. Just to kind of summarize here, again Finding 1 had to do with the fact that we do have an incomplete data set. Again, what can we say? What kind of investigative things can we do to either convince ourselves or not convince ourselves that what we have is either representative or bounding.

And again, I think it's to a lesser level since this isn't forming a basis of a co-exposure model but rather a piece of evidence that the proposed dose reconstruction approach of 100 millirem in bounding. Now if we were going to try to take this breathing zone data and actually construct a co-exposure model, then the bar gets set in my mind a little bit higher about what data is missing.

But again, what we found is really no indication that the data that's missing, the exposures that are missing would not be bounded, and in fact the data set suggests in comparison to the DAC-hour log books and the WebDose database, that if anything it might be as high.

Observation 1 was about the duplicate samples, which NIOSH reevaluated. It did not make an

appreciable difference. That's no problem there. We can close that. There was the discussion about how to deal with, if not updating the SEC ER instead adding it as part of the TBD revisions and potentially a note associated with the ER about the fact that additional data came in after the ER addendum was issued.

That was evaluated. It ended up not changing the actual exposure conclusions regarding the 100 millirem, but it certainly did, as Chuck pointed out, fill in some of the gaps that were seen, which is always a good thing, I think, just as far as optics to the public. It paints a better picture of the data we had to come to this conclusion. If we present the additional data but also correct for some of those anomalies about how different breathing zones were actually counted in the original ER table.

Observation 2 was simply looking at what we have over time, and we did that by year and we also did it by month, just to get a better sense. For example, you wouldn't expect to see, you know, 100 breathing zones in one month and then zero for the next two, and then 50 the next month unless there is perhaps a shutdown or a strike.

I think when we look at that, it convinced at least SC&A that we did not have a complete data set, which NIOSH agrees with. Now the question is is what we have sufficient to justify the 100 millirem?

Again, Observation 3 was the same thing, but comparing it against WebDose this time instead of the DAC-hour reports. And again based on that, we feel that -- we're confident that the data we have is either representative or might be biased high. And again, this is all in the context of an unmonitored worker or partially monitored and as we found when comparing these breathing zone data against the actual bioassay data, there's quite a few of them

that were monitored internally by other methods, which would be used in their specific dose reconstruction.

4, this is one we looked at the number of BZ samples per worker per year, and we do not feel that this impacted the feasibility, because we didn't find it likely that a given worker was unmonitored, could have been involved in essentially 200 exposure events in a given year.

And then Observation 5, as I just intimated, was a comparison of breathing zone participants and the actual non-tritium bioassay program, and both 4 and 5 we recommend closure. Again, it was meant to be informative to the Work Group about the types of investigation tools that we looked at to again, convince ourselves that if the data is incomplete, how does that actually impact feasibility.

And then Observation 6 was again looking at the actual exposure potential across different years and different areas, and while there was certainly fluctuation that we saw based on the year and the area and what was going on, especially in the first few years with that hot cell facility, we don't believe that actually affects the feasibility of dose reconstruction here with the 100 millirem approach.

That's really because of all three, but maybe four main factors. The fact that in the analysis done we have assumed plutonium nearly all the time, it was close to 100 percent. Even a lot of these RWPs would actually specify that it was depleted uranium or fission products or something like that, which if the analysis had tried to go down to that level of granularity, would only have lessened the dose per event for these BZs. So lessened the dose per event, which would mean, even require even more than 200 events per year to exceed that 100

millirem threshold.

Again, no consideration for respiratory protection, even though a very large portion of these RWPs indicate that the workers had to wear to varying types and degrees. And so you add that -- again, it's going to have more specificity to the actual exposure analysis. This only would lower the dose further.

And then to add more we looked what does the data tell us about the probable number of exposure events for someone who is not monitored, and is that -- it seems unlikely to us that they would exceed the 100 millirem threshold.

And in the fourth one, which is not shown here, but just noting that those folks who had or appeared in the breathing zone records to a degree of frequency were almost always included in the bioassay program anyway. So this 100 millirem threshold might, frankly doesn't even apply for most.

Observation 7, as Ron talked about, has to do with the Sandia Pulse Reactor, and the fact that folks could be underneath but wearing a badge on their lapel. So it's essentially a geometry correction issue, and so you just kind of need to see. There's data about -- folks were even wearing head dosimeters at one point, but also ring dosimeters.

So there's data out there to come up with a geometry correction factor to address the fact that if you had workers underneath, you know, essentially underneath the reactor vessel, a dosimeter, an external dosimeter on the lapel is probably going to underestimate the dose received by the head and then certainly the hands as you're working above your head.

So in conclusion, the follow-up actions essentially is

the, you know, clarification on how those geometric correction factors will be developed from the available data, and the only thing left is that discussion about the data incompleteness. But as I said, we went at it a number of different ways, to see if there's any indication to us that what's missing, which is really unknowable since we don't have secondary sources that say how many BZs we should be having per month, per year, that sort of thing.

We still believe based on the entirety of the picture here that dose reconstruction is feasible, sufficiently accurate and claimant-favorable during the evaluation period. That's my reference slide. Before I necessarily turn it over to questions, I just want to make sure Joe and Ron Buchanan, was there anything that you wanted to add before we open up the floor?

Not hearing any, can I answer any questions about breathing zone or Joe answer any questions about implementation or security, anything like that? Be happy to.

Work Group Discussion

Dr. Anderson: Okay, thank you Bob. I just have a question. I don't remember ever seeing this. When NIOSH does dose reconstruction analyses or does dose, do they include a respiratory protection factor at any point? This is not to you Bob, but maybe to NIOSH.

Mr. Nelson: Generally dose reconstruction would be based on a bioassay or other analyses in place. The answer to that, I guess you've got to give me a scenario but typically --

Dr. Anderson: Well, it's certainly through the biomonitoring and that sort of thing. It's what they

actually got not --

Mr. Nelson: Right.

Mr. Rutherford: Can I add something to this?

Dr. Anderson: Yeah. Well, go ahead.

Mr. Rutherford: Yeah. This is LaVon Rutherford. If we use air sampling, air data in support of internal monitoring, we do not use a respiratory protection factor.

Dr. Anderson: Okay. Just I don't remember seeing it, but I never asked before. So that's what I assumed, but thank you.

Member Beach: Yeah. I've seen it mentioned a few times in different scenarios Andy.

Dr. Anderson: Yeah, okay.

Member Beach: Bob, I had a question on the breathing zone samples, but you answered it. So I guess we're left to what is that about, 30 percent or 35 percent of the breathing zone samples and the rest are unavailable, about 70 percent possibly?

Mr. Nelson: I don't think --

Member Beach: My question -- oh, go ahead.

Mr. Nelson: Sorry, Josie. I don't think we know the exact number that are unavailable.

Member Beach: Yeah.

Mr. Nelson: Those are the years that we know are, had the highest ones contained. After that, any time there was a dose consequence it would have showed up in WebDose. That's the reporting tool. For the entire period, there was 26 millirem assigned. So we felt like that's certainly 100

millirem bounding for one individual, you know, compared to the dose of record.

So we looked at incident reports and other things, and didn't see any big dose consequences as a result. The BZs we saw were, when there were some BZs that they got results higher than expected. Then they actually followed it up with bioassay and did a complete dose evaluation.

Member Beach: Is there any plans to look for more data?

Mr. Nelson: Well, we thought we'd present this to you all what we had. I don't know that we'll know the exact number. Is there a log of every BZ? No, not that we know of. There is a couple. There's a visual, like this visual data system where it has all the or many of the air samples written down. It will have key words like "breathing zone."

We used some of those to capture some BZs, but it ends up being very involved to go back and mine those out through the mountains and so forth, and we felt we had a pretty good cache of breathing zone monitoring records, coupled with the dose of record in WebDose just showing that, you know, those consequences don't seem to very high and, you know, how far along do we want to keep digging and digging and capturing more data as I'm not sure we could tell you a percentage, ever.

Member Roessler: Right. Henry, I have a comment.

Dr. Anderson: Go ahead.

Member Roessler: No questions exactly. Actually, I have two comments and what I have been thinking about as we go through this, the two comments is that I want to bring up a bottom line to see if maybe that will bring up discussion. We can move

this along and it's my impression at this point that NIOSH has presented enough information and reasoning using multiple things, the data and the 10 C.F.R. 835 approach to back up their conclusion that they can do dose reconstruction for this particular period.

SC&A has done a very detailed and thoughtful evaluation of this, and it's my impression that SC&A is pretty much in agreement with that conclusion. However, there's this thing that's always hanging over one of these discussions, and it's the data completeness.

This kind of brings me then into my second comment. Bob mentioned that, I think expressed a desire for having a quantitative way to look at completeness, and boy that would really be helpful, because these discussions that take place in other, on other Sites too, are quite frustrating because SC&A will say well, we don't feel that there's data completeness, but it's left sort of vague.

It's very hard for NIOSH to answer that and to come back then without some specific direction on, as to how to answer that question. Of course quantitative, if there a quantitative way, then that would make it much easier. So I guess my thought at this point is that the second part really doesn't affect the decision today, but it makes me think that we need -- it's an overreaching discussion, a separate discussion that affects other Sites.

It seems like there should be maybe not for this Work Group but a special group within the Board to look at this particular question, as Bob brings it up. So that I think is kind of expresses my thoughts at this point in time.

Dr. Anderson: Thanks. No, that's kind of where I was heading on that other, that I think I missed, I

missed I think the data is, you know, pretty -- I think we're all probably pretty agreeable of dose reconstruction using the 100 millirem approach is a good one.

Following up a question on that would be to you have some of the biomonitoring, and then those biomonitored workers were in the breathing zone, quite a few of them. My question to NIOSH would be if you just -- I'm going to have to go a second, sorry. Any other questions before that?

Member Beach: I want to make a comment while Henry's gone, and to you Gen, I thought your suggestion and your comments were very helpful, so thank you for that. I think that we should consider moving that discussion on incompleteness or completeness and quantity of data. It's something that does come up every single time we have a meeting. So that would be worth pursuing, I believe.

Dr. Anderson: As a separate issue?

Member Beach: Yes, as a separate issue.

Dr. Anderson: Yeah.

Member Beach: I mean obviously today we have agreement between NIOSH and SC&A, and these are generally Site Profile issues moving forward. But we don't want to lose track of the discussion on incompleteness. Tim's got his hand up. I'll call on Tim. Go for it.

Dr. Taulbee: I'd like to make a recommendation to you, Dr. Anderson. Following up with what Dr. Roessler just mentioned, this sounds like a very good -- the SEC Issues Work Group, of which I believe you're chair and Dr. Roessler's part of and Josie is also part of, that would be a good issue to

be tackled by that particular Work Group, especially for data completeness, because it does affect so many Sites. Just a recommendation.

Dr. Anderson: Yeah, yeah. I mean it sort of also fills in the issue of we -- routinely the comment used is "sufficiently conservative," which is quite a qualitative thing, and what constitutes sufficiently conservative is sort of -- I mean in our drinking water program it's a factor of ten uncertainty factor kind of a thing. So I think that kind of goes into what when is it overly conservative as opposed to sufficiently conservative as well.

So I'm not sure we'll ever resolve that to come up with a qualitative factor that we can look at the data as sufficient to say we're very confident that it's usable and not a wild guess kind of a thing, that you could always make something conservative. So I think we're -- I think, Tim, your idea of passing the issue along to another work group is probably worthwhile.

I think this is a good example of what can be done. Back before I snuck away there, my question was in using the 100 millirem, that also seems to be a bounding approach rather than the, trying to use dose reconstruction of co-workers, and of course co-workers has its other issues. But that could be, if in fact we had good evidence which you have put together here for this Site on other sites would be if in fact we're confident that the 10 C.F.R. 835 we had documentation that wasn't just supposed to be implemented but had been implemented, had been evaluated.

Then the 100 millirem for the unmonitored workers might become a useful tool moving forward elsewhere for those years, in the '97 and beyond years. But that's why I was wondering if you look at the workers who were biomonitored as well as had

breathing zones, and assume that they haven't been biomonitored, are the biomonitored data when it's used as the dose reconstruction always over 100 millirem, or is it always under 100 millirem?

So we could sort of use the actual measurements as a way to also evaluate that 100 millirem assumption that's being used in this case. Other comments, Josie or --

Member Beach: None right now.

Member Roessler: Well then I'd like to -- I think we're in a position where I could move that the Work Group accept NIOSH's conclusion that they can do dose reconstruction on this particular SEC period.

Dr. Anderson: On the subgroup, yeah.

Dr. Roberts: Actually, may I -- may I say something? There is an item on Petitioner Comments that are optional to Petitioner, then the Work Group, another Work Group discussion. Could we have that, the Petitioner have an opportunity to comment before we get into this?

Dr. Anderson: Yes, yes. Let's do that now. Yeah, hold that thought Gen.

Member Roessler: Okay.

Petitioner Comments

Mr. Giron: Chairman?

Dr. Anderson: There you are. I was going to say. I don't recognize your phone number, but go ahead.

Mr. Giron: Yes. I'm the Petitioner, Eloy Giron. First, I want to apologize for being on the phone and then trying to log on to Zoom, giving all that feedback.

So I am that guy that messes up. So sorry about that guys. Hope everybody's doing well.

First of all, I listened to Mr. Chuck Nelson's presentation today, and I'm not disputing any of his numbers or any of his conclusions on that. What I am disputing is we don't feel security personnel were included in those numbers that was provided from Sandia. I know the Working Group visited Sandia in January of '20, and we feel that as a group when they visited, that we weren't able to correspond exactly how we worked.

It seemed that should have been easy, but we failed somehow and I take responsibility for that. For example, we took them to some of the locations that's for the pulse reactor, and during our security postures, we were in one of the rooms that had holes in the wall that were used for -- logistic holes for electrical cords, and they were big five-six inch holes, and they've been there for 50-60 years. Nothing has changed.

The working or the group that visited Sandia, they didn't see that, and that's what I feel bad about, that we were in that security posture when those jobs go off. None of us in security, I'm not going to dispute any of the bioassay that was completed throughout the lab, but we were not involved in any of that, on any of those programs. For sure we were not involved in any of the respiratory programs.

One of the biggest failures we have was our dosimetries. There was no accountability on that. There was no really big push to make sure people were wearing them. I've read the, I've read the report, I've read the recommendation. I feel validated. It troubles me because we still have people getting sick, but we changed our security posture in the middle 2000's.

I know that the Chairman had an excellent question on the respiratory factor. We were seeing operating personnel going to respirators, and we were with them without any respiratory protection. There's no documentation or anything like that with the security personnel using that.

I know, I don't know who used the word but there's gaps, and there is gaps. Security was treated much different than operating personnel. So I could see Sandia providing that information and documentation for operating personnel, but I know there's nothing, no documentation as far as security personnel, the way we were working those areas. I know there's going to be a motion now to accept this.

I was hoping, I know we had a meeting or we had no comment in I think August of 2020. There was no way I was going to be able to speak. That was during the COVID and we were on a skeleton crew and I was at work, I couldn't even get off work that day to do that. So I know there's going to be a recommendation to accept it. It's disappointing that's going to happen, because security was treated completely different.

I know you guys need to go put this to bed and get on with it, because you've been going at this for a while, but is there an appeal process for this? What steps do we have after this? That's a question. I guess that's to the Chairman. I don't know who to send that question to.

Work Group Discussion and Path Forward

Dr. Anderson: Rashaun, do you want to talk, say something?

Dr. Roberts: Yeah. There is an opportunity, I'm sorry, an opportunity to request administrative

review with the HHS Secretary's Office.

Mr. Giron: Okay. Thank you. I'm just disappointed that this --

Member Beach: Can I -- I'm sorry to interrupt. Rashaun, is there a time limit on that or is that open?

Mr. Nelson: This is Chuck Nelson. If the Work Group and the Advisory Board agree that there's no SEC issue here, we will issue a letter, Mr. Eloy Giron, allowing him ample time to put in that administrative review request, and that will come in writing to you Eloy, if this should go that direction.

Mr. Rutherford: Yeah, this is LaVon Rutherford. I'd like to add to that what happens after the Advisory Board makes the determination that they are not going to recommend an STC, it will go up to the Secretary. The Secretary of HHS will make a final determination. At that point you will be issued a letter, and will be given a certain time period to make, request that administrative review. I just wanted to add a little to that.

Mr. Giron: Thank you.

Dr. Anderson: So this is back to LaVon. Does --if we accept this, I mean do we need to vote to deny making it an SEC?

Mr. Rutherford: That's correct, yes. In order for this to -- in order for him to be allowed to request an administrative review, a determination needs to be made by the Secretary.

Dr. Anderson: Yeah, but the Board is supposed to affirmatively approve SECs, but there's nothing in there that says we need to deny an SEC. It would seem to be that comes from the Secretary's Office?

Mr. Rutherford: No. The Advisory Board has to make a recommendation to the Secretary to deny the SEC, and then the Secretary would review the information by both the Advisory Board and NIOSH, and make the determination at that point to deny the SEC. Then the administrative review request would go out.

Dr. Anderson: Okay.

Dr. Taulbee: Right. The Secretary can't move forward until the Board makes a recommendation, whether it's to add or to deny.

Dr. Anderson: Okay.

Member Beach: Andy, this is Josie again. Didn't you have a question early on in the presentation that we put on hold? Did that get answered?

Dr. Anderson: I don't remember. Do you remember what it was?

(Simultaneous speaking.)

Dr. Anderson: I've got all my notes here. I'm going to search through them.

Mr. Barton: I think the question was what Dr. Roessler brought back up, about is there a sort of a standard quantitative way we can approach these things across the entire program rather than site by site?

Dr. Anderson: Okay. Well, Josie and Gen, do you want to move forward? Do you want to --

Member Beach: Yeah. I think we need to. Do we settle that and then go through the different items that are recommended for closure?

Dr. Anderson: Yeah.

Member Beach: Gen, did you have a motion? That was a motion to deny the SEC; correct?

Member Roessler: Sorry, I was on mute. I think I made a motion.

Member Beach: Yeah, I thought you did. I was just verifying that you had made the motion.

Member Roessler: On the, on the decision on this particular SEC time period, but I think then we have to follow through with the other discussion.

Member Beach: Of course, yeah. I'm going to go ahead and second that Andy, because based on SC&A's agreement with NIOSH, I believe that we need a motion.

Dr. Roberts: Okay. Just for clarification of the record, could you specify, you know, the class that you're denying, the proposed class being denied?

Member Roessler: I believe somebody from NIOSH should state that, to get it completely accurate.

Mr. Nelson: I'm trying to come off mute here, sorry about that. Okay. I want to make sure I say it properly. So the period that's left open for evaluation is 1997 through May 2011. I'm looking for it. I think it's May 11th. So those are the dates of this Addendum. The other previous periods are already SECs.

Member Beach: So January 1st, 1997 to May 21st, 2011?

Mr. Nelson: I think it's '11. I'm trying to find it. I don't know why I'm drawing a blank with that.

Member Beach: I'm pretty sure it's May 21st, 2011.

Member Roessler: Would it be sufficient to say

Petition SEC-00188, Addendum 2?

Mr. Nelson: Josie, you're correct. It is May 21st, 2011. Yeah, Addendum 2 covers that time period. I don't know if you're -- what do you think about that LaVon?

Dr. Taulbee: This is Tim, if I could chime in here. I think a simple motion could be that the Work Group concurs with NIOSH that dose reconstruction is feasible based upon the SEC-00188, Addendum 2 evaluation. So I think that should be sufficient.

Dr. Anderson: So I will -- and then we take it to the full Board.

Dr. Taulbee: That's correct.

Dr. Anderson: So that's the recommendation to the full Board, yeah. And it only pertains to the security workforce?

Dr. Taulbee: All personnel.

Dr. Anderson: All personnel? Okay.

Dr. Taulbee: Yes sir.

Member Roessler: Yeah, this is all personnel, according to the ER of 2019.

Dr. Anderson: Yeah.

Member Roessler: Okay.

Dr. Roberts: And that has been seconded?

Member Beach: Yeah I --

Dr. Roberts: The motion to bring the recommendation to the Board.

Member Beach: Yes, I seconded it.

Dr. Anderson: Okay. We've got a motion. It's been made and seconded. All in favor of accepting the motion, I don't know if we need to go through each of us. Why don't we just, since there's only three of us. Gen, how do you vote?

Member Roessler: Yes.

Dr. Anderson: Okay, and Josie?

Member Beach: Yes.

Dr. Anderson: And I'll vote yes too. So it's unanimous. It's hard as the chair; I can't make motions, and therefore if we're going to have a second, it has to be pretty unanimous. Okay. So we're onto any other comments others want to make before we -- we'll take this on the -- we have a Board meeting end of the month. We'll bring this to the Board with a recommendation, and we'll need I guess presentations, Chuck and Bob.

Mr. Nelson: I can probably give me statement. I'm going to be on vacation in the next week. I can do the same presentation or I'm just trying to think if I can get it over to them in time for adequate review. Oftentimes, we get it over in the last minute and we get a lot of flak for that, so I'll -- I don't know. I've talked to LaVon about that some. I don't know if he's got an opinion.

Mr. Rutherford: Yeah. I mean I think what you could do if -- I mean if it's appropriate, we can do the same presentation that you just did, and then Bob. But it would seem like it would be a much, you know, we'd want probably a shorter presentation --

Mr. Nelson: Yes.

Mr. Rutherford: --than that long one.

Dr. Taulbee: I was going to recommend that same

thing, that it seems like a shorter presentation, perhaps Bob's, SC&A go through their findings and they recommended closure and everything's closed and the Work Group voted.

Mr. Rutherford: Right.

Dr. Taulbee: And that's really all that's needed.

Dr. Anderson: So can we -- kind of a question on the timing of it. We need to get, since we're going to recommend a denial here, I want to be sure that all the other Board members are going to have sufficient time to look at this. Are we going to be able to get this out, or do we need to postpone this to another Board meeting?

It would be nice to get it here, but I don't want to have things coming out three days in advance, and full Board discussion will begin with completing I haven't had enough time to look at it if we're denying it. It's one thing if we're going to accept it.

Mr. Barton: Well, this is Bob. It is pretty, I mean very short amount of time, and it does take a while to get these things, in particular not just to the Advisory Board but also available to the public. It's also obviously important, because they'll want to have time to review it as well.

Of course, the underlying documents are already all up there on the website. It would be -- the new material would simply be I guess the shortened presentations and the update from this meeting.

Dr. Anderson: Yeah, and you've gotten the clearance for this meeting, so unless you alter things.

Mr. Rutherford: Yeah. I was getting ready -- I believe the agenda's already out for this meeting, and Dr. Roberts can jump in here. But I --

Dr. Roberts: Right.

Mr. Rutherford: Go ahead.

Dr. Roberts: Yeah. The agendas can be revised.

Mr. Rutherford: Okay, and then the only other point I wanted to make, again this is LaVon Rutherford, is this is not only a short amount of time for the Board's review, but it's also nice to give the Petitioners enough time to prepare their whatever they may want to say as well.

Dr. Anderson: So I mean I am sort of leaning towards maybe postponing it just for all those reasons. We could report here that at the end of the month that we had the -- well no. Rashaun, what are your thoughts?

Dr. Roberts: Yeah. I think there's a lot of validity to the concerns about not giving the public and the Board sufficient time to review. Had we been able to hold this meeting back in March, it definitely would have been less of an issue.

Dr. Anderson: Yeah.

Dr. Roberts: But since it got rescheduled, I think we are a little bit jammed for that. So it sounds like you Andy may be leaning toward postponement.

Dr. Anderson: Yeah that's -- that's my thought. I'm not sure there's that much of a rush. It would have been nice to been able to do it, but I'd like to be sure that everybody has adequate time and that the discussion with the full Board doesn't lead to a lot of historic questions that people don't remember back from the early start of this.

Member Beach: Well, and I'm wondering if it wouldn't be better to go ahead and present, and have the discussions on both sides. I think we have

time on the agenda. I guess we could ask the Petitioner if he feels that's adequate time. He's on the line, and then if we don't get to a vote, then the information is out and then we --

(Simultaneous speaking.)

Dr. Anderson: It could be tabled. Yeah, you're right. It could be tabled --

Member Beach: It could be tabled. That's been done.

Dr. Anderson: Yeah, good. That's a good thought, right. Let's do that. Let's go through, make the presentations and start the discussion there and then see how it goes.

Dr. Roberts: So would that be SC&A and DCAS providing the same presentations as today or --

(Simultaneous speaking.)

Dr. Anderson: Yeah.

Dr. Roberts: --what we're asking.

Member Beach: Yeah. I think that they could definitely do that, and then provide the background documents as you did for this meeting.

Dr. Taulbee: May I make a recommendation here, that these be actually just a really short presentation by SC&A, and in the sense of going through their findings. I mean if you want Chuck to go through and redo his presentation, we can. I guess I can see going either way. It's just it seems like we're trying to fit a lot into, you know, this time slot here.

Dr. Anderson: I mean my thought on it is that if Chuck could go through. I think people ain't gonna

remember the earlier SEC, and the reason why you couldn't and then what changed in the '97 to 2011 period that -- and we're saying there's data problems and shortages. But you know, it's more -- I think the tipping point was the ability to show that the Part 835 was in fact implemented. We have documentation on that, and that makes the use of the 100 millirems acceptable here versus the earlier time periods.

So I think people need to know that we're not changing in midstream here. We're up to this point everything has been made an SEC, and from '97 forward, we're now saying things have changed and we need to say what is that and why do we believe it can't be done.

So I think, you know, whether we have Bob present that history, but I think that's important to get to the Board and not have them necessarily have to try to wade through all of the earlier documents to come to that conclusion. At least that's my bottom line on why we're moving forward, able to accept it here more, because everybody agrees there's data problems.

But the use of the 100 millirem, which is built right into the 10 C.F.R., I think, is the key thing to focus on, that in fact that was implemented and was working effectively.

Dr. Taulbee: Okay, I understand.

Dr. Anderson: Yeah.

Dr. Taulbee: I understand what it is you're looking for now. Thank you very much for that clarification.

Dr. Anderson: Right, yeah. At least that's my thought. I don't know if Josie or Gen --

Member Beach: No, I agree also.

Dr. Anderson: So I guess it's -- Tim, if you want to work Bob and Chuck, whether your -- Bob can go through all of that. I think that can be handled fairly quickly.

Dr. Taulbee: No, I think I can work with Chuck and we can get that done on our end, as to what it is you're looking for.

Dr. Anderson: Okay.

Dr. Taulbee: So thank you. And Bob, I'm assuming you're going to want to go through your findings and do recommended closures, but yeah.

Mr. Barton: Yeah, I think the suggestion you had earlier about really paring down both presentations. If you don't have to have the level of detail, then it won't necessarily take as long. I think that was a good suggestion.

Mr. Nelson: Now will this be just an update or would you be looking to eventually get a vote here?

Dr. Taulbee: I could go either way.

Dr. Anderson: Yeah. I would like to get a vote, but my concern is that are people going to be uncomfortable because they haven't had enough time.

Dr. Taulbee: Right.

Dr. Anderson: And if I get a sense at the Board meeting that that's the case, that I would think we may want to think in terms of not just churning away time with people being uncomfortable by enforcing a vote, but we could table it then. But I'm hoping the presentations will be sufficient, that Board members will agree with our Committee conclusions to recommend –

(Simultaneous speaking.)

Member Beach: Go ahead, Joe.

Dr. Taulbee: Go ahead.

Mr. Fitzgerald: Yeah. The only thing I would add is, you know, we need to reach back to our original review, which includes the treatment of the, you know, the security guard issue. We don't really address this specifically in these follow-up findings and observations. But that is contained in the 2020 report that we produced, with an appendix of the interview and tour summary.

So you know, there's a lot of detail of how we reviewed that issue and how we came to the conclusion that, you know, it didn't necessarily present a problem with the 100 millirem criterion. So I'm just looking ahead and thinking if you're a Board member who hasn't been on this Work Group, that might be a little cryptic unless you were familiar with that work that was done on that particular issue of the Petitioner.

So that's the only thing I would add, that in the presentation, somehow that, you know, with the provision of a report or maybe even a slide on that, you know, on that review, that would probably fill in the hole that some Board members may have.

Member Beach: Joe, is that something you can work with Bob on?

Mr. Fitzgerald: Yeah, I mean that's easy enough to do. I mean it's maybe one slide, but I think it's an important one because again, we did spend a lot of time and effort on trying to put that one to bed, and I know Henry you and Josie were on the tour and on the interviews. But it may be a little hard for the other Board members to understand how we

dispatched or how we actually dispositioned that question.

Member Beach: Good point, Joe.

Dr. Anderson: Yeah, yeah. Okay, do we want to go back through the -- and close out the various points?

Member Beach: Yeah, back starting with 4?

Dr. Anderson: Yeah. Bob?

Mr. Barton: Yeah. Let me take myself off of mute. So a lot of these we recommended closure, but I'm not sure if they were actually formally closed out if that's what we're --

Dr. Anderson: No, we didn't. That's why I think we -- we either need to say we're going to accept all your closure recommendations, and some we're to keep it open until the documents have been revised, or wait. Maybe we need to go through one at a time. So let's just quickly go through here.

Mr. Barton: Okay. Well I mean on this slide you're all looking at right now, Finding 1, 2 and 3 all had to do with whether we were dealing with a complete data set, which NIOSH and SC&A agree it is not, and frankly we don't know at this point how much data might be missing. So that's really the gist of those.

Based on the motion that was just voted on, it seems like Finding 1, 2 -- Finding 1 and Observation 2 and 3 could be closed out by the Work Group as there are data completeness issues, but as they don't necessarily inhibit feasibility, they can be closed is what I would recommend.

Dr. Anderson: Can I have motion for one or the other?

Member Beach: So this -- my question on this would be would this have anything to do moving forward for Site Profile issues?

Mr. Barton: Well, if we accept the 100 millirem, I would say no, because while there is a completeness issue with the breathing zone data, the totality of evidence suggests that 100 millirem is a bounding dose reconstruction approach. So I'm not sure what else we need to happen here, other than -- well as was suggested, it's sort of under Observation 1 here.

The update to the TBD would have a more accurate depiction of the available breathing zone, as well as include the additional breathing zone that had been obtained after the ER. So that would be something that we would consider a TBD issue. But that would be under Observation 1. The fact that the Work Group recommends that 100 millirem is appropriate, then I think that essentially closes out the finding and two observations directly related to the fact that there's completeness, yes.

Member Beach: Yeah, and Bob thanks for bringing that up. I think that goes back to Henry's or Andy's question on whether we do a memo for the ER or it's placed into the Site Profile or the TBD.

Dr. Taulbee: I can tell you that my preference would be that we put it into the TBD, because that's the technical basis of how we end up doing dose reconstruction.

Dr. Anderson: Well, if you're willing to do that, where reviewing or redoing the ER is quite different, then I think let's put that in and we can wait until that's been completed to close it out altogether.

Mr. Barton: That would be just -- that would be that second part of Observation 1. But that update to the

TBD wouldn't really affect your ability to close out Finding 1 and Observations 2 and 3, based on your recommendation that 100 millirem is sufficient.

Dr. Anderson: Yeah.

Mr. Barton: So there's no completeness issue that says that we shouldn't be able to use that approach.

Dr. Anderson: Okay. Do I have a motion from someone to close? I mean we've discussed them and the issues have been basically resolved, and it's going to be going into the TBD.

Member Beach: Yeah. Andy, I guess I -- I wasn't sure that this was -- this part of it was actually resolved. We had talked about maybe moving it into the SEC's Work Group. So under this, Bob's absolute correct. We agree that the 100 millirem is satisfied.

Somehow I don't want to lose track of this moving forward because I think it's an important distinction that needs to be made. So --

Dr. Anderson: Shall we move on? Yeah.

Member Beach: Yeah. I guess we have to agree to close.

Dr. Anderson: Yeah. So is that a motion to close then?

Member Beach: Yes.

Dr. Anderson: Okay.

Member Roessler: Second.

Dr. Anderson: Okay, all right. So we're all vote along with that, so we're going to close these. But I think we need to remember at the Board meeting, Bob if you're going to go through these, we'll also

say to identify the issue that needs to go to the Committee.

Mr. Barton: Okay. Well I can certainly indicate that as part of the discussion, and really I think Finding 1 is very specific to this Site at this time, and I think as far as sort of a macro issue of how you deal with completeness across the program, I can certainly mention that.

Dr. Anderson: Yeah.

Mr. Barton: I think there's a way to transfer some of these inquiries to the SEC Issues Work Group. But in this case, we wouldn't really transfer Finding 1 if it's been decided here unless you all were hesitant about the completeness of the data here, in which you wanted the SEC Issues Work Group to take a look at it. It doesn't seem like that's --

Dr. Anderson: Well that's what I would, what I would -- I mean we can close it out as it relates to this Site. What I don't -- as Josie was saying, I don't think we want to lose that. So we may want to have it on the record at the Board meeting that yeah, do we want -- does our Committee want to recommend that it goes to the SEC Issues Committee?

Dr. Taulbee: I think that's a good recommendation there Dr. Anderson, is that coming out of this Work Group, the recommendation that the SEC Issues Work Group look at data completeness on a global scale across all of the sites and SECs.

Dr. Anderson: Yeah.

Member Beach: I think moving forward, we would have to look at the examples, and this would be one of the examples. It would be closed here, but we would probably need to have examples listed for other sites and if it's going to be more global, this

completeness or incompleteness of data. So this would be a good one to not lose.

Dr. Anderson: Yeah.

Member Beach: Okay, thank you. Thanks for the explanation on that too Bob.

Mr. Barton: Okay. So we're closing Finding 1 with the caveat that there will be some language in the Advisory Board meeting that this Work Group is recommending the SEC Issues Work Group take up the more global issue of data completeness.

So Finding 1 will be closed in this venue, as well as Observations 2 and 3. Observation 1 still has the TBD update, but the actual number of available breathing zone monitoring results to be updated. So that would sort of remain in abeyance, but not an SEC-related issue.

Dr. Anderson: Yeah.

Mr. Barton: Okay. All right, and then the next three, let's see. All right. This is -- this is again, these are observations that are describing what SC&A did as far as analysis, to convince ourselves that the data set that we have and the completeness issues that we have did not actually represent an infeasibility when it came to the 100 millirem, which I believe, you know, based on the discussions today, we recommended closure even in this presentation. So I guess unless there's more discussion on that, SC&A certainly will be recommending 4 and 5 are closed today.

Dr. Anderson: Do I have a recommendation for that? Board members.

Member Beach: Andy, this is Josie. I'll go ahead and recommendation that we close Observations 4, 5 and 6, based on SC&A's recommendation.

Dr. Anderson: Okay.

Member Roessler: Second.

Dr. Anderson: And I'll agree with that. So --

Mr. Barton: The last one here was, involved he external dose geometric correction factors for the pulse reactor, and I think the recommendation that was -- it seems like there's certainly a path forward to address that. We don't feel it's an SEC-related issue.

It's just a question of how that geometry correction factor will be developed based on data we have of folks actually under that reactor doing work and we want more actual head dosimetry. It's just that hasn't been addressed yet. It's a Site Profile issue, so I would say that one would essentially be held perhaps in abeyance, because I think both SC&A agrees that there's a viable path forward, but we haven't seen it yet, the specifics.

So it's sort of a gray area, sort of in progress, but since we haven't seen the specifics of it, I'm not sure if we can put it in abeyance, because in abeyance usually means you know exactly what's going to happen. We just need to see it officially in writing.

Member Beach: Right.

Mr. Barton: And in this case, we don't know exactly what's going to happen.

Member Beach: I guess Bob we should hear from NIOSH, if they're planning on doing any work on that.

(Simultaneous speaking.)

Mr. Nelson: Yeah, actually -- sorry Josie. The

progress is underway on that. I don't know if you guys want a full report on it. We could give it to you, but we can write it all up and present it over to the Work Group so they can see it. We're not complete with it yet.

We do have to do some further communication with the Site on a particular period of time, just to dial in some doses between work area measurements and actual measurements. Other than that, I think our principle internal, external dosimetrist has made some good headway on it, and I think we've got it laid out fairly good. We just have not completed that effort.

Dr. Anderson: We can keep this open then.

Member Beach: So it's actually in progress?

Mr. Nelson: Yes.

Member Beach: Yeah.

Dr. Taulbee: If I can make a recommendation that you designate it as a Site Profile issue that is in progress, to separate it from the SEC side of things?

Member Beach: Yes.

Dr. Anderson: Uh-huh, okay.

Member Beach: That makes sense. I agree with that recommendation.

Dr. Anderson: Okay. I think we're all in agreement on that.

Mr. Barton: Right. So just to recap, Finding 1 is closed. Observation 1 is in progress or in abeyance as a TBD issue. Again, since we haven't quite seen it yet, I think it's probably still in progress. But in progress as an TBD issue, not an SEC issue. And 2

through 6 are closed, and then 7 is likewise in progress as a TBD issue.

Dr. Anderson: And the finding data completeness issue in a broader sense, we're recommending that it be forwarded to the SEC Issues Committee.

Mr. Barton: Right, currently we're not necessarily talking about Sandia, though it form I think one of the examples going forward on that.

Dr. Anderson: Right, yes.

Mr. Barton: As Josie indicated.

Dr. Anderson: Yeah.

Member Beach: And then I guess on that Andy, I have a question for you since you're the Chair of the SEC Committee. Maybe think about plans moving forward with that, and tasking -- I know we don't want to task NIOSH, but NIOSH should probably start that discussion possibly. I don't know if we need a work group meeting I guess is what I'm saying to get that started.

Member Roessler: We certainly have to provide some wording and some backup justification for doing that, to give them something to work on.

Dr. Anderson: Well, I mean one thing would be to we need to identify a number of examples of this. So this is an example, and then we could either go through what are the other sites that we've dealt with. I mean I think almost every one deals with data completeness. Now it's a little easier when there's no data, and that's been where we've entered with a lot of the approved SEC.

But more now as we get into dealing with co-worker model issues, data completeness also feeds into that at a certain point. So I don't know if SC&A, you

deal with all of the sites. If you would say there's one or two others that the Committee might want to look at as examples.

Mr. Barton: Well, if I could comment, as you said we could provide examples. But as far as being able to actually develop quantitative criteria, I mean this is just my thoughts off the top of my head. But I see that as being very fraught with peril because of all these examples are really completely different from each other.

You might have a site where you have a 95 percent good data set, but as it turns out that five percent we're dealing with something completely different and had nothing to do with the 95 percent you do have. You might have another site where you're 50 percent complete and that 50 percent represents everybody who's doing the hardest work, in which case is that really a completeness issue.

In this case, we looked at from a couple of different angles what different areas, years, different types of tasks they were doing, and here it was concluded that the incompleteness, which we really don't even know and can't put a number on it, as Chuck mentioned, is not an issue. Whereas at a different site under different circumstances, it very well might be an issue.

So I think it's going to be very complicated to come up with a quantitative way to address this across the program, because really you have to look at the site and why does this incompleteness exist, and with what we have, is it appropriate to use in an SEC context. I'm not sure you can come up with a number or a formula that addresses that if you get --

It really comes down to the individual qualities of the site and what informs us about the incomplete

section of the data set.

Dr. Taulbee: Right, but that's, this is the, that's the discussion that should be happening within that SEC Issues Work Group.

Mr. Barton: Sure.

Dr. Taulbee: I think what Dr. Anderson is bringing up is, you know, we come to the table with some examples that we've discussed in the past, and we start exploring those, of what are those differences to identify.

Member Roessler: Perhaps instead of specifying or suggesting a quantitative approach, just say a more definitive approach.

Dr. Anderson: Yeah. I mean my conclusion before we've even looked at is I don't think at this time you can come up with a modeling approach that will address all sites. So that really is, as Bob was saying, a site-specific issue. You really have to look at each of the sites and then make a determination there.

And that is not an easy task necessarily to do, but we can potentially come up with a list of here are the kind of things to consider, that the Committee would like to look at. I think we've done that at each of these other sites. You don't always arrive at the same conclusion. But I do think, you know, it's better to have as a larger group, a somewhat different group discussion about the issues.

I'm not sure we can resolve everything, but I think it is worth a broader discussion, and I think putting it in a Committee makes it a more manageable discussion than trying to do it with the whole Board. You know, it will just run on forever to try to do that.

But I think if we could start it to say are there some commonalities that need to be addressed, that have been addressed, that begin to do, you know, getting to the issue of sufficient, to get a definition of sufficient is a challenge. So that's kind of where I would think our Committee would want to go.

But it would be nice again to have some individual cases, where the committee that -- our Committee struggled with this a fair amount, for a long period of time and I think others may have as well. So it would be nice to get an idea which were those and then are there commonalities in them that we could then summarize and say this is the approach that is needed?

Member Beach: It sounds like NIOSH could potentially provide some of that start-up discussion, and then schedule a work group meeting.

Dr. Anderson: Yeah.

Member Beach: Is that correct Tim?

Dr. Taulbee: That's correct. We could come up with a memo to get the ball rolling.

Member Beach: There you go.

Dr. Taulbee: From that standpoint.

Dr. Anderson: I don't think we need a full --

Member Beach: No, no.

Dr. Anderson: I would go, I would go just with a memo if you can, and that would give us the foundation to pass it on.

Dr. Taulbee: Yes.

Member Beach: Yeah.

Dr. Taulbee: Thank you.

Dr. Anderson: Okay. Are there other comments? Let me pull up our agenda here. I think we're pretty well finished with that. Okay. So we have the -- what's that, okay. So we've got follow-up actions. I think we've pretty well been through that.

At the Board meeting, we're going to have the two presentations and the discussion there, and see how the Board members feel. I think we need to get the information out to them quite a bit and point out that, which isn't in the agenda particularly, that we're going to look for a potential Board vote.

So that will really encourage people. There's a lot on the agenda. We really want them to prioritize looking at this one. Any comments?

Member Beach: Nope. I think you covered it Andy.

Dr. Anderson: Okay. I need a motion to adjourn.

Member Beach: I recommend that we adjourn.

Member Roessler: I second it.

Dr. Anderson: Okay, yeah. For us, we're a little past lunch but for the east coasters, you're well past lunch. So with that, I appreciate everybody's comments and participation here in the delay. I think we've brought it back on track and hopefully we can move forward at the end of or at the Board meeting. Any other questions people have before? Last chance. Okay, with that I'll adjourn the meeting. Rashaun, do you have any other comments?

Dr. Roberts: No, nothing here. Thanks, Andy.

Dr. Anderson: Okay. Thanks everybody.

Member Beach: See everybody in a couple of weeks.

Dr. Anderson: Yeah.

Adjourn

(Whereupon, the above-entitled matter went off the record at 1:31 p.m.)