Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
Hanford Work Group
Tuesday, April 14, 2020

The meeting convened via teleconference at 10:00 a.m. Eastern Time, Brad Clawson, Chair, presiding.

Present:

Bradley Clawson, Chair
Phillip Schofield, Member
Paul Ziemer, Member

Also Present:

Ted Katz, Designated Federal Official
Nancy Adams, NIOSH Contractor
Terrie Barrie, ANWAG
Ron Buchanan, SC&A
Bob Burns, ORAU Team
Grady Calhoun, DCAS
Joe Fitzgerald, SC&A
Mark Lewis, ATL
Pat McCloskey, ORAU Team
Jenny Naylor, HHS
Chuck Nelson, DCAS
Lavon Rutherford, DCAS
Tim Taulbee, DCAS

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Proceedings

(10:01 a.m.)

Welcome and Introductions

Mr. Katz: So, welcome, everyone. This is the Advisory Board on Radiation and Worker Health. This is the Hanford Work Group. It's been quite a while since we met.

Let me just cover some preliminaries. We have -- the Work Group is dealing with the SEC still. And it is going to pull together our information from bringing the Work Group up to date and everyone up to date with what's been put to bed and what is ready to be addressed.

The presentations for today should be posted on the NIOSH website under the schedule of meetings with today's date, so people could follow on with the presentation there, if they would like to. And there's both a presentation from the program, from DCAS, and a presentation from the Board's technical support contractor, SC&A, both for today's meeting.

There is also a report from the program that's the background for these presentations today that also should be posted there.

So, roll call. This is a Work Group on a specific site, so conflict of interest is always an issue there. The Work Group Members by definition don't have conflicts of interests or they wouldn't be Members of the Work Group. So, and our Work Group Members are all present. That's Brad Clawson who's on the line. He's Chair of the Work Group. And Paul Ziemer and Phil Schofield, both Members.

Let's go on with roll call for NIOSH ORAU team and, please, speak to the conflicts of interests.

(Roll call.)

Mr. Katz: All right, that takes care of it. So, and with that, Brad, it's your meeting.

Brad? You might be on mute.

Chair Clawson: Hello?

Mr. Katz: There you are.

Chair Clawson: There I am. What do we got? I'm sorry.

Mr. Katz: That's all right.

Chair Clawson: I'm trying to work, at, I'm trying to work at the same time here, so.

Okay. One of the things, I'd like to welcome everybody here and to the meeting. Like you said, this has been a long time since we got in there. So, I'm going to talk with Joe and Chuck.

Chuck has just put out all of these different papers and stuff. So I was wondering, Joe, if we wanted Chuck to first go over what he's done, or do you want to respond to some of these?

Mr. Fitzgerald: No. I think Chuck's done a pretty good job just laying out the background. And when we get into the specific issues on the agenda, you know, certainly I would expect them to present the NIOSH position, then we can respond. I think that would be the best thing once we get into the issues.

Chair Clawson: Okay. So, do we want to proceed that way?

Mr. Nelson: That sounds good to me too, Joe.

Chair Clawson: You've got it, then.

Mr. Nelson: Okay. All right. My name's Chuck Nelson. I'm the SEC team lead for Hanford.

And, Bomber, has anybody pulled up my presentation? I might be over here. The only reason I'm getting the audio so let me try to share it to see if that works. Apologize.

Mr. Rutherford: You shared it earlier. It should be, should be okay.

Mr. Nelson: Okay. Let me know if it pops up there.

Mr. Rutherford: It's coming up now.

Mr. Nelson: Okay. Can you see it yet?

Mr. Rutherford: Yes. Yep, we've got it.

Mr. Nelson: Sorry about that. Anyways, I'm the SEC team lead for Hanford. I'll go ahead and go through some of the background information since it's been a while, and for everybody else's benefit on the phone.

Just talk about, a little bit about the SEC evaluation history. We had SEC Petition 57 Part 1. That covered October 1st, '43 to August 31st, 1946.

Then we had SEC Petition 57 Part 2, covered September 1, '46 through December 31, 1968 for select areas.

Then there was another Petition, SEC 152, and it subsumed both those two previous Classes from SEC Part 57 Part 1 and 2 for those time periods through '68, as well as through June 30th, 1976.

There is also another Petition, 155, and that Class was not added. There was no evidence of falsification of radiological records during that time period.

And then we had SEC Petition 201, which covered a period from January -- make that July 1, 1972 through December 31st, 1983. And that was for all areas.

SEC 201 determined that dose reconstruction was feasible from 1984 onward, which was the same conclusion drawn from SEC 57-2.

Mr. Rutherford: Chuck, can you move your slide?

Mr. Nelson: Oh. Thank you, Bomber.

Okay, sorry about that. Forgive my coordination here.

Okay. So, in March of 2015 there was an 83.14 status, and the Class was issued. And it was for SEC-226 that was for contractors and subcontractors who worked at Hanford during the period of January 1, '84 through December 31st, 1990. There were some exclusions from this class, specifically Battelle Memorial Institute from January 1, '84 through December 31st, 1990; Rockwell from January 1, 1984 through June 28th, 1987; Boeing Computer Services from January 1, '84 through June 28th, 1987; United Nuclear from January 1, 1984 through June 28, 1987; and Westinghouse from January 1, 1984 through December 31st, 1990; and Hanford Environmental Health Foundation from January 1, 1984 through December 31st, 1990.

So, basically there was a Class issued for the contractors and subcontractors, but the prime contractors were excluded.

Okay. There was a consolidation that took place in mid-1987, around the June 28th time frame. And the prime contractors' responsibilities that were executed by Rockwell, Boeing Computer Services,

United Nuclear, were all brought together under a single contract which was executed, which was executed by Westinghouse Hanford Company.

United Nuclear was operating as contractor for the N Reactors and some other 100 Area facilities. Rockwell managed the operations in the two other areas, which was PUREX and the Plutonium Finishing Plant.

Okay. I also wanted to just go over some of the Hanford Work Group efforts in the recent past just to bring us all up to speed, on the same page.

In November 2017, NIOSH and SC&A provided the Hanford Work Group consensus recommendations of the scope and status of outstanding Hanford issues. And what happened from that is we captured all unresolved SEC-related and dose reconstruction issues.

In October 26 of 2018, the Hanford Work Group met again to consider these joint recommendations. And during the Work Group meeting each issue and recommendation was discussed individually, followed by input from the Work Group regarding whether they concurred with the joint recommendations from SC&A and NIOSH or whether they requested changes or any other actions they may have had. During that meeting some of the issues were closed.

In November of 2018, NIOSH placed all the issues into a Board Review System and then we updated it with the proper status whether it was an in-progress item, closed, or in abeyance. And since that period of time NIOSH has been going through all our holdings and interviews. And we documented the summary of all our findings into a White Paper, which is the subject of this meeting.

The title of the White Paper is Assessment of Hanford SEC Issues. And it was issued on January 7th, 2020.

Okay. So, we have this White Paper. And its purpose was attach and present all the extensive site research activities accomplished since the approval of SEC 201.

The White Paper's purpose, again, was to provide status of the assessment of the dose reconstruction feasibility for the several Special Exposure Cohort-related issues and that reflect the current state of knowledge based on extensive site research actions to accomplished since the approval of SEC 201.

And, again, the White Paper only addresses potential SEC issues not dependent on implementation of revised co-exposure methods.

Okay. At this point what we're going to do is go into the Hanford Rad Protection Program and just give some background information prior to getting into the issues.

So, at this point I'd like to turn it over to Bob Burns. He was our principal investigator on the ORAU side. And I'd like for him to give a little overview of that subject there.

Mr. Burns: Okay. Thank you, Chuck.

I'm going to rely on you to advance the slides because I don't have them up on the Skype presentation. I'm going from hard copy here.

Mr. Nelson: Okay. I'm ready for that.

Mr. Burns: So, assuming we're on slide 7, that's where I'll pick it up.

Mr. Nelson: Okay.

Mr. Burns: All right. And as Chuck described, Hanford, we're talking about the time period 1984 through 1990. And bear in mind that we're specifically, as far as the issues we're going to be talking about subsequently, we're just talking those with respect to the site, the prime contractors, you know, the contractors that were responsible for the various operating areas of Hanford.

And keep in mind that Hanford throughout its history it seems like, you know, the site level was always going back and forth between when it was operated by one single overarching contractor versus, you know, a number of individual contractors that were responsible for individual operating areas.

So, this period we're talking about, '84 through '90, at the beginning of that period, '84 through mid-'87, we had a mixture of site prime contractors and then, as Chuck said, mid-1987 was this consolidation where all the site operations came under one, one overall contract that was administered by Westinghouse.

But regardless, that was history, so the Radiation Protection Program at Hanford has always operated almost like the airlines, a hub-and-spoke type model is how I think of it. So, you have the centralized program that was maintained as a services function by PNL, by Pacific Northwest Lab. And it provided those health physics, and monitoring, and internal dosimetry sources and so forth across the site.

So, regardless of whether it was site contractor or multiple site contractors, you always had this, you know, centralized radiation protection element that, again, was managed by PNL.

So, each prime contractor was responsible for its

own rad protection plans and so forth. But, you know, they didn't do it in a vacuum. There was guidance and so forth that was provided by PNNL.

And specifically, as far as the issues we're addressing in this White Paper, most of those pertained to questions of internal monitoring. So, the discussion here, likewise, is going to focus on internal monitoring.

So, one of the key documents that PNL maintained for the site was the Hanford Internal Dosimetry Program Manual. And that's where they spelled out, you know, contractor responsibilities for identifying when bioassays were needed and things of that nature. It specified a lot of things. It was a big, comprehensive document.

But, I guess the bottom line here is the overarching basis for the Radiation Protection Program at Hanford during this time was the first line of defense was workplace monitoring. That was the primary means for identifying things in the field that were representative of internal exposure potential.

And then backstopping that was the routine bioassay program which was secondary to the Workplace Monitoring Program. And one of the purposes of, you know, the routine bioassay program, of course, was to confirm the effectiveness of the Workplace Monitoring Program.

So, if you have things showing up in your routine bioassay then, you know, that tells you there are going to be gaps in your workplace monitoring. So, the bottom line there, you know, that approach reflects a basis that, you know, internal exposures were infrequent, and typically would only occur as a result of, as I said there, a failure of a protective system. You know, generalizing, internal exposures would only happen as a result of radiological

incidents.

With the exception of the Plutonium Finishing Plant -- and really we don't have any issues associated with that at this point -- there were no chronic sources of intake at Hanford during this period. So that's something to bear in mind as we proceed here.

So, with respect to the Workplace Monitoring Program, PNL's guidance to the contractors was Internal Dosimetry should be contacted whenever an intake of radioactivity is suspected or when the dosimetric significance of an observation or event is in doubt. That's a quote from the Internal Dosimetry Manual.

And that includes, you know, even describing some of them in the White Paper. They are, you know, included several examples of those types of circumstances where they would want the contractors to now, hey, you guys might want to take a look at this.

About 1987 the Internal Dosimetry Program began publishing its formal annual summary reports. And within those they included summary statistics of radiological incidents that had occurred across the site during the prior year, whatever the year, whatever the subject year was. So, when we reviewed those, you know, we made several observations, one being PNL's guidance for incident reporting was indeed adopted site-wide, so all incidents being reported across the various operating areas, across the various contractors.

Another take-away was that the workplace monitoring was quite capable of identifying radiological occurrences at a level below those of internal dose significance. And along with that, incidents of internal dose significance were rare.

Basically, an event, you know, a radiological incident that had potential for internal dose was a big deal. You know, and this wasn't your everyday, you know, personnel contamination type of incident. So, as I said, the take-away there was, you know, occurrences of internal dose significance were, you know, significant events and would have been recognized in the workplace.

The Workplace Monitoring Program was more than capable of identifying such incidents when they occurred.

So, and then the back end -- oh, sorry, Chuck, were up to Slide 9. Forgive me. I'm just looking at my hard copy.

Mr. Nelson: I got you covered.

Mr. Burns: Sorry about that. Battling away here.

So, in addition to the Workplace Monitoring Program then, on the back end of that was the Routine Bioassay Program. So, and in particular the routine monitoring was provided for both in vivo and in vitro bioassay. But a key element of the routine program was the in vivo program. In other words, the whole body count and the chest counting program. Those were key elements of the routine monitoring.

So, whole body counts were performed as an element of workers' annual physical in the occupational medicine, occupational medical requirement. And they also performed whole body counts for new hires, for folks that terminated, or at the beginning or end of special progress -- projects when they needed, you know, where they wanted a baseline.

So, you know, I included this quote here from one

of the whole body counting summary reports for a given year just to have the purpose of the Routine Monitoring Program.

Document the absence of radioactivity in most radiation workers -- you know, that's the backstopping of the Workplace Monitoring Program -- and determine the amount, distribution, and so forth for the few employees who become internally contaminated.

And then in addition to the whole body counting program there was also a routine chest counting program for individuals that worked with materials that had, that were, you know, lower energy gamma emitters that wouldn't -- where the chest counting would have better sensitivity for it.

But, you know, the individuals that received routine chest counts also received routine whole body counts. So, the chest counts were in addition to the whole body counts.

And keep in mind an important point regarding the chest counts, all chest counts recorded, at a minimum recorded three readings of interest for three isotopes: americium-241 as a proxy for plutonium; thorium-234 as a proxy for uranium; and also uranium-235, of course, as an indicator for HEU. So, all chest counts covered plutonium and both natural, depleted, and enriched uranium.

So, moving on to slide 10, you know, regarding, okay, we had the Routine Monitoring Program, where does it -- you know, where are results generated by that program? Where is that information? Now revising it on the REX database, the Radiation Exposure Database, which contains both the in vitro monitoring data and the data from, you know, urinalyses and so forth, and in vivo data, the data from chest counting and whole body

counting and such.

And we, the project has available a version, you know, a fully identified version of the REX database that was provided to us. It's a snapshot of, I want to say 2014, I think it was October of 2014. But suffice it to say it more than covers the '84 to '90 period we're talking about here.

So, you know, one of the elements of these evaluations, of course, was to review what we see in the REX database for this evaluation period. And in doing so, it showed, you know, we see participation in the Routine Whole Body Counting Program across all the prime contractors. But also, and this was interesting to me, we see participation, you know, yeah, you see the routine chest counting program but I was kind of surprised as to how broad that was as well. You know, I wasn't a bit expecting participation in the chest counting program from folks from Boeing Computer Sciences, for instance.

So, not only did all the contractors participate in the whole body counting program but there was, you know, -- well, not sure it was all, but, you know, by and large there was a lot more participation in the routine chest counting program than I would have expected.

So, short of that being, so the routine in vivo program, you know, it did its job. It did, you know, as far as the prime contractors go, those folks were indeed monitored.

So, in summary, Slide 11 now Chuck. You know, the take-away to summary review of the

Internal Dosimetry Program, the rad program at Hanford during this time were the prime contractors did report incidents of internal dose significance to

PNL and, you know, in concert with that the minor incidents that were not of internal dose significance.

And the Routine Bioassay Program, again, served as a backstop to the Workplace Monitoring Program.

As far as the bioassay methods they had available, they had appropriate bioassay methods for all radionuclides of concern.

Another observation was the routine in vivo monitoring program was sensitive to the presence of, you know, unexpected radioisotopes. Like I said, they always reported plutonium and uranium, and different enrichments of uranium. But you do see counts or results where they saw other isotopes. And they were on the lookout for those.

As I said, there was participation across the Board by the prime contractors. And we did not see any indication of any chronic sources of intake or any, you know, previously unknown sources of chronic intake. They would have shown up in this routine bioassay result. So that was kind of just a confirmation that the underlying basis that intakes were only the results of incidents, that was indeed valid.

Mr. Nelson: Okay. Well, are you done, Bob?

Mr. Burns: That was Slide 11. Yes.

Review of SEC Exposure Issues

Issue 3: TH-232 internal exposure from Jan 1, 1960 Onward

Mr. Nelson: Okay. Thanks very much. Okay. So, that takes us to the individual SEC issues addressed in the White Paper. I think what I heard Joe say is that I'd give an overview of each issue then turn it over to SC&A. I think they have something to say

about each issue.

So, I can start with the first issue which is thorium-232. And the issue relates to potential thorium exposure during remediation of certain areas. That would be like legacy contamination, potential use of thorium in nuclear fuels fabrication and related operations in the 300 Area, and potential thorium uses in other areas at Hanford during that time.

You know, during these reviews of these radionuclides of concern, as Bob likes to call them, the team mined through a large volume of NMC&A data. And there were many, many site records captured and several interviews performed. And the conclusion was the likelihood of intake for thorium-232 at Hanford appear very small. A prior internal dosimetry program expert -- we can't say specifically who it is for Privacy Act reasons, but at least we'll call it an expert -- does not recall any incidents or exposures, concerns involving thorium during this evaluation period.

And, again, like Bob was mentioning earlier, if an intake potential existed, any dosimetrically significant intakes would have resulted from incidents that have been recognized in the field. And we just didn't see any chronic intake for thorium-232.

So, our NIOSH conclusion is the site research and interviews to investigate the potential for unmonitored intakes of thorium-232 by the Hanford prime contractor employees during '84 through 1990 have not identified any information contrary to determinations made in SEC 201 or SEC 57-2 that dose reconstruction is feasible.

I don't know if you want to get into any more detail on this issue. I know SC&A in their presentation had a position on thorium.

Mr. Fitzgerald: Yeah. Let me just jump in then.

Before getting into what we've been calling the Big 4 in terms of the nuclides, the ROCs as Bob calls it, just to back up a little bit for the Work Group's benefit. You know, what we're looking at is the prior SEC up through the end of '83 was concluded on the basis of just inadequate in vitro/in vivo bioassay. And the fact is NIOSH lacked sufficient workplace monitoring source term data for HEU, U-233, neptunium, thorium, those four.

And again, when we're looking at 1984 to '90, the subsequent period, the conclusion -- this is in the White Paper but, you know, it's been stated before -- that NIOSH believes that the maturation of the Hanford work practices and programs, as well as the nature of the work performed after '83 was such that, you know, again, one could estimate potential intakes or rule out potential intakes, because whether source term data were available or one could make a conclusion that there were no chronic sources of intake as monitored.

So, much of what we're trying to weigh is really weight of evidence from a programmatic standpoint. I think that's how we termed it in the past. And to look at the program, to look at to what extent one can confirm or not confirm whether or not there may have been sources of chronic intakes.

And so a lot of what certainly NIOSH has done is, over the last couple of years, has done the confirmatory survey of methods, of documentation at Hanford to settle some of these uncertainties on source terms.

So, anyway, going to thorium -- and Chuck cited the three lines of inquiry that we had, and I think both NIOSH and SC&A agreed to put this in the BRS -- the first one was the remediation of certain

Hanford areas, this is 200 and 300 Areas.

And I guess, in short, NIOSH noted that significant clean-up work did not begin at Hanford until after 1990 and was performed by prime contractors, other than those considered, you know, in the White Paper. And any thorium -- and this was the chief conclusion -- any thorium present in the soil or residual matter would likely have been commingled with other radiological materials, notably uranium. So, you would not have had thorium by itself. And that was the conclusion that is cited in the White Paper.

And, finally, I think they concluded that if any such work performed during --

Mr. Katz: Joe. Sorry.

Mr. Fitzgerald: Yeah.

Mr. Katz: Sorry, can you stop a sec?

Someone on the line doesn't have their phone muted and you're having a little sidebar which is kind of what everyone else is hearing. So, everyone but Joe should have their phone muted. And if you don't have a mute button, then *6 -- I should have said that before the call -- and then press *6 to come off mute. Thanks.

Sorry, Joe. I'm sorry to interrupt.

Mr. Fitzgerald: Okay. Am I coming through clear? I guess I am.

Okay. Finally, any such work that was performed during 1984 to 1990, it would have been limited in scope and likely would have been performed by individuals already covered by the 83.14 that created in the 0226 petition.

So, that was one -- that was basically a summary of the conclusions that are in the White Paper on the remediation question. This is one of the three.

I think our response basically is that we agree that potential exposure to legacy thorium-232 contamination would have been unlikely and, in any case, would have been likely detected in this particular time frame. And certainly the program can advance, and I think we agree to that.

And so, the monitoring would have certainly have identified any thorium-232 legacy contamination.

Mr. Katz: Okay, again sorry, Joe. Sorry, Joe.

Folks, there's now a woman speaking and you're not on mute. So please, if you want to be on this call from the public, please mute your phone. If you don't have mute, press *6, or get off the line completely. But you're interfering with the Work Group call.

Okay. Sorry, Joe.

Mr. Fitzgerald: Let me continue. As construction trade workers are largely encompassed by the prior SEC 226 Class, I think NIOSH concluded, and we agree, that in terms of D&D clean-up workers, many of these, if not all of them, would have been covered under the subcontractor, the CTW Classes that were within the last SEC. This was the other primes in the '84 to '90.

So, there wasn't -- and maybe Chuck can correct me -- there wasn't any definitive black and white that there wasn't any pure thorium in a residual contamination in the clean-up work.

On the other hand, in terms of the monitoring available, in terms of the programmatic history of that program where there wasn't really any clear

evidence that they did any substantial clean-up until after 1990, you know, certainly the weight of evidence seems to suggest that there would not be a chronic source of thorium intakes from legacy contamination or clean-up contamination.

And that was a concern we had because, again, certainly disturbing soils around some of these operations and facilities in D&D and clean-up would have presented a potential source in that time frame if in fact that occurred. And based on the review, it doesn't appear that any operation of that sort did occur.

So, we're okay with the way the conclusion was reached on that particular aspect.

So, if the Work Group or NIOSH has anything to add, I know that this is going to get a bit long, so just jump in.

I'm sorry, somebody was going to say something?

Mr. Nelson: Joe, I was going to say, you kind of asked a question about, you know, materials present and pure forms and all that. You know, we looked through the materials accountability data and reviewed it. And actually Bob went through it and looked for material movement and transfer. And there just seemed very little movement or transfer of material, and it just didn't indicate any chronic sources, you know, due to that, so.

And, yeah, I agree with what you're saying about the soil. That's essentially what our point was for legacy contamination. So, that's my point.

Mr. Fitzgerald: Yeah, I think the weight of evidence would suggest that there wasn't any issue with chronic sources. I think that was probably one of our major concerns because it wouldn't have shown

up likely on the NMC&A just because it was a legacy contamination that would have been in the soils.

But again, I think the fact that there's no record of clean-up after 1990, and the fact that the monitoring would have been subset, it would have been part of the surveillance, I think is persuasive.

A lot of this, again, is weight of evidence just because it is programmatic. I mean, I think that was one recognition we had going into this in terms of Bob had called it confirmatory surveys that NIOSH did of the documentation. I mean, it's going to come down to what do the records indicate. And I think in this case it would indicate that there wasn't a chronic source.

So, on this part I think we're okay.

Member Ziemer: Joe, this is Paul Ziemer. You don't specifically say it, but it sounds like SC&A is recommending that Issue 3 be closed. Is that correct?

Mr. Fitzgerald: No. There's actually three operational facets to this. This is one of the three. So, we haven't gotten to the overall, you know, --

Member Ziemer: Okay. You're not ready for that yet. Okay.

Mr. Fitzgerald: Well, I'm just trying to break this up. There was three lines of inquiry we had an issue with on thorium. And NIOSH actually walked each one of those down.

This was the first one. This was the remediation of 200 and 300 Area in terms of any legacy contamination that might have contained thorium.

So in any case, the second question that we had raised originally and that NIOSH agreed and

included in the BRS for review was the potential use of thorium in nuclear fuel fabrication. This was the 300 Area.

And this is where I think, Chuck, you guys emphasized that you had gone through quite a bit of the NMC&A data. This is the accountability data where DOE and the contractor were obliged to track, for national security reasons, where key special nuclear and strategic material was being used and transferred on site. And in this case thorium-232 was one of the nuclides that were being tracked.

And in any case, this review of the documentation saw indications that there was occasional work that involved small amounts of thorium that moved around within PNL facilities. And PNL had operational control of the 300 Area in this time period. But the conclusion was that these would have been small amounts of thorium where the intake, if there was any potential intake, would have been confined to incidents rather than any kind of ongoing chronic exposure.

And I guess from our standpoint, our original concern -- I'm just going to go back to where this came from -- was that we had looked at a database at Hanford called SWITS. And that stands for Solid Waste Information and Tracking System database, which was the database that looked at the movement of waste materials in terms of nuclides. And from that we established the presence of what appeared to be residual thorium contamination in process drains, piping, and sewers in the 300 Area.

And this is from years and years of processing in the 300 Building, you know, 324, 326, the rest of them.

And in any case, that was the source of our concern

to look at the 300 Area and to look at these operations to see if, upstream -- you know, this is indications that you have some small residual thorium contamination in these sewers and the drains. The question was upstream, could you find any evidence of the chronic source of such thorium in those buildings?

And we pointed to 340 Building, 340 Building, 325, and 308 in particular. But, I think at the same time -- this is going back a few years -- we also noted that the thorium exposure potential from whatever contamination was upstream was unclear. I mean, just the fact that we saw some small amounts in the drainage did not suggest that there was in fact any exposure potential wherever it was being used.

And based on the NIOSH review and the NMC&A survey, and also the operational evaluations that were done on these 300 Area buildings, we don't see an exposure potential that would have been anything other than maybe incidental, meaning that the there was some evidence that you had occasional leaks, you had occasional contaminations, but these were all picked up and reported.

So, we don't see any evidence that there was a so-called chronic source of thorium exposure potential for workers in the 300 Area. So, I think there was agreement on that as well.

I guess anyone from the Work Group have any questions on that particular review?

Okay. The final, the third aspect of this was I think what Chuck called other areas, that we're calling operational sources in terms of the site. And NIOSH's review of the PNL, Pacific Northwest inventories for '84 to '90 and whatever transfers they did on site as well as between sites -- you

know, again we can use the accountability system and you can look at the manifests, and I think NIOSH did a pretty comprehensive job.

And what we were concerned about was where did it go on site? Because lot of it was actually in vaults. It was being stored. It wasn't necessarily being used. So, even if you had NMC&A values, it didn't really tell you whether or not there was a potential for exposure because if it's just sitting in a vault, there wouldn't be any exposure.

So, the idea here is more that's an exercise of establishing where it was, where did it go, was it actually being operationally used in a way that would have led to a potential intake. And I think the conclusion that NIOSH reached was there was no uncontained thorium sources identified. And that's pretty important. There were sources, but they were all contained.

And, again, I think we agree with that based on the review that was done. We were looking for some confirmation on it, and I think this is the confirmation that was required. So, I think that resolves that question of where it was on site and whether or not it was in an uncontained circumstance that would have led to potential intake.

So, going back to your original question, Paul, yeah, I think on the three lines of inquiry that were, you know, our key ones from a few years ago, I think NIOSH has done the programmatic review that we thought was necessary to confirm that there were no chronic sources of thorium. This is a key because thorium, of course, was a key part of or key basis for the SEC up through '83. So, this confirmation is pretty critical as far as going forward to '84 to '90.

So, at least tentatively -- we haven't written this up

-- but based on what we have seen in the White Paper, I think SC&A is satisfied with the confirmatory review that NIOSH did.

Any questions on that, on that element?

Member Ziemer: Joe, this is Paul again. I'd kind of gotten ahead of myself or ahead of you, I guess, on this. I was actually looking at Issue 3 on your slides as well. And I guess I was looking at your bottom line there, it wasn't clear to me whether you were recommending closure or just agreeing with NIOSH per se, but, yeah.

Mr. Fitzgerald: Well, yeah, like the Work Group, that's certainly the Work Group's prerogative. I'll say, though, I think we're certainly in agreement with what NIOSH did in terms of confirmation, and we have no issues.

Member Ziemer: My question for Brad, do you want to deal with each of these issues as they go, or do you want to wait till the end?

Chair Clawson: I kind of wanted to wait for an end. There's still a little bit that I've got questions on. I'd rather just go through this and see if my questions get answered a little bit further down.

Member Ziemer: Sure.

Chair Clawson: If that's all right with you, Paul?

Member Ziemer: Sure. It's your, it's your meeting. I'm just asking.

Mr. Fitzgerald: I guess the other thing, too, is we're developing a report that would basically be a response. And obviously, in the context of the times that may or may not get to you very fast. So, that might be a consideration as far as doing things in real time versus waiting for details.

Member Ziemer: We may want to wait for the final report then anyway. I just was asking how you wanted to proceed actually.

Mr. Katz: And this is Ted. I mean, as far as, I mean, if you've concluded something for discussion, there's no problem with the Work Group. We just had a Work Group meeting yesterday, and there's no problem with closing findings where everyone's in agreement that there's nothing left to do. It's kind of silly to leave it open for another Work Group meeting to close the findings.

But certainly, you know, waiting for the end of the meeting and going through them then, that's fine, if you want to do that.

Chair Clawson: Well, yeah, I kind of would. I'd like to run through everything.

Member Ziemer: That's fine.

Chair Clawson: Then go ahead and close it down. I'd appreciate that. Thanks.

Mr. Katz: That's fine. Yeah, no trouble with that.

Mr. Fitzgerald: I guess, Chuck, you can -- if that completes that one, maybe we can move on to HEU.

Issue 4: HEU - Uranium Intake Estimation

Mr. Nelson: Okay. All right.

Okay. So, Issue 4 is highly-enriched uranium intake estimation. It pertains to whether workers who had potentially received intakes of highly enriched uranium during the post-'83 period were monitored by alpha spectrometry for urinalysis or by other appropriate means.

Okay. The issue is contingent upon identification of

a potential source of HEU intakes by Hanford workers from 1984 through 1990.

Okay. Reviews of the NMC&A records at Hanford identified what appeared to be potential sources of HEU within the 200 and 300 Areas. Regarding the 200 Area, our site research activity concluded, since those earlier NMC&A reviews included numerous interviews with Hanford staff, where we determined there was no significant operations within the 200 -- within the 200 Area.

The vaults at the Plutonium Finishing Plant were used to store HEU materials on behalf of others but there was no processing of HEU at the Plutonium Finishing Plant or the PUREX Plant.

Regarding the 300 Area, site research activities included potential use of HEU in nuclear fuels research and development activities in 308. 308 was the plutonium fuels pilot plant.

The research looked into oxides, metals, and mixed oxide fuels for use in fast reactors in the late ‘80s. So, that would be for the fast flux test facility. And this involved intermittent fuel pin fabrications and fuel pellets produced at Argonne National Lab and at Los Alamos.

NMC&A indicated the presence of HEU powders in Building 308, but no records were found indicating the use of material.

Okay. We did some interviews in 2017 to look into this further. And, again, we spoke to a rad monitoring expert as we have to call them for Westinghouse 300 Area. And the person stated that nuclear materials in 308 included both plutonium and uranium, and that there were various types of air monitoring used in the facility.

And the 308 Building was solely a Westinghouse facility that was not shared with PNL. And he said monitoring practices were very stringent, and workers received routine whole body and chest counts, as well as in vitro bioassays and nasal smears as needed.

Procedures were in place for responding to incidents.

Now, when we get to regarding incidents, it's also further discussed in Issue 22, which we'll talk about later. Okay.

Chair Clawson: Hey, Chuck.

Mr. Nelson: Yes?

Chair Clawson: Chuck, this is Brad. I've got a question.

Now, you were talking to the radcon individuals over the monitoring part of this and so forth. Did you talk to any of the fuels people that were controlling these products or were you just talking to radcon?

Mr. Nelson: Well, if you look at the end of the White Paper, we cite every interview that we did. I know some of that was, like, there was a PDF version. It went through Privacy Act to take their name out of there. But --

Chair Clawson: Okay.

Mr. Nelson: -- if you look at those, you'll see we did interview some of those.

Chair Clawson: Okay. I just --

Mr. Nelson: Go ahead, Brad. Okay.

Chair Clawson: Well, my thing is is I'm just, I'm

trying -- you guys, you guys are using one source to be able to track some of this plutonium, enriched uranium, and so forth, but there's a thing in the DOE world that you track your own material. But when you are storing somebody else's material, you don't, you don't track it except on your criticality charts.

I'm just wondering how you're getting through with that because it's not uncommon for them to hold other people's material but they have no traceability because they do not own it; it is somebody else's. So, it only shows up on their crit scenarios. And once it's gone, the paperwork is gone too.

So, I'm just wondering if you were taking a look at that as you've gone through here because I've been told, just put it this way, that our HEU is a little off, and some other ones are off because of this practice that went on. So I'm just trying to figure out how you were going to be able to address some of these, because I know all you're using is this database. And this is their stuff. But you're not, somehow we're not accounting for the other people's material. And we shared material between each other quite often.

Mr. Nelson: I would have to -- when you're having highly enriched uranium at a facility, I wouldn't think that stuff was moved in and around without having documentation.

Chair Clawson: Well, I can tell you the way from experience, that I had HEU didn't belong to us. It was not for use. The only thing it shows up on is our crit. It does not -- when it leaves here, all the paperwork with it goes. It doesn't even go into our filing system because we do not own it and other people and other sources.

And that's one of the issues that we've had with

using some of these programs. But I just want you to keep that in the back of your mind because that is going to become a bigger issue. And so I just wanted --

Mr. Nelson: Okay. So I --

Chair Clawson: What?

Mr. Nelson: Sorry about that. I didn't mean to interrupt you. I thought you were done.

Chair Clawson: No, you can go ahead.

Mr. Nelson: One thing I'd like to say is what we're looking at is uranium intakes. So, if we're --

Chair Clawson: Right.

Mr. Nelson: -- if they're storing material on behalf of others I'm sure it's pretty well contained, not being manipulated or used, so I wouldn't expect that there would be a whole lot of -- I wouldn't expect any use.

Chair Clawson: I wouldn't ever make that, I wouldn't ever make that comment because there's special little places around all of these sites where other work has gone on for others. And I'm just, I'm thinking of one of them that is out, you know, in our area.

But I'll let you continue with this and we'll bring this up a little bit later. But I just want you to be thinking about that.

Mr. Nelson: Okay.

Chair Clawson: But go ahead, continue on.

Mr. Nelson: -- that's stored --

Member Ziemer: This is Paul. Can I, can I insert a

comment here as well?

You're not using source term data to determine internal dose in any event, as I understand it. So, even if you had no source term information about material stored for others, you would still have the in vivo data, or in vivo and in vitro data on the workers who were in that location. That's what you're basing your internal doses on; isn't that correct?

Mr. Nelson: Right. And then the lack of seeing any report what's done with the material.

Chair Clawson: But that's --

(Simultaneous speaking.)

Member Ziemer: I thought that was suggesting that you might not have all the source term information. But even if you didn't, you're not using source term information to determine internal dose. You're using the actual in vivo/in vitro information.

Mr. Nelson: Correct. If we're going to assign dose, that's what we'd be using.

Chair Clawson: But, Chuck, also on that, if you did not have any information on that, you are using that you could not find a source term for it; is that not correct?

Mr. Burns: Brad, this is Bob. If I may, keep in mind we didn't base these determinations solely on a material control and accountability data. That was just one resource. We have, you know, lots and lots and lots of documents or memoranda and so forth, that describe operations in these facilities. So we, you know, we see them, during fuel pin fabrication and so forth, using pellets that came from Argonne, pellets that came from LANL and, you know, things of that nature.

So I, you know, NMC&A is certainly not our only resource here.

Chair Clawson: Okay. But, and I understand that, and I appreciate that. I just, well, I read through some of these that were, that you were also using that you couldn't find any material and so -- for use, so that wouldn't have been an issue there. And that's kind of what bothers me a little bit now.

But you know what, keep on going, Chuck. And we'll address some of these issues down the road and go from there.

Mr. Nelson: Okay.

Chair Clawson: Thank you.

Mr. Nelson: All right, thank you.

All right. So, we were talking about interviews. We did some additional interviews in July of 2013 that included several workers from 308. These are people that worked in the '70s and the '80s, so our time period being '84 to '90. The individuals say the operations were performed in gloveboxes, and contamination surveys and air monitoring testing were performed daily.

Okay. Now, reactor fuel pin, reactor fuel pin assembly in 308 Building was the only operation involving enriched uranium that was identified. And this was an intermittent batch process activity for research and development. But we saw no routine use of HEU identified.

Operations were performed in gloveboxes and it was described as a well-controlled environment including daily surveys and various types of air monitoring, which I mentioned previously.

Internal exposures from HEU would have only

resulted from radiological incidents that would upset conditions. It seems unlikely that an incident would have gone unrecognized, especially given that 308 was considered an alpha facility, so they had very stringent monitoring.

Procedures were in place for responding to incidents, including individual or in vivo counting as needed.

So, with regard to workers in 308 Building, they received routine bioassays, including whole body counts and chest counting.

U-235 was one of the isotopes routinely reported in chest counts, as Bob mentioned earlier. Transuranic material in 308 required a rigorous internal monitoring and workplace surveillance program. Appropriate bioassay measures, meaning both in vivo and in vitro, were available in the event there was an incident involving HEU. And unknown intakes would have been detected by routine chest counting.

NIOSH's conclusion is site research and interviews to investigate the potential for monitoring intake for highly-enriched uranium by Hanford prime contractors for the period 1984 through 1990 have not identified any information contrary to the determination made in SEC-201 that dose reconstruction is feasible for those workers during that time.

That's what I have regarding HEU. And I'll turn it over to SC&A.

Mr. Fitzgerald: Yeah, thanks, Chuck.

This one actually has quite a bit of history. Back in 2011 we wrote up our initial review or survey on HEU. And looking at NMC&A records and looking at

what records, you know, documentation we could find at the site, you know, we established particularly HEU, highly-enriched uranium, figured in several operations, particularly with respect to pins that were used in the FFTF experimental work.

And in this case you have sort of the old thing of you have the front end of that where the pins were fabricated, the powders were pressed and the pins were made. And then you, once they were in the reactor obviously you had the shield source, certainly not really internal intake issues.

And then on the back end you have issues of where those pins would be processed, resolved. And then you have some questions about scrap if there were in fact scrap.

So, we kind of looked at all that. And certainly the line of inquiry which was adopted at NIOSH reflected that in our, in the BRS of a couple years ago, was to in fact look at that particular issue and to characterize it from the standpoint of any potential intakes.

And we sent the Work Group an update in January of 2019. I think this kind of summarizes it pretty good. It is clear that an HEU inventory continued to exist at Hanford in the SEC time period of 1984 to ‘90, and that some exposure potential may have existed in the handling or packaging of scrap or other material for shipping or storage.

However, as noted by SC&A, it was likely confined to the HEDL Facility, the PFP if it was scrap inventory, and to much smaller extent in other facilities such as the 222-S Laboratory.

So what we’re saying is that even though there’s evidence that this material, the source was there, it appeared that it was in a form that would have

precluded chronic intakes of HEU.

So the question really came down to, in this particular case it wasn't a question of source term -- certainly the sources were there -- the question was whether or not it was handled in such a way and in such a form that there would have been a potential for intake.

And as Chuck was saying, certainly they expanded the interviews that we initially conducted with former workers and staff at the 308 Building and other facilities. And I think what was established was, you know, the workers received routine whole body and chest counts, in vitro bioassay and nasal smears, but they had a mature surveillance program for workers at those facilities, which is not too surprising. These were probably some of the more hazardous processing facilities at Hanford.

And I think Chuck already mentioned some of the feedback from the interviews.

And the conclusion that NIOSH reached was -- and I went ahead and wrote this down -- it's unknown how frequently operations involving enriched uranium took place at 308 Building. However, it appears that only internal exposure potential from HEU would have been associated with radiological incidents.

So it wasn't, the way we read this it wasn't possible to confirm necessarily how frequent those operations took place in the late '80s. However, the monitoring program that was in place was stringent enough that something like HEU would have certainly been picked up in the whole body counting and the bioassay analysis, the overall bioassay analysis you're talking about.

So, again, we think the weight of evidence is that,

you know, that there wasn't a chronic source of HEU intake. Although one has to qualify that by, you know, NIOSH's conclusion that, you know, there just wasn't any confirmation on how frequent those powder pressing operations and other operations in 308 were taking place.

We don't think that disqualifies the conclusion, but we just want to make sure it's clear that this is a case where the likelihood of any exposure potential at a chronic level doesn't appear to exist, and that the monitoring system in place was stringent enough that it would have identified any incidental intakes that did take place.

So, from our standpoint we think this would be confirmatory that there was no chronic sources of HEU intake that were evident in this time period at Hanford.

Does the Work Group have any questions on that?

Chair Clawson: No. This is Brad.

Member Ziemer: No. This is Ziemer. I have none.

Member Schofield: I don't have any.

Mr. Fitzgerald: Okay. I guess we can go to 233, Chuck.

Issue 7: U-233 Intakes

Mr. Fitzgerald: Yes, okay. Yeah.

That's Issue 7, Uranium-233.

This issue pertains to potential sources of U-233 intakes during 1984 through 1990 and the adequacy of Hanford's internal monitoring practice for Uranium-233 in the event such sources existed.

So, for us the issue was really contingent upon

identification of a potential source of U-233 intakes by Hanford workers during this time period. And with respect to the intake potential, site research interviews, we found no indication of any sources for uses of U-233 from 1984 through 1990.

And we did make a recommendation to the Work Group that the issue be closed due to lack of identified source terms.

We do believe that availability of alpha spectroscopy bioassay data would help estimate, estimation of U-233 exposures if they did exist.

And I do see the SC&A had some issues perhaps with that, so I'll let them get into it.

Mr. Fitzgerald: Yeah. I mean, just quickly.

Our review back two or three years ago confirmed inventory of 233 being held in four organizations at Hanford in FY '74 into the middle of the '70s. And the key thing for us was the presence of U-233 apparently in scrap solutions and PFP, and possible continued experimental work in the 300 area. And that was the source of our question about potential exposure.

But we at the same time agree that there's no evidence of any chronic potential exposure to Hanford employees from 233 based on looking at the incident data, looking at the bioassays, and also operational information.

So, our question really on that one was a scope issue, you know, since that was the starting point for our inquiry on this even though we agree there doesn't appear to be any evidence of an intake source, whether that, whether the scrap solutions and the so-called experimental work in 300 Area was specifically addressed as part of, you know,

your NIOSH survey work, the research, onsite research.

So, it's not so much a question of the bottom line as much as the scope of the review since this is something that was certainly of interest to us originally. So that's the question that we sort of posed back to NIOSH, and it's sort of a clarification question on scope.

Mr. Nelson: Bob, do you want to expand on that at all?

Mr. Burns: I'll just say, yeah, Joe, I completely understand what you're saying. And as you put it, it just seems to be a question back to NIOSH looking for some expansion and confirmation that those items that you identified were indeed in the scope of our review, sir.

Mr. Nelson: We can certainly dig deeper in those areas and see if we can uncover anything.

Mr. Fitzgerald: Yeah, that was all that we had picked up back in 2011, sort of those source terms, without any indication of potential exposure. But nonetheless, it just seems like it would be helpful to know, you know, if there was any, any records or any way to confirm, you know, that, that people handling scrap or people that were involved in whatever 300 Area experiments with 233 would not have had a source of exposure.

Mr. Nelson: Okay. I'll leave it up, I'll push it over to Bomber or Tim. But we can certainly dig in that area deeper and look at that topic. So, like we dug in there enough. I know we didn't come across it. However, if we didn't drive the nail in that then we can certainly dig deeper on it because it sounds like perhaps we need to.

Dr. Taulbee: This is Tim. I have a kind of follow-up question for SC&A on this. I mean, I guess and Bob.

With regards to U-233, and first to Bob, we looked at material accountability and controls associated with that, didn't we?

Mr. Burns: Yes.

Dr. Taulbee: Okay. And so I guess my question then to SC&A is what more do you want us to look at from that standpoint? U-233 would be a trackable material along that line, including the scrap coming from various areas. So, what more are you looking for here?

Mr. Fitzgerald: Well, I think -- given that I think at this stage we're talking more or less confirmatory reviews, just looking at the source term and then tying that to potential intake.

So, my question's just a very basic one. Since this was an originating question for this particular issue from our review back about, probably seven or eight years ago, I guess my question is whether it's the NMC&A review or any other review, and can NIOSH really confirm, you know, whether or not there was a source term connected to these particular activities? And then, you know, conclude whether that's an issue of intake or not.

And that's what you've done elsewhere. I'm just asking whether or not this was specifically addressed or not.

Mr. Calhoun: It appears to me that it was. Correct me if I'm wrong here, Bob, but if you look through the materials accountability and controls at the various areas and we don't see any indications of sources or the usage from '84 to 1990.

Mr. Nelson: Yeah. I think that's correct. To Joe's

point, I think we just need to re-craft our response to, as he said, just to adjust the scope so that it specifically addresses those issues that it raised previously.

Mr. Fitzgerald: Yeah. I think you can go back and look at the citations or references behind that particular finding. I can give you the original. I think it's 2011. So, you know, tying that to your most recent review should be enough to, you know, close that out.

Or, if it turns out it doesn't quite encompass it, then to maybe do additional work on it.

Mr. Nelson: Okay. All right. I think, Bob, you can go ahead and --

Mr. Fitzgerald: And, Bob, if you can't find that 2011 --

(Telephonic interference.)

Chair Clawson: That sounded cool.

(Simultaneous speaking.)

Mr. Fitzgerald: I was going to say, Bob, if you can't put your finger on that particular citation from that time frame, I'll be glad to send it to you. But you know, I think it was 2011 that was the original item.

Mr. Burns: Okay. I'll check. I think I have it, but if not then we'll let you know.

Mr. Fitzgerald: All right.

Mr. Nelson: This is Chuck. I'm certain we have it. We'll dig that up and make sure we've covered that particular issue.

Mr. Fitzgerald: I have that down as review of Special Exposure Cohort issues for Hanford '72 to

‘90, September 2011. It’s on the DCAS website, apparently.

Chair Clawson: All right.

Mr. Fitzgerald: Okay. I guess, I don’t know if the Work Group has any questions on the U-233?

Chair Clawson: No, not at this time, Joe.

Mr. Fitzgerald: Okay.

Member Ziemer: I think that will take care of it. It’s probably a matter of tying in more specifically to that particular, what was it, Building 300?

Mr. Fitzgerald: It was a 300 Area question on experimental work.

Member Ziemer: This area, right.

Mr. Fitzgerald: The scrap was, where the scrap was -- the scrap was in a different location. I think it was PFP actually.

Member Ziemer: Right.

Member Schofield: How about any chem analysis, was it done in the same building?

Mr. Fitzgerald: Chem analysis in what sense?

Member Schofield: Like when they sent samples in for, you know, the -- like that whether they were looking into a microscope or doing a chem analysis on it to see whether there was any contaminants in it or anything. Was all that done in the same building?

Mr. Fitzgerald: I think that would have been probably the 300 Area. And that would have been probably related to some of the process and experimental work. So on U-233 that was one of

our questions is whether or not one could establish that there was a source term in the 300 Area in terms of experimental work and whether that was a source of chronic intake or not.

So, that's part of the question I think we're raising along with the scrap metal issue, just to sort of nail that down.

Member Schofield: Okay.

Mr. Fitzgerald: Now, U-233 was a, obviously, a very critical strategic nuclide or material. So, it was tracked very carefully.

And I agree, the NMC&A, you know, review or system is one that was pretty precise. So, you know, that would be a starting point certainly as far as where it was. And then the follow-on question is why does it matter? Was there a possible intake?

If it was sitting in a vault in PFP as scrap metal, then there's no issue, the potential for intake would have been negligible. So that's kind of what we just want to cross the T on.

Member Schofield: Okay.

Mr. Fitzgerald: Okay. Neptunium, Chuck.

Issue 9: Np-237 Intakes

Mr. Nelson: Okay. All right. Issue Number 9 was Neptunium-237 intakes. And we did some site research actually to investigate potential exposures associated with the multi-isotope production, that's the MIP, performed at Fast Flux Test Facility, the potential exposures associated with nuclear waste characterization research, and potential exposures at the PUREX plant associated with side-pocketing of impure neptunium solutions and from legacy material in Q Cell.

And, you know, the White Paper goes into quite a bit of detail on each of those. And our conclusion basically was it's unlikely such activities would have resulted in unknown intakes of purified Neptunium-237.

And now, with respect to chronic intake potential, we didn't see any significant sources of purified neptunium during this time period. And what little intake potential existed during that time appears to have been limited to infrequent activities involving small quantities within the 300 Area. And any intakes would have been the results of radiological incidents.

An incident involving a potential intake of Neptunium-237 apparently occurred in July 1989, but it was a confirmation to us that appropriate bioassay measures were available and used, if needed.

NIOSH's conclusion is that site research and interviews completed to investigate the potential for unmonitored intakes of the purified Neptunium-237 by Hanford prime contractor employees during 1984 through 1990 have not identified any information contrary to those determinations made in SEC-201 that dose reconstruction is feasible for those workers during that time.

I'll turn it over to SC&A to give their analysis of what they saw.

Mr. Fitzgerald: Yeah. And certainly, again, this goes back quite a while. But we had looked at three operations that we thought based on the NMC&A information, as well as other information, that neptunium figured in. And certainly this was the MIP, so-called MIP multi-isotope production test that was performed in FFTF.

There was exposures that may have been associated -- and again, may have been associated -- with nuclear waste characterization research. This was in the 300 Area.

And then finally, potential exposures that were clear that may have occurred at the PUREX plant because again, Neptunium-237 was present in the facility in what we would call impure neptunium solutions, so it wasn't the pure neptunium solutions, in legacy materials in Q Cell.

So, and certainly with PUREX it did go through a number of operational phases where it was supposed to restart. It didn't restart. It didn't actually stay in -- online and then was finally shut down in the early '70s. So, there's certainly a history that had some impact on what happened with respect to the stored neptunium.

Going back a few years ago we, frankly, came to a conclusion, and we actually expressed this in a couple of documentation reports that we sent to, you know, to NIOSH and the Work Group, that we were satisfied based on what we could see on the MIP test testing and some of the 300 Area processing that we did not see any chronic potential exposure from neptunium in those operations. However, we couldn't get to that same point for PUREX.

Certainly we knew the impure neptunium was in those cells and we knew workers were going in performing maintenance and other support work, but it wasn't clear at that time whether or not there was a potential for intake for those workers for those particular operations.

So, that was a lot of the confirmatory work was to -- and this was on NIOSH's part -- to go back and research that, and also contribute any other

additional information for the source terms for the other two potential sources of exposure for neptunium, meaning the MIP as well as the 300 Area.

You can see from the slides that, you know, we're comfortable. We're in agreement with what was done on the PUREX review. It was detailed and certainly brought some new information as well as some interviews as far as some lead people involved at PUREX.

The only clarification question that we have on the review on neptunium, there was some additional discussion that talked to neptunium in waste streams at several Hanford facilities. This is PFP, the 324 Building, I think there were two.

And on this, NIOSH observed -- and this is quote from the report, the White Paper -- "Neptunium-237 appears to have been associated with liquid waste or other similar materials present in the 325 Building in support of its various radiochemical research missions. However, the NMC&A data show only accountable materials, not fission products or other radioactive materials in general that might also be present."

And I think the bottom line was that even though neptunium shows up as far as the identified nuclides in the waste stream, that the NMC&A data wouldn't tell you if it were in fact commingled with other materials like plutonium and other maybe fission products. And therefore it would have been, as far as exposure potential, it would have been also an exposure that would have involved these other nuclides and therefore would have been certainly identified and would not have been pure in any case.

The only, the only issue we have with that is that,

you know, I think NIOSH's conclusion on the presence of neptunium in the waste stream came out of the nuclear material accountability database. And Bob, you can correct me if I get this wrong. Our original concern about neptunium being present in the waste stream came from the SWIFT waste management database.

So, you know, it certainly would have reflected, you know, other materials that would have been present. So, I don't know if that's going to make a difference or not. But as far as clarification, we didn't rely on the NMC&A so much for that particular issue, it was mostly the SWIFT waste management database that indicated neptunium was present in the waste stream from the 300 Area.

So, I don't know, do you have a reaction to that?

Mr. Nelson: Yeah, I do. I would say it's two sides of the same coin. In the same sense that the NMC&A data is only going to show the neptunium and not the other fission products that would be present in those waste streams, but granted they're working with tank waste, it's all nuclear fuel, that's why the neptunium's showing up.

But the same thing in SWIFT. SWIFT tells you, you know, if you query SWIFT for neptunium it tells you waste streams that included neptunium. That doesn't mean, in the same sense, that doesn't mean they were pure sources. I think you're seeing the same waste streams.

Mr. Fitzgerald: Well, that's what I was wondering. Because I think the conclusion I got from what you're putting in the report was that it only reports the strategic metal, and therefore it's likely that there would have been other materials. And I think that, you know, I think that assumption is probably a good one.

But my question is was that, was SWIFT also a basis for that conclusion or -- I think that would be clearer on what, you know, whether the other materials are commingled or not.

Mr. Nelson: I would say the principal basis would be just going to operations of the 224 Building and what they worked with, which again was tank waste. Looking at, you know, vitrification methods and so forth. So they had megarad levels of, you know, basically high-level liquid waste from PUREX.

So neptunium was certainly a constituent of those, but by no means were there any pure sources.

Mr. Fitzgerald: Yeah. I'm just curious why, you know, it seemed like there was an assumption that was tied into the NMC&A assessment where I think, I think your explanation here is probably a clearer one. Because one doesn't have to, you know, just simply rely on NMC&A. There's other information that would confirm that in fact it was a mingled, commingled waste stream.

Mr. Nelson: Sure. I was trying to, I think I was just trying to address the questions that had come up as to, you know, why it does show up in the NMC&A data. So I was just trying to clarify.

Mr. Fitzgerald: Okay. I think that clarifies. I'm just saying that the way it was worded it wasn't clear why the assumptions had to be made because I think there's other information, including SWIFT and the operational stuff that you just mentioned, that kind of confirms that it was a mixed waste stream. And you know, the fact that neptunium was present, it would have been, it would have been detected just because there's all this other material involved as well.

Mr. Nelson: Right.

Mr. Fitzgerald: Anyway, I think that helps.

That's all we have. Does the Work Group have any questions on this one?

Member Ziemer: This is Ziemer. So what's the follow-up on this? Do you need some more clarification in the, in the OCAS summary?

Mr. Fitzgerald: I think specifically, no. I think the one question we had really linked into PUREX more than anything else. And I think the confirmatory review they've done is a pretty comprehensive one.

The clarification I was just indicating was in reading the report, since a lot of our, you know, a lot of our line of inquiry came from SWIFT in terms of neptunium, and to what extent that played into, you know, some of these conclusions and findings.

Member Ziemer: Right.

Mr. Fitzgerald: It sounds like Bob -- a lot of NMC&A and sort of an operational perspective which I think helps. I think maybe, you know, doing that makes that much clearer to me.

Member Ziemer: Thanks.

Mr. Fitzgerald: So, I think we're good with that clarification.

Mr. Nelson: Okay. Any other questions from the Work Group?

Chair Clawson: I don't have any at this time.

Member Schofield: I'm good.

Issue 10: Tritium Intake Estimation from 1949 Onwards

Mr. Nelson: Thank you. Okay. I'll move on to the

next issue if I can get the slide to -- hold on.

There it goes. Sorry about that.

Issue 10 is tritium intake estimation. This issue came about -- the issue pertains to tritium dose assignment in the event that sources of special tritium compounds are identified that present a potential for worker intakes during the period of 1984 to 1990.

And like I said, it came about and was prompted by a statement that was in our Hanford site profile, and it said that metal tritides were potentially present as part of the tritium target production program -- tritium target program that began in 1988. And that was something, a line that was in our internal occupational internal dose TBD.

And we believe that to be referring to the post-irradiation examination of test assemblies for light water reactor-based tritium production performed by PNL in the 300 Area.

The NIOSH team did -- going to the slide with those again. I don't know why it's dragging here. There it goes.

Okay. The NIOSH team conducted research but we still have not identified any sources of metal tritide exposure at Hanford from 1984 through 1990. However, it is worth noting that NIOSH has developed methods for assigning dose from intakes of special tritium compounds. We have a procedure, ORAU OTIB-66. And it's a procedure for calculations of dose and internal intakes of special tritium compounds.

So, based on the fact that we haven't found anything, but if we were to find something we have a procedure in place, we found that we had no dose

reconstruction infeasibility related to the intakes of special tritium compounds.

I'll turn it over to SC&A.

Mr. Fitzgerald: Yeah. Our concern here was just a basic one: whether or not there were in fact any evidence of special tritium compounds, you know, tritides that were present. We saw the operations involving tritium and the circumstances of the work that was being done, and that was the question, you know, were there in fact tritides in that time frame?

I think NIOSH has confirmed that there was in fact no tritides.

So that was our, that was basically our question. So we're good with this.

Mr. Nelson: Any questions from the Work Group?

Chair Clawson: No. This is Brad.

Member Schofield: I've got just one question.

Was this a small subset of people or are we talking about a fairly large group of people for this or a very small group?

Mr. Burns: Well, we found no indication of special tritium compounds. So, we went through our research and didn't identify any, so we're not aware that they even exist during this time period.

Member Schofield: Okay. Thanks.

Mr. Nelson: So, the point being, if we were to find them then we could reconstruct the dose because we have a procedure in place on how to do that.

Member Schofield: So there weren't any claimants in the file or anything that they said that they did

work with these or they had potential exposure to any special compounds?

Mr. Nelson: Is that Phil Schofield?

Member Schofield: Yes.

Mr. Nelson: Hi, Phil. I'm not aware of any specific claimants making that statement. I know Bob doesn't generally work with dose reconstructions I don't think too much. But I'm not aware of any.

Member Schofield: Okay.

Issue 20: Skin Contamination

Mr. Nelson: Okay. I'll get the slides advanced again. I don't know why I'm having issues.

Okay. Issue 20 is skin contamination at the N Reactor. What we have in our BRS is this issue pertains to adequacy of monitoring data for skin contamination that resulted from radiological incidents involving primary cooling water at the Hanford N Reactor.

The N Reactor was shut down in 1987 as part of the -- due in part to the Chernobyl nuclear accident in 1986. And what we found is that there was formal monitoring and recording of skin contamination events in the reactor. And they were in place well before 1984.

And they used skin contamination forms to document any contamination an individual may have on their skin.

And we also saw that personnel used portal monitors, and they were in place as of 1984.

And on the skin contamination forms, if you look at them -- we've reviewed many of them -- you'll find

that it will list maximum contamination levels and it will show, like, the location of the contamination on the person's body. And it will also show an estimated time that the contamination was on that person's body. And also on the form there's usually a checkbox that will say if the person was sent for whole-body counting.

And during that review we went and looked at several hundred skin contamination forms that we had in our Site Research Database. And in addition to that, we went through all our Hanford claims for the period of 1984 to 1990.

We looked at all those just to see, you know, what kind of skin contaminations were we seeing and were they documented properly. And based on the review we drew the conclusion that no internal or external dose reconstruction infeasibility related to insufficient monitoring for skin contamination events at N Reactor were identified.

We know that the site had portal monitors. They had a formal system in place for identifying and documenting skin contamination, as well as to prescribe any follow-up actions as deemed appropriate. And this was in place throughout the entire period of 1984 through 1990.

So, basically, we saw they had a good system in place for documenting skin contaminations and that it existed for quite a while. So, we were satisfied with what we found.

I'll turn it over to you, Joe, if you have any specific comments.

Mr. Fitzgerald: Just in terms of background. This came from recognition that, you know, N Reactor being a graphite reactor, it was sort of a characteristic of that reactor where in refueling

outages workers tended to get, I guess, get splashed with some of the in-process cooling water.

And so the question became to what extent were they monitored for what would have been skin contamination from what looked like it was a fairly frequent occurrence, at least anecdotally from talking to people that were associated with the operation.

So, that was the question that was left, was to what extent was there monitoring and what is the evidence that that monitoring was routine and, you know, complete.

So, that's what we were looking for. And I think, again, this was only the first part of the 1980s because it was shut down right after Chernobyl. But based on the forms and the documentation that NIOSH was able to identify it looked like there was a -- and this was not too surprising because of the, again, it seemed like it was a reoccurring situation with the workers being splashed with what may have been slightly contaminated water.

They had a contamination form, a skin contamination form. And it was used pretty comprehensively. And certainly it would have been the basis for identifying what, or knowing what the exposure would have been to those workers from skin contamination.

So, I think there's a basis for knowing that exposure potential and doing dose reconstruction from it. So, so we're fine with what review was done on that one.

Chair Clawson: So, Chuck, what kind of portal monitors were these? Where were they located at on the site? I don't see that they can be fairly close to where this was at or they wouldn't be any good.

Mr. Nelson: Well, I would expect portal monitors would be on the exit of the areas. And generally they, like you said, they can't locate them in real hot areas. So, typically they'd have to put them in a low background area. I don't know specifically -- I was going to say I don't know if Bob specifically looked at that in detail or not with regard to the exact location of the portal monitors.

Mr. Burns: Yeah, the short answer would be no. I can't tell you specifically, no.

Chair Clawson: Well, and I was just looking, just going through some of the records when we were up there I thought for some reason the portal monitors were almost outside the building, but also I thought it was a little bit later. But that's neither here nor there. I'm just -- it seemed like there was a lot of, a lot of skin contaminations in this one area, so. Okay, thanks.

Member Schofield: I have a question on the skin contaminations. The levels that we reported was that before or after they were treated or trying to remove any skin contamination? Was the level reported what initially they found or after they deconned them as much as they could, was that the level that's reported on this document?

Mr. Nelson: Yeah, the levels reported on the skin contamination form are those that were detected on initial finding. So, they might alarm a portal monitor and the technician would take them to the side, do detailed monitoring, take the skin contamination form, log it on that form. And know that if they did any decontamination efforts afterwards there would be details to that respect and what level they got them down to.

Member Schofield: Okay.

Issue 22: Radiological Incidents

Mr. Nelson: Anybody else on this issue? Okay. I will move on to Issue 22.

Issue 22 pertains to whether sufficient bioassays were taken to account for potential worker exposures from minor radiological incidents during 1984 through 1990.

Previously SC&A was looking at, you know, the major incidents. And they felt those were documented properly and sufficient bioassays were taken. So they were more, in this particular issue, they were looking at the minor radiological incidents.

So, looking at Hanford guidance to site contractors, it refers employees for internal dosimetry evaluation, would send them for internal dose evaluation when an incident or workplace indication suggests a potential for radiological intake.

We reviewed numerous site references and conducted interviews, and also looked at numerous examples of contractor radiological incident reports which we had in our Site Research Database.

And our conclusion was that they recognized and documented radiological incidents in the field and performed further investigation of potential exposures, notifying PNL when required.

And that based on this review it left us with the conclusion that no dose reconstruction infeasibility was associated with insufficient attention to internal doses from radiological incidents.

That's what we had on that. I don't know if SC&A wants to weigh in.

Mr. Fitzgerald: Well, we went through all the

incident reports. I think this was just a question, as you pointed out, that, you know, we had done a pretty good review of the major ones but that was sort of the other question that we had is how comprehensive did that go in terms of sort of the day to day type of incident reporting.

And I think your survey was pretty comprehensive.

The only question we have, you, at one part of the report you cite the PNL incident file as representative of the kind of reporting we're talking about, but you also cite something called the Hanford radiological incident file, which sounds like the gold standard. That sounds like the truly comprehensive file. But it apparently was never actually located. Is that right?

Mr. Nelson: Yes. I think you're right. We have the PNL incident file. And then they may be one and the same that what we have now is the remnants of the original file now that the two, you know, now that Hanford and PNL are operated kind of separately where, you know, previously they didn't.

But the short answer to your question is yes.

Mr. Fitzgerald: Okay. It was just a little confusing because it sounded like the Hanford radiological incident file was the, you know, was the comprehensive one and then the actual information that you were citing in the White Paper was from the PNL file. But you're saying they may have been the same.

Mr. Nelson: Right. I don't know for certain. But, you know, or maybe one is a subset of the other. You know, the PNL file is what we tangibly had, whereas the other one, the Hanford, Hanford incident file we know about that because it's referred to in, you know, procedures and the program documents. But

I don't know that we actually, you know, explicitly had something of that title.

Mr. Fitzgerald: Okay. Well, again, the citations from the PNL file seem pretty comprehensive. But that was just a question from the way it was described.

Otherwise I don't think we have any issue. I think this sort of answers that question, lingering question we had from a few years ago.

Any questions from the Work Group?

Chair Clawson: This is Brad. No.

Mr. Fitzgerald: Okay. I guess, Chuck, on the 324 leaks.

Issue 27: Building 324 Leaks

Mr. Nelson: Yes. Okay. Issue 27 was Building 324 leaks. There were leaks of high level waste in B Cell in Building 324, including a major spill in 1986. Decontamination of B Cell began in the late 1980s.

There were earlier leaks under A and C Cells and the soil under B Cell was found to be contaminated in 2010.

So, in the BRS we have it reading "adequacy and completeness of monitoring data have been evaluated and determined to be sufficient for dose reconstruction. Documentation of those findings is pending."

So basically, I think the missing link was to put all this in one document and discuss Building 324 leaks, hit the highlights of the major incidents that occurred there in see if there was proper monitoring.

So, the NIOSH team evaluation of -- excuse me.

The NIOSH evaluation of pertinent radiological incidents that occurred within the 324 Building did not identify any personnel monitoring deficiencies or indications of unmonitored internal dose.

We found no infeasibility associated with cell leakage at 324 Building for any of the Hanford prime contractors from 1984 through 1990.

And if you go and read the White Paper, we go into detail of three of the events, incidents that occurred in there.

So, I'll turn it over to Joe to see if you want to discuss any of those in detail or if you're satisfied with the review.

Mr. Fitzgerald: Yeah. The reason we left this a bit open is that when this call was scheduled a couple, two, three weeks ago we hadn't really completed our review of the incidents and the underlying data from those incidents. We're pretty much done.

I'll let Ron certainly speak to some of the data review. But, you know, I certainly looked at the incidents and the supporting information and, you know, I'm -- we're pretty satisfied at least from the standpoint of the question of the leaks and the fact that there was adequate, you know, monitoring that was done at the time.

Ron, did you want to say something to your review of the data itself?

Dr. Buchanan: Yes. This is Ron Buchanan. Yes, we looked at these incidents and tracked back. It's been going on for a while, way back to 2013. And I followed the paper trail and then NIOSH's response. And I did look up those references and reviewed the incidents. And also went to the REX database, which is a fairly large database, and sifted out the

information from that period of time and did verify the whole body counts that were done. And that appeared adequate.

And so, at this time we have no outstanding issues. I think we'll probably summarize this in our report at the end of the month. At this time I have no red flags on it.

Review of Data Adequacy and Completeness

Mr. Fitzgerald: Yeah. I might add that I think this is described as due diligence type follow-up. I mean, this was picked up in the course of our review that there had been some leakage, some question of contamination at the facility and in that time frame, '89-'90.

So the question just arose as to whether or not you could find the incident reports and then find whether in fact there was monitoring that was done for any of the workers that might have been involved in these particular incidents.

So, this is really kind of an -- almost a proof of principle whether in fact there was a rad control program surveillance that was deficient and that you could find the documentation that we're talking about.

And I think, again, based on this review, yeah, the incident reports are there, the accounts are there. And as Ron mentioned, we can certainly identify where it's available, where bioassay data is available as well.

So, we haven't really written this up but I think that's where we came out.

Does the Work Group have any questions on that?

Chair Clawson: Yeah. I'm just looking at this first

statement up here. I'm trying to understand the timeline here. You're saying that there was, including a major leak in '86, decontamination of the cell started in '80. So this leak happened after they start decontamination of the cell?

You see where I'm at?

Mr. Nelson: I think that was just calling out a specific incident in 324. And that's just, that's a separate statement that -- I believe it is. I'll have to ask Bob about that.

Chair Clawson: Well, if you just read it, the timeline kind of just becomes interesting to me, we reported one in '86 but they started decontaminating it in '80. And then there were earlier leaks that found contamination in '10. So, I'm just trying to figure your timeline here. It doesn't --

Mr. Burns: Doesn't that say, Chuck, doesn't that say decontamination began in the late '80s?

Mr. Nelson: Yeah, it says late '80s.

Mr. Burns: After '86.

Mr. Nelson: Late '80s. I can't tell you, I don't recall the specific date but that was, you know, they started -- you know, they began clean-up at 324, you know, going into the major clean-up activities that began in the post-1990 time frame.

Chair Clawson: Okay. That's making a little more sense to me. Okay, thank you.

Mr. Nelson: Okay. Anything else from the Work Group?

Mr. Fitzgerald: Okay, I think that pretty much addresses the specific items that were on the White Paper.

We also, as a matter of course, wanted to look at the -- in terms of the incidents and whatnot, the data adequacy and completeness. This is something we normally do.

It's not a, it's not a broad general thing that we've done, but looking at the bioassay data that was presented in the White Paper for the nuclides concern as well as some of the incident data, we wanted to be able to speak to that as well.

And Ron can address that. I just have a couple clarifying questions and maybe Chuck or Bob can answer this.

You know, you spent a great deal of time in the last couple two, three years doing the companion piece to the 226 83.14 SEC, which is -- were the other unnamed primes, also with the bioassay monitoring program complete.

Does the data in this White Paper represent the results of that review?

Mr. Nelson: I hate to answer with a question. But if you're asking if the data in the White -- the data in the White Paper, the bioassay data reflects just the prime contractors, you know, represented totals for the given type of analysis for a given type of year, that does not include Kaiser or J.A. Jones or those folks.

Mr. Fitzgerald: Yeah, I was going to say that --

Mr. Nelson: If that's what you're asking.

Mr. Fitzgerald: -- is there a separate exercise -- I know you've been doing sort of, again I call it a companion piece, but the flip side of the 226 SEC was the other prime contractors.

Mr. Nelson: Well, it wasn't prime, it was anyone that

wasn't a prime.

Mr. Fitzgerald: Well, anybody that wasn't named in the 226 SEC. I guess that's the easier way to put it.

Mr. Nelson: Right. That was the purpose of this effort.

So, the information I presented in the White Paper is just Rockwell, United, you know, Westinghouse before and after consolidation, Boeing Computer.

Mr. Fitzgerald: So this is everybody that was not named in the 226.

Mr. Nelson: That's right.

Mr. Fitzgerald: Okay.

Mr. Nelson: Including Boeing and including PNL.

Mr. Fitzgerald: Right. Because I think certainly the first year or so of your review onsite was to settle that question as to whether the same conditions that led to the SEC for the other contractors under 226, whether those conditions existed for the balance of the site.

So you're saying this, what's presented here would be the balance of the site?

Mr. Nelson: That's correct.

Mr. Fitzgerald: Okay. I just wanted to be clear on that.

The other thing, I guess in terms of the data, certainly, as you pointed out before, for this overall question of adequacy and completeness awaits the coworker model based on a new implementation guide? Is that still forthcoming?

Mr. Burns: Yes, it is. I think Dr. Taulbee could

probably speak to that because we spoke about it the other day. I think it's going to be presented in the upcoming NIOSH Board meeting.

Mr. Fitzgerald: So, we can talk completeness and adequacy but it comes with an asterisk. You know, we still have to look to that coworker model before we have a complete picture.

Dr. Taulbee: Let me clarify that for just a second. What we're going to be talking about at the upcoming Board meeting will be a schedule for us to complete all of the co-exposure models in accordance with the implementation guide. We're currently working on that. We do not have that yet in place or know when the Hanford one would be scheduled to be updated.

Mr. Fitzgerald: Okay. So, just for the Work Group's advantage, so the context of our looking at adequacy and completeness, it's pretty much the data presented and looking at that data but not certainly speaking to, you know, the co-exposure coworker aspect of it, which as Tim points out is still down the road.

Okay. With that, Ron, did you want to say something about what we've done so far?

Dr. Buchanan: Yes, this is Ron again. Yes. We went to, and now this is limited to, like Joe says, to the data that's in the White Paper. And just as a check on the information in there I went through, mainly using the REX database, which is a very large database. It's kind of hard to manipulate on these little laptops.

But I did go through and verify each of the -- all the data in the tables and in the radionuclides of concern, and looked at those and seen that they were present and that they were correct as

represented in the White Paper.

And at this point, and also I looked at some of the Site Research Database documents and the claim documents and did not find any discrepancy to speak of. And so at this point we will probably include that write-up in our report. And have no issues at this time on that item.

Mr. Fitzgerald: And again, we're planning on documenting all of this in a relatively brief report, but one that obviously awaits the opening of governmental buildings since we can't get this through DOE.

So, you know, that's in progress. And actually it's probably about half written already.

Member Ziemer: This is Ziemer. Let me raise a question then.

Is it important that we get the completion of the adequacy and completeness issue prior to closing any of these items that were before us today?

Mr. Fitzgerald: Let me answer this way, I think the other issues don't rely upon this particular part of it. As Ron was pointing out, we have looked at it and did not see any red flags. So we can report that to the Work Group.

I think the question of adequacy and completeness, you know, sort of requires the completion of the coworker model to finally answer that part of it.

So, everything else I think is certainly open to the Work Group for, you know, discussion or closure. I don't think it relies on this data issue. We didn't see any red flags.

Member Ziemer: Right. Well, that was my impression but I wanted to make sure that was your

understanding as well. Because, and Brad I think it's your call on this, but I think there's a few of these, like the tritium one in my mind could be closed today. But I'd like to hear from the other Work Group Members.

Chair Clawson: I understand what you're saying, Paul. I guess I'd just like SC&A to be able to finish up their report and for us to be able to digest that. And then we could go through and close each one.

That's just my opinion. But it's up to you guys, too.

Member Ziemer: Well, I am certainly willing to do that. I just was trying to think if there's any way we could trim it down that wouldn't depend on the final report.

Chair Clawson: Yes.

Member Ziemer: But I'm fine with it either way.

Mr. Katz: If I could speak up, Brad. You know, I just, I hate to where you're already gone through it and you're all on here, and I just -- you know, maybe it's my recent health experiences that are impressing me here, but I hate to, when there's work that's already been done and it's ready I hate to put it off. Because you never promise what's going to be -- who's going to be okay tomorrow. And you've done it all now.

And so I would love for you to close the findings that you seem to be ready to close now. You won't be closing the SEC as, you know, we just discussed, but it will be putting, you know, off the table the matters that can be put off the table.

And keep in mind, you know, all of what you do here is just a recommendation by the Work Group to the Board anyway. So it's not, you know, it's not ending anything until the Board has a chance to

consider it and review everything.

So really, I really hate for, when work's been done for it to sit on the shelf sort of unclosed, again, in part, and this is just sort of influenced by my recent health experience, but then we all know, we've had a lot of these with the Board given our longevity with the Board, of things happening --

Chair Clawson: Well, I have no problem with doing that. I just so many times in my personal opinion we have basically forced SC&A into these last little parts. But I have no problem going through it today if we want to. And we can close the ones that we can and go from there. That would not be a bit of a problem.

And then we'll just wait for, we'll just wait for SC&A's final report and go from there.

I didn't want to make it -- I guess I didn't want to think that we were forcing SC&A into these reports, but we can go back and go through them and close them out if you'd like. Do you have any issue with that?

Mr. Katz: I'd appreciate that.

Chair Clawson: Well, anything for you, Ted.

(Laughter.)

Mr. Katz: I'll take that, Brad. I'll take that.

Chair Clawson: Okay.

Member Ziemer: It would be helpful to me to -- if SC&A as the Board's contractor would be in a position to tell us which one they're comfortable in stating today that they would actually recommend that the Work Group close.

Chair Clawson: Okay. I agree with that fully, Paul.

Mr. Fitzgerald: Okay. Well, you know, I think the ones that don't have an attendant clarification question hanging would be the ones that would be obviously ones we would be comfortable with closing.

Member Ziemer: Yes. That's exactly what I'm saying. And if you'd be willing, Joe, to identify those again for us just in order, I think it would make it easier for us.

Mr. Fitzgerald: Yeah. I'd say the thorium we're comfortable with.

The --

Chair Clawson: So, Issue 3.

Mr. Nelson: Yes.

Mr. Fitzgerald: That's Issue --

Mr. Nelson: 3 is thorium.

Mr. Fitzgerald: Issue 3, yes.

Issue, I believe Issue 4 didn't have anything hanging as well. So HEU we'd be comfortable with.

Member Ziemer: Okay.

Mr. Fitzgerald: 233 I think there was a question that at least Bob was going, Bob and Chuck were going to follow up on, which is the scrap solutions and the experimental work, to see if there's any way to put that to bed.

Member Schofield: Yes, that's correct.

Mr. Fitzgerald: So, which leaves Issue 7 open or in abeyance.

Issue -- Issue 9 we would be comfortable closing, as would we on Issue 10, tritium.

The same for Issue 20 on skin contamination. Same for Issue 22 on radiological incidents.

And we're not, we're not quite crossing the T on 27 yet, so --

Member Ziemer: Right.

Mr. Fitzgerald: -- we probably wouldn't recommend that. And, of course, we already talked about the data completeness issue.

So, but all those, the other ones I think would be okay.

Chair Clawson: Okay.

Member Ziemer: Brad, if you're comfortable with a single motion I would move that we close Issues 3, 4, 7, 9, 10, 20, and 22. If you're not comfortable with a group we can do them one at a time.

Chair Clawson: No, I have no problem with that.

I thought that there was a question on 7, but maybe I wasn't writing it down either myself right. 233 --

Mr. Fitzgerald: Yeah, I think the question on 7 was just the collection --

Member Ziemer: 7 is, no, 7, I shouldn't have said 7. You're right. 7 should really be open.

So it would be 3, 4, 9, 10, 20, and 22.

Mr. Fitzgerald: Right.

Chair Clawson: That's what I've got. I have, I have no problem. I guess I'll ask the other Work Group. I

move to -- or Paul's already moved that we close these. And I agree with him.

Do you have anything Phil?

Member Schofield: No. I agree with that.

Chair Clawson: Okay.

Mr. Katz: Okay, thank you.

Chair Clawson: Does that make you feel better, Ted?

Mr. Katz: It does. It makes me smile from ear to ear. Ear to ear. Thank you.

Member Schofield: I think Ted's starting to feel older.

Mr. Katz: I'm always feeling older, Phil. But I really can't talk in this company. I have some people who are far more senior than me.

Chair Clawson: Yeah, Phil, I'm not going to mention any names, but you know them.

(Laughter.)

Chair Clawson: Okay. Is there any, is there anything else? Because I am an essential person and I have to be back to work. So is there anything else that we need to do?

Petitioner Comments

Mr. Katz: I just want to mention, I just want to mention, so we have -- we don't have any petitioners on. I'll just confirm that, because they have an opportunity to comment. But if they are on now, certainly you do have that opportunity. Yes, I didn't think so.

So, and then last thing, just to note for you all that obviously you officially had a meeting in -- hello? We have a lot of background sound. Can you still hear me?

Mr. Fitzgerald: I can hear you.

Path Forward

Mr. Katz: Hello? Okay. So, we had to cancel the April meeting. We are now at our August meeting. That August meeting we are planning to have at the end of August, the 26th and the 27th I believe. And we're planning to have that in your neck of the woods, Brad, Idaho Falls.

And given that you've done so much here on Hanford, I think even though we're not going to be there, it seems to me a good time to get an update, it's been a long time, on Hanford. So, while that was on the agenda because we were going to be there in Richland area, I don't see any reason, unless you disagree, to give such an update just the same in Idaho Falls. But let me know if you think differently about that.

And this is something certainly you guys can discuss at the June teleconference when you're discussing the agenda for August.

But any thoughts, immediate thoughts you have about that issue, by all means speak up on that, Brad or Paul or Phil.

Chair Clawson: I think it would be a good thing to make, do an update with it. It's been quite a while. Be able to bring up everybody to speed where we're at on Hanford.

Mr. Katz: Yeah.

Member Ziemer: I agree. I agree. And Ted, on the

June teleconference will you still be aboard or --

Mr. Katz: I will not. I will be missing in action. Before I lose the thought on this matter, though, just let me just say, Joe, if you wouldn't mind preparing a presentation for that, for the August meeting?

Mr. Fitzgerald: Yeah, sure.

Mr. Katz: That would be great because that would be sort of traditional for you to summarize the review as it stands for the Work Group.

And of course, Brad, you know, whether a piece is presenting, introducing, et cetera, you know, that's of course your prerogative always. But Joe, if you could just prepare the technical part of that presentation that would be great.

Chair Clawson: Great.

Mr. Katz: So, Paul, yeah, so I didn't, I wasn't trying to escape that, just I wanted to get that off my mind because I would forget it.

But no, the beginning of June, I'll be out from the beginning of June forward.

Member Ziemer: Yeah. So you're going to wash your hands of Hanford by end of this meeting.

Mr. Katz: That's a terrible way to put it, Paul.

(Laughter.)

Chair Clawson: He's just being honest.

Mr. Katz: That's not how I feel at all.

Member Ziemer: No. I just want to make sure you don't have a party scheduled for right after this phone call.

Mr. Katz: It's actually, you know, I'm sort of surprised at how sad I'm feeling about retirement, so.

Mr. Katz: Well we are, too, Ted. We will certainly miss you.

Ms. Adams: It won't last long.

Member Schofield: We're not going to have you to beat up on anymore.

Mr. Katz: No. I've been beat up all my life, so it's kind of a part -- I'm going to miss that, too. So, but I'll be in touch with all of you certainly before I go in a more extensive fashion than this little hello here.

Member Ziemer: Right. A small group of us. Okay.

Adjourn

Mr. Katz: So, anyway, I want to thank you all for a great meeting and for all the hard work everybody, the staff did preparing for this, and for the Work Group in getting ready to address the issues that the staff prepared. Thank you.

And, you know, have a good rest of the week and stay safe and healthy. And we are adjourned.

(Whereupon, the above-entitled matter went off the record at 12:17 p.m.)