The Work Group convened telephonically at 1:30 p.m. Eastern Time, Richard Lemen, Chairman, presiding.

PRESENT:
RICHARD LEMEN, Chairman
R. WILLIAM FIELD, Member
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ALSO PRESENT:

TED KATZ, Designated Federal Official
ISAF AL-NABULSI, DOE
RONALD BUCHANAN, SC&A
DAVE HARRISON, ORAU Team
MONICA HARRISON-MAPLES, ORAU Team
STU HINNEFELD, DCAS
KAREN JOHNSON
MARY JOHNSON
JENNY LIN, HHS
ROBERT MORRIS, ORAU Team
MARK ROLFES, ORAU Team
BILLY SMITH, ORAU Team
TINA TRIPLETT
P-R-O-C-E-E-D-I-N-G-S

1:36 p.m.

MR. KATZ: Let's just then get started. This is the Advisory Board on Radiation and Worker Health Weldon Spring Work Group. We'll do a roll call with Board members, beginning with the Chair and please speak to conflict of interest since we're speaking about a specific site.

(Roll call.)

MR. KATZ: Okay then. We have an agenda. Very simple. It's two issues. It's posted on the web. It's Dr. Lemen's agenda and your meeting. Go ahead.

And let me just remind everyone on the phone when you're not speaking to the group, if you would mute the phones. It will make the audio much better for everyone. So press *6 to mute your phone and then when you want to come on you press *6 again. And that will take you off mute. Thanks.

CHAIRMAN LEMEN: This is Dick
Lemen. Let's start with the issue of the thorium exposures. I think we have -- the Petitioners have gotten together with SC&A. I believe you've produced at least five documents.

And I guess it would be best to turn that over to Ron Buchanan right now, if you would like to make any comments on the issue with thorium exposure and where we should go from here. Ron.

DR. BUCHANAN: Okay. This is Ron Buchanan, SC&A. Yes, the Petitioner submitted a total of six documents, one early on March 13th and then five later on March 22nd. And these documents were submitted because there came up to question of, was thorium taken from the raffinate pits and recycled and processed.

And the reason that this was important was that this would indicate that the thorium would be in a different ratio to the uranium. Because Weldon Spring only used uranium urinalysis to assign internal dose.
And the same way in dose reconstruction, they used a ratio, then, of the thorium to the uranium since there wasn't any thorium monitoring to speak of at Weldon Spring.

And so this is the reason that this was brought up. And if you did the raffinate and recycled it then it would be in a different concentration, a different ratio, from the uranium.

Looking through these documents there was -- if you read them and compared them, what I concluded -- and I passed this by several other SC&A people to look it over also -- was that there was no indication that Weldon Spring there in '57 to '67 took raffinate material and reprocessed it with thorium.

Now I want to qualify that in that later documents used some terms that we didn't initially have in the TBD or I did not find in looking through any of the Weldon Spring documents. And we assumed -- it's always been
assumed -- on the premise that thorium was a campaign-type processing in `63 to `66 in which thorium was brought in and processed for thorium metal and then sent out. And nowhere was it talked about in a recycled thorium as recycled uranium came into play at some of the sites.

And so I did notice that in some of the documents submitted by the Petitioner they used the word thorium residue, thorium recycled material, and thorium recycled products which is not clear what that is. And they use also scrap thorium.

I guess that was the main issue is during the thorium processing, the thorium-232 processing, did they use anything besides thorium ore or did they take some scrap recycled material and bring it on site. That was one of the things that stood out that has not been addressed.

And number two would be the fact that the pits one and two apparently could
have been uncovered during the dry stations. But apparently this was before the thorium products arrived in the `60s, `66. Pits three and four were used later on when the thorium processing campaigns were present, `63 to `66.

And I guess there is some question -- some of the documents say -- that these never went dry. And so you didn't have a dust or contamination that would be concentrated and anything to blow around if they were dried out. Did it dry out during the `56 to `67 period where a worker could be exposed to the raffinate dust which would have a different thorium concentration and other radionuclides perhaps and uranium bioassays would indicate?

And so those were the two issues I summarized in the email I sent out at the latter part of March to Ted and he distributed to the Work Group.

CHAIRMAN LEMEN: Does anyone have any answers to the question that Ron brought up?
Can you hear me?

MR. KATZ: Yes. This is Ted. So that would be Mark Rolfes.

MR. ROLFES: Yes. Sorry. I was on mute. I started responding.

Yes, we've looked at the same references also and we didn't find any information that indicates that there was a separate process where thorium-230 was being extracted from uranium ore concentrates that were processed at the Weldon Spring plant which was the concern that the Petitioner had identified.

We are aware that there was earlier work and there was a confusing document which we had hoped to possibly learn some additional insight into why the document was written as it was because it was a little confusing. Because all thorium -- I think this came up as a result of all thorium exposures at both Mallinckrodt as well as
Weldon Spring had been lumped into one document and considered for an epi study. So that's one of the pieces of background, one of the background reports, I guess that led to some confusion. And I just go back and look at this issue again.

As far as whether or not the pits dried up, I believe that the documentation we have seen indicated that the waste pits were usually underwater because -- I'd have to go back and look, but I think there were some documents that were written in the more recent time period in the 1980s during remediation and such which had said something about the possibility of waste pits drying up.

I don't have those documents right here at the time. And if I'm missing a detail on that, maybe I can call on someone from ORAU to help clarify anything I said.

The other aspect of if there's any recycled thorium on site, we have no indication that I'm aware of of recycled

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thorium being processed at the Weldon Spring plant. The thorium that came to the Weldon Spring plant would have come from Fernald. Fernald would have -- you know, we can look into if the Work Group would like us to look into the types of material that were sent from Fernald to Weldon Spring. But the recycled thorium issue is sort of different than recycled uranium. And my initial impression for recycled thorium is that the dose metric impact of any recycled thorium contaminants in whatever may have been speculatively processed at the Weldon Spring plant. Since NIOSH is using the daily weighted exposure-derived thorium intakes, any observed activity from an alpha emitter would be assumed to be thorium-232 and would be assigned as thorium-232. So I'm thinking that would probably result in a bounding dose for that exposure scenario.

And the other aspect of this, you know we focused a lot on recycled uranium
discussions with Fernald. And the recycled thorium issue is what I'd consider to be much less of an issue than would be recycled uranium just because one of the concentration processes for some of the contaminants in the recycled uranium resulted as part of the isotopic separation in the gaseous diffusion plants. And then it's also a result of the fluorination of uranium at the gaseous diffusion plants, which concentrated some of those contaminants which were later sent back to Fernald.

Thorium isn't put through the gaseous diffusion process in the same way as uranium was. And so there wouldn't be as much of a tendency to concentrate some of those contaminants.

And once again, as I said earlier on, this is all just speculative because everything that we've seen indicates that -- you know, we've not seen any indication that the thorium that was processed at the Weldon
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Spring plant was recyclable uranium.

CHAIRMAN LEMEN: On the issue of the drying out from 1988-`89, is it clear that that did or did not happen?

MS. HARRISON-MAPLES: Can I --

MR. ROLFES: Monica?

MS. HARRISON-MAPLES: I was going to ask if I could speak to that. And I'm not sure who that was speaking just now.

CHAIRMAN LEMEN: That was Dick Lemen.

MS. HARRISON-MAPLES: Hi. The documentation that speaks about some of the pits drying out specifically calls out Pits 1 and 2 could have possibly been uncovered, could have had some drying out periods, and that Pits 3 and 4 did not. They were marshy. There was no indication that Pits 3 and 4 ever dried out.

Pit 4 specifically is where the raffinates and the thorium-232 campaign went into. So there should not have been any
thorium-232 -- there would not have been any thorium-232 in Pits 1 or 2 if they had dried out. And that seems to be the concern that because the thorium-232 would be different in terms of ratio.

Could that Pit 4 have dried out? And we have absolutely -- well, I have not seen any indication that Pit 4 ever dried out. And I have seen documentation to say that it did not.

CHAIRMAN LEMEN: Well, in the case of Pits 1 and 2 is there any potential for exposure from any type of radiation that might be considered by the Board?

DR. BUCHANAN: This is Ron Buchanan from SC&A. If Pits 1 and 2 even before they were used before the thorium campaign you could possibly have had thorium or other isotopes became airborne. You'd have an ambient environmental exposure, perhaps intake, that if you took uranium bioassays and then did a ratio for uranium to thorium,
perhaps it wouldn't be the same in the dust as it would be in the raffinate in the plant.

Mark, do you want to speak to that? What if Pits 1 and 2 were dried out? What would be the environmental impact of that?

MR. ROLFES: Well, from my recollection, I do think we do have some samples that were taken from the pits during the remediation time period which would have shown the ratios of various isotopes within the chemical pits. And also I believe -- now I don't recall the exact dates, but the waste pits were not like in the center of the site.

For example, they were off to the side of the site. I don't know if workers were routinely in that area to do anything or if they were sort of self -- you know, off by themselves.

Monica, do you happen to know? I think during the remediation time period, I think there were some samples taken to basically say here are the isotopic
constituents of each of the pits. Is that correct?

MS. HARRISON-MAPLES: I believe that is correct. I believe that part of that information we used when we were looking at the assessment for the area around the raffinate pit. As you said, the geography of the plant is such that the raffinate pits were right up against the boundary of the operating area, but they were separate. And they were separated by a fence and personnel didn't too much travel between the two.

CHAIRMAN LEMEN: Dr. Field, do you have any questions?

MEMBER FIELD: I guess I just wanted to clarify that if there was sampling done for Pits 1 and 2 that thorium-232 wasn't present in the quantities that you would expect if it was recycled or disposed of there. Is that correct?

MR. ROLFES: Monica -- I didn't quite follow what you said, Dr. Field. And I
know Monica probably is much more familiar with this than I. Monica, did you understand the question?

MEMBER FIELD: Let me phrase it again.

MR. ROLFES: Okay.

MEMBER FIELD: I was just wondering if there was analysis performed for thorium-232 at Pits 1 and 2.

MR. ROLFES: Let me take a look and maybe Monica could answer better than I.

MEMBER FIELD: It sounded from Monica about what you said before that there is no indication there was thorium-232. And I would just like to confirm that if there was sampling that took place.

MS. HARRISON-MAPLES: Right. I'm not sure if the sampling specifically looked for thorium-232. But I know that the Pits 1 and 2 would have had the raffinates from the uranium processing and the thorium in that raffinate is the progeny from the 238.
MEMBER FIELD: 238.

MS. HARRISON-MAPLES: Right.

MEMBER FIELD: Yes.

MS. HARRISON-MAPLES: So I don't know how 232 would have gotten in there. And we have no indication that 232 should have been in there.

MEMBER FIELD: Okay.

MS. HARRISON-MAPLES: I don't recall specifically what was analyzed for in the remediation period.

MEMBER FIELD: Okay.

MS. HARRISON-MAPLES: I don't want to speak without having the documentation right in front of me to verify it.

MEMBER FIELD: Yes. And I haven't been on this Committee before. So I don't know of other specifics about the site. I'm trying to catch up a little bit. But was there air monitoring done in the vicinity of the pits at all that you're aware of?

MS. HARRISON-MAPLES: Billy, help
me out. I believe that the air monitoring was
done around the perimeter of the facility.

MR. MORRIS: This is Robert
Morris. We did find data periodically over
the course of time which we used to derive
intake rates for the environmental intake
rates.

MEMBER FIELD: Right.

MR. MORRIS: Sometimes we had to
use an atmospheric dispersion approach to
relocate the concentrations to a location
nearer the pit. But we revised the
environmental site profile technical basis
document for occupational environmental
exposures.

MEMBER FIELD: I guess for the
thorium-232, if it was indeed covered, then
thoron should not have been a problem from the
waste sites.

MR. MORRIS: We agree with that.

That was one of our inherent assumptions.

COURT REPORTER: This is the court
reporter. Who were the last two people who were speaking?

MEMBER FIELD: This is Field.

MR. MORRIS: And I'm Robert Morris.

CHAIRMAN LEMEN: This is Dr. Lemen. If those were assumptions, do you have any backup for those assumptions other than just that they're assumptions?

MR. MORRIS: Well, I believe we do. You know it's been a year or more since we wrote that. But there were good bases for everything we did. If you want to open that conversations, then I'll need some time to look at those documents. I didn't realize that was on the agenda today.

CHAIRMAN LEMEN: Well, I think we need to try and resolve these two issues and the thorium issue as to what we do about that. Does NIOSH feel comfortable at this time that they have enough data to make a decision on that?
MR. ROLFES: This is Mark, Dr. Lemen. And I'm looking back at a Weldon Spring environmental intake rates and external dose rates paper from April 12, 2011. And I think this is what Bob Morris was referring to. On page 16 of 38 of this document, there's a figure that shows the locations of particular air samplers, radon gas detectors, and some gamma monitoring stations.

I don't know exactly -- let's see. The air sampling it says ended in the year 2000. And I believe it said that the air monitoring was done. Let's see. There are particulate concentrations from 1975 through 1986 in our table. Let me flip to that.

There was monitoring data in the more recent time period, but not during the operational time period, is my recollection. But I believe that the approach that we've adopted is a claimant-favorable approach for assigning ambient exposures to workers from uranium and --
CHAIRMAN LEMEN: When you said -- this is Dr. Lemen. When you say, Mark, that it's a claimant-friendly, can you explain that a little bit more so that the Petitioners that are on the line will understand what you're saying?

MR. ROLFES: Sure. In most cases, when we complete a dose reconstruction, that the ambient internal exposure pathways is very minimal in comparison to the approach that we would take for a worker that was involved in some sort of workplace operation. First and foremost, if we had an individual that was monitored for uranium exposure, we would use their uranium bioassay results.

And if you take a look back at the information I think we presented in our initial evaluation report, there was a large number of employees that were monitored for uranium internal exposure.

So really the ambient internal exposures are a small portion of the total
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dose that we would assign. And usually we make assumptions as to the amount of time that the worker is on site. We usually choose the highest ambient concentrations from any location on the site if we have no idea where that person worked.

I'm trying to think of some other overestimating assumptions or claimant-favorable assumptions regarding the assignment of ambient dose. But one of the biggest ones that we choose is to use the highest ambient exposure rates or air concentrations on the site if we have uncertainty as to where that worker worked in the outdoor environment.

CHAIRMAN LEMEN: Okay.

DR. BUCHANAN: This is Ron Buchanan. I just want to clarify. I think, Mark, there was environmental air samples for uranium taken during the operations period.

MR. ROLFES: Oh, yes.

DR. BUCHANAN: Okay.

MR. ROLFES: Yes, definitely.
DR. BUCHANAN: And so those were used in TBD 4 to set up an ambient intake level. So there was uranium air samples during `57 to `66 there.

MR. ROLFES: Yes. There were both uranium and thorium. That's correct. And I was looking at the more recent air sampling that was done in the later years and that was more perimeter air sampling in the later years.

CHAIRMAN LEMEN: This is Dr. Lemen again. Dr. Field, do you have any more to say on this issue?

MEMBER FIELD: No, I think -- I'm still trying to put all the pieces together, but not at this time.

CHAIRMAN LEMEN: Ted, is it appropriate to let Petitioners make any comments they want to make at this time?

MR. KATZ: Oh yes. Of course. You can always invite the Petitioners to comment on the issue.
CHAIRMAN LEMEN: That being the case, I'd like to ask the Petitioners that are on the line if they have any comments they want to make to NIOSH or to the Board about what has been said so far and if they have any suggestions as to what they want to see happen at this point.

Tina?

MS. TRIPPLETT: I don't have anything at this point.

CHAIRMAN LEMEN: All right. Anyone else have anything?

MS. K. JOHNSON: This is Karen. And I'm not really sure what to say at this point. I hear a lot of I guess, I think, I believe, but I haven't heard any actual references to documentation. I would really like to hear some of those or see them in writing.

CHAIRMAN LEMEN: Mark Rolfes, anyone from NIOSH, can address that question?

MR. ROLFES: Yes. This is Mark
Rolfes, Dr. Lemen. And regarding the references specifically for some of the air monitoring and for our environmental intake rates and external dose rates for Weldon Spring plant and our White Paper from April 12, 2011, that is available on the NIOSH website and beginning on page -- let's see here -- 33 of 38 there are -- one, two, three, four, five -- four and a half pages of references that we've referred to and where we've gathered data, maps of the site, positions of the air monitoring locations.

CHAIRMAN LEMEN: Is there any way that the Petitioners can get a hold of that? Can you send it to them? Or are you saying they should go to the website and just pull it up?

MR. ROLFES: If the Petitioners haven't seen a copy of this report, it is available on the website. I can also talk to someone here to see if the Petitioners have not received this document we can see if maybe
we can send a copy to them either electronically or a hard copy, if they prefer.

CHAIRMAN LEMEN: Would it be appropriate for NIOSH at this point in time to talk directly to Karen about her concerns and give her the document so she can look at it before you have that discussion? And then maybe we can come to some conclusion on this issue.

MR. ROLFES: Yes. This isn't something that's new to us since we have spoken with the Petitioners in the past about these concerns. And if there's new concerns, then we'd certainly be willing to --

CHAIRMAN LEMEN: I can see where the Petitioner is coming from because I heard a lot of guesses and assumptions and stuff like that. I think that before we can come to final decision on this one issue that I would like to request if it's not inappropriate and tell me if I'm wrong, Ted, that NIOSH get together with Karen and any other Petitioners
to try and resolve any questions they might have about this issue before we make a final decision. Is that appropriate, Ted? Ted? Did we lose Ted?

MR. KATZ: I'm sorry.

MR. HINNEFELD: This is Stu Hinnefeld. I don't know what happened to Ted.

MR. KATZ: I was on mute, but go ahead, Stu.

MR. HINNEFELD: I was just going to say that we can certainly send those to the Petitioners. If they'll just let us know now, would you rather have a hard copy or an electronic copy meaning an email with a file attached that has that document that Mark referred to from 2011?

MS. K. JOHNSON: This is Karen. Electronic would be fine. And I'm not sure that it is not something we haven't looked at before.

MR. HINNEFELD: Yes, I understand. But if it's -- we're specifically discussing
it here. You'll get this email then with one file attached.

    MS. K. JOHNSON: Okay. That would be fine.

    MR. HINNEFELD: And, Ms. Triplett?

    MS. TRIPLETT: Yes, that's fine.

    MR. HINNEFELD: Electronic is okay?

    MS. TRIPLETT: Yes.

    MR. HINNEFELD: Okay. Then we'll do that. Mark, you can talk to Josh.

    MR. ROLFES: Okay.

    MR. HINNEFELD: I'll send him an email and then you can talk to him about sending it to him to make sure he's getting the precise report you're talking about and then email it to them. And then we'll rely on Josh Kinman to get in touch with the Petitioners and arrange a call. How does that sound?

    CHAIRMAN LEMEN: That sounds good to me. Dr. Lemen. I was wondering. I don't

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want to keep putting this off and off and off.

If I could request at least from the Board if you could make that contact in the very near future before we have our meeting in Santa Fe, if that's possible.

MR. HINNEFELD: They should certainly have the file and we will at least be in contact to try to schedule the call before then. We have to deal with everybody's schedules including the schedules of our staff who will have to participate in that call. So we will certainly be in contact before the Santa Fe Board Meeting in terms of trying to schedule it. And maybe we can even have it done by then.

CHAIRMAN LEMEN: I would really appreciate if we did go forward with that. Let me just ask the other Board Member on the phone, Dr. Field, if you're in agreement with that approach or if you would like to see it a different way.

MEMBER FIELD: Yes, I think that
makes sense. My concern though is that and my
guess is that the documents that are going to
be provided are things that they've already
seen. But we'll find that out when they look
at them again.

But what they'll probably -- I
don't want to speak certainly on behalf of
them, but I can anticipate that some of the
questions that they may have may go back to
how firm is the information on were these pits
covered, just to use one example. And I'm not
sure that's going to be in the materials
provided to them. It just sounds like there's
evidence from various sources that these Pits
1 and 2 may have been open, that thorium-232
was just in Pit 4. But as far as we know,
that was never -- that never dried out.

So I think it may be hard to
answer some of the questions that exist. And
it may rely on some assumptions that there is
no indication that these pits did dry out. So
I guess it's at what level of confidence can
you provide to answer questions about, you know, just a pretty basic question about were the pits covered the whole time. And, if not, which ones were not covered and for what years and what were in those pits?

I guess that's -- I'm not sure this will resolve the issue, but at least we'll know where the questions remain.

CHAIRMAN LEMEN: I would like to give the Petitioners at least another opportunity to go over this and make their concerns known to NIOSH and to the Board so that we can at least have an open discussion on this at the Santa Fe meeting and get some resolution because this has gone on for quite a while. I don't want to keep it going on by pushing off decisions.

MEMBER FIELD: And I don't -- this is Dr. Field. I don't disagree. I want to make sure that this time is used in the best way it can be for the Petitioners and for the folks gathering this material. If it's not
the material that they're seeking, then it's not very helpful. But we won't know that until they look at it, I guess.

CHAIRMAN LEMEN: So I guess the last question I have on this to the Petitioners, is that an agreeable plan with you. Karen.

MS. K. JOHNSON: This is Karen. That is agreeable and I just want to thank you. I actually agree with both of you. For us, there is a lack of confidence and we desperately need that confidence to be comfortable with this.

CHAIRMAN LEMEN: All right. So I will leave it, Stu, for you to spearhead this with whoever you designate: Mark or whoever. And we'll readdress this maybe by telephone before the Santa Fe meeting but for sure at the Santa Fe meeting.

MR. KATZ: Yes. This is Ted. I don't think we have enough time for another Work Group meeting before the Santa Fe
meeting.

CHAIRMAN LEMEN: I wasn't suggesting a Work Group meeting.

MR. KATZ: Yes.

CHAIRMAN LEMEN: I was just suggesting maybe Stu could get back to me or something like that and let me know what happened.

MR. KATZ: Yes. But let me just suggest this for a path forward. I mean Stu or his folks can organize providing these papers to the Petitioners and having that discussion with them. I would ask that, when they set that up, it would be nice for Ron Buchanan to be able to have an opportunity to join that since he's been --

DR. BUCHANAN: I would be very happy to do that.

MR. KATZ: I would like for that to happen and then at the conclusion of that meeting it would nice to just have a little brief email from Mark or whoever just sort of
summing up that contact and so on. And then at the Board meeting, they can run over that as to what occurred with that discussion as well and then Petitioners, during their time, will have an opportunity to speak to that again as well.

CHAIRMAN LEMEN: That sounds good to me, Ted. This is Dick Lemen. So we will put that item off the table right now with that action plan in place.

And we'll move to the second item on the radiation. And I think, Mark, you had a presentation to make on that or were you going to address that first?

MR. ROLFES: I can run through really quickly those slides that I sent out this morning. I apologize for not getting those out earlier.

CHAIRMAN LEMEN: Well, maybe -- I don't know. Does SC&A have something first or would you like to proceed with Mark going first and going after Mark?
DR. BUCHANAN: This is Ron Buchanan. There is one piece of the thorium that we did not address or did not draw a conclusion on and that was -- Mark spoke to recycled thorium, and it wasn't an issue like recycled uranium and such.

I would like to see some short documentation of recycled or residue, thorium residue, or something kind of laid out on what Weldon Spring received, what that's referring to at Weldon Spring, and how that would be handled in the dose reconstruction because this was a new term that had come up since the TBD was written. So I would like to see something come forward on that either just to show that it is not of concern or was taken care of by the air sampling that was in place or something.

And so I'm wondering what we can work out on that, Mark. If you could do something short and concise on addressing the thorium recycled material.
MR. ROLFES: Yes, we can work on that. I don't know that we'll be able to get anything prior to the Santa Fe Board meeting.

I'm having trouble accessing some of the documents in our site research database. I would need to go back and check into it for some of the information.

There were some bits and pieces of information where they had analyzed the hazard potential for recycled thorium in the contaminants being processed. And I believe this was done at Fernald in the `60s, some of this investigative work.

And, as I had mentioned earlier, the thorium that was processed at Weldon Spring came from Fernald. But we haven't seen anything that indicates that it's recycled thorium per se.

I think the more important thing would maybe be to look to see if we can find any kind of information for the shipments of thorium from Fernald to Weldon Spring and see...
if we can get any kind of information along that line first.

DR. BUCHANAN: How long do you think that might take you, Mark?

MR. ROLFES: I wouldn't be able to give you a time estimate. It probably would take, I'd say, a few weeks at the minimum to go through some of the references and see if we can identify what types of thorium were sent.

MR. KATZ: This is Ted. I'm just -- Can you hear me? Am I on mute?

MR. ROLFES: Yes.

MR. KATZ: I'm just a little bit confused here about this. Ron or Mark, I don't know where this is coming from. But, I mean, presumably you looked at what source terms were sent and processed at Weldon Spring to do your evaluation in the first place. I'm just a little confused as to what this is about.

Now you're talking about a
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possibility of this other source term. Can you explain this? I just don't really understand what's going on here with recycled thorium being shipped from Fernald if you didn't address it already in the Evaluation Report and so on.

DR. BUCHANAN: This is Ron Buchanan of SC&A. In the past, it's always been assumed that the thorium was in an ore form. And then, these papers that the Petitioner sent in used the terms "thorium recycled material" and "thorium residue." So my question is: what does this refer to? Is this something different than what we have been addressing all along?

Or is this a different terminology being used for what was already being processed? Or where does this term come from? And was it different than the thorium that was there and what we've worked up, you know, looked at the dose reconstruction for?

This just came to light in these
papers. This terminology came out in these papers that the Petitioner recently sent us.

MR. KATZ: Okay. And these --

CHAIRMAN LEMEN: This is Dick Lemen. I'm sorry. My phone went out.

MR. KATZ: Okay. And these papers were papers that, Mark, your folks never saw these papers before and didn't -- can you just explain the other side of the story?

MR. ROLFES: I believe five references were provided and I believe we had seen maybe half of the references, two or three of those previously. I'd have to go back and look at the context just because we've seen hundreds of records before.

Maybe, Monica, if you recall. I know you had gone through and looked at some of the records as well that were provided, and if you have anything to add.

I don't recall the specific terminology and I didn't go back and look at this specific issue because I wasn't sure
which aspect of thorium exposure was on the agenda that we were going to be discussing. So I would have to go back and look at the context of the statement.

I don't know if, for example, you know, it all depends, because sometimes when you're referring to thorium residues it could just be what's left over after they process the thorium if it was put through the process. I would have to go look at the context to figure it out.

MR. KATZ: Okay.

MR. ROLFES: I mean, I couldn't make a guess without seeing it.

MR. KATZ: I mean, I guess I'm just asking the question. Ron did review these papers that Tina provided, I think Tina provided, and you know we sent those around to everyone. And it's just sounding on this call like there was no follow-up to Ron's review of these papers. And so while we're thinking about what we might do to explore the
questions that are open, it sounds like nothing was done to explore those in advance of this meeting.

MR. ROLFES:  Ted, this is Mark. And I think what we originally had agreed to look into those references for was to see if there was any supporting evidence showing that thorium-230 had been separated from the uranium ore residues for the raffinates. And I think that was the review that we had conducted.

We didn't really go and look to see if there was information, additional information, about terminology referring to thorium. I think we looked at those references for a different reason.

MR. KATZ:  Okay. I see.

MR. HINNEFELD:  Ted, this is Stu. I think part of the difficulty here is the fact that this recycled is not really a standard term. And people can use the term "recycled" in a number of ways. And that's
what the confusion is. We don't know in these latest references that were provided by Petitioners how they used the term "recycled."

For instance, when we talk about recycled uranium, by and large in our program and at Fernald when we talk about recycled thorium, we're talking about materials that have been irradiated in a reactor and then reprocessed and repurified back to uranium or back to thorium. And in that process, there are some impurities that go along with it. And that's what we in our program have been talking about as recycled uranium or recycled thorium.

But that's just sort of a term of convenience for us. And that's not necessarily like the only acceptable use of recycled.

A common practice on the DOE's side was something called scrap recovery where they would take materials that are byproducts of a production material like uranium shavings.
or something, from metal turnings or the ends
of cuttings that, when they're cutting uranium
to a particular size you get some odd length
pieces that need to be recovered. Or, maybe
people might use the term "recycled" for that.

So the question is does the term
"recycled" as used in these papers, at least
one of which was written in the `80s by
Batelle, really talking about material that
went into a reactor and was reprocessed or is
that just talking about some other sort of
reclamation process that they were doing? So
that's the basis for the confusion here.

MR. KATZ: Okay.

DR. BUCHANAN: Yes, you're
correct, Stu. That summarizes it good.

Thanks.

CHAIRMAN LEMEN: This is Dick
Lemen again. I got cut off. So I didn't hear
all of that conversation, but it sounds like
there is still a lot of work at least to be
done on this second issue. And I hear a
commitment from Stu and the rest of you at NIOSH that you're going to pursue that as rapidly as you can and try and have something at least to discuss on this second issue, maybe at the Santa Fe meeting also. Is that -- did I hear right? Or did I miss something?

MR. HINNEFELD: This is Stu Hinnefeld, and I think it will be difficult for us to have much to say at the Santa Fe meeting on this. I'm afraid this might take a little more research than we have days available.

CHAIRMAN LEMEN: Can we get --

MR. HINNEFELD: We'll see what we can do, but I don't know what we'll be able to do by Santa Fe.

CHAIRMAN LEMEN: Okay. Can we get some kind of commitment to the Petitioners to you to set a little -- some type of time frame that you could say in a month you'll have something back? Or how would you like to handle that?
MR. HINNEFELD: I think the best I can do is we will have to scope this, right? Sitting here today, we don't really know what the scope of the task that we're looking at because we're not really sure where it's going to go. We'll have to scope this. And once we scope it, then we can have some idea of when we can be done.

We will provide that after we've had the opportunity to do that. We'll provide a projected schedule.

CHAIRMAN LEMEN: I was really hoping that we could get things resolved by the Santa Fe meeting, because I thought we were closer than this. But I guess I was wrong on that, so we'll have to go by your time frame.

MS. M. JOHNSON: Hello?

CHAIRMAN LEMEN: Hello.

MS. M. JOHNSON: This is Mary Johnson, the Claimant on the Petition.

CHAIRMAN LEMEN: Yes.
MS. M. JOHNSON: We are wondering, when this comes to an end, how long does NIOSH have to prove, in their words, that we are not going to get this petition? We have waited and waited and waited and they always need more time.

Where is the preparation in this and how long do we have to be patient? This has just gotten ridiculous.

CHAIRMAN LEMEN: I hear your concerns, ma'am. Stu, I was kind of hoping at this meeting today we would be able to resolve all these issues. But it appears that it's not going to happen.

Ted, how do you usually handle something like this when they're just putting stuff off?

MR. KATZ: Well, in a matter like this, when someone submits some papers that had some ratings and issues that hadn't been addressed before, I mean, that's the consequence of a new issue coming to light is...
that they have to pull the string on it.

And there is really -- I understand fully the frustration of that involving more time. But, I mean, there are two choices: ignore the new issue or to pull the string and find out whether that issue has any consequence or not.

But I don't think there's any way for the program to answer a question that's raised without looking into the documentation related to that new question. So I don't think you have much of an alternative unless you're going to ignore the issue.

CHAIRMAN LEMEN: Well, I certainly don't want to ignore the issue. And I guess my question on this issue, one last time, would be: was there anything else besides this last issue that the Petitioners intend to ask? Or is there any issue that might come up again?

MR. KATZ: Dick, I think you missed because you were cut off, I guess.
CHAIRMAN LEMEN: Yes.

MR. KATZ: Basically, we haven't heard yet about the radon model. We're still talking about thorium here.

CHAIRMAN LEMEN: I know. That's what I'm talking about.

MR. KATZ: Okay.

CHAIRMAN LEMEN: I'm talking about thorium.

MR. KATZ: Okay.

CHAIRMAN LEMEN: I hadn't gotten to radon yet.

MR. KATZ: Okay.

CHAIRMAN LEMEN: So I am very sympathetic with the Petitioners. And I guess we'll bring this up at the Santa Fe meeting, at least the questions that are still open, and let the Board discuss that with NIOSH a little bit more.

MS. K. JOHNSON: This is Karen Johnson again. I just want to make a statement that these documents we've...
introduced came from our FOIA request from NIOSH. These aren't new. And they shouldn't be new to NIOSH. So I just wanted to throw that out there and make sure it's on record.

CHAIRMAN LEMEN: Okay.

MR. KATZ: Karen, I think what you're hearing from the NIOSH folks and the DCAS folks about this is that the terms that are in some of those documents that you're raising questions about a concern, I think to them those terms were not of concern. And that's why -- I assume they're aware that these materials existed, but they didn't have concerns about them, and now they're trying to address questions that you're raising related to those terms, which is why they have to go and do more research.

CHAIRMAN LEMEN: Well, again, I would like to know how long the research is going to take and if we could get some commitment from NIOSH. But I don't think we're going to be able to.
MR. KATZ: Right.

CHAIRMAN LEMEN: I understand the Petitioners' frustration on this and the best I can do at this time is to take it up with the whole Board at the meeting in a couple of weeks. I can't act by myself on this. I need the Board's support. Okay?

Can you hear me?

MR. KATZ: Yes, Dick.

CHAIRMAN LEMEN: Is that all right?

MR. KATZ: Of course.

CHAIRMAN LEMEN: Let's move on to the second issue, with this first one still unresolved. Mark, do you want to go ahead and make your presentation?

MR. ROLFES: Yes. At the last Board meeting, I guess -- I'll just go ahead and go quickly through these slides that I sent out this morning. They're available on the K: drive or O: drive under the AB document review folder for Weldon Spring. And most of
this information came from the earlier presentation that we initially presented to the Advisory Board when the Special Exposure Cohort petition was issued.

Just to go through the Weldon Spring Plant Site History, the AEC contracted with Mallinckrodt Chemical to refine uranium at the Weldon Spring Plant between June 1957 and December of 1966.

In 1967, the AEC returned the land to the Department of the Army. And there really was no indication of any work being done during 1967, process work.

The covered period, we've got the operational period defined as 1957 through 1967 and the actual processing was closed down by the AEC in 1966.

MS. TRIPLETT: I'm sorry. This is one of the Petitioners. Can you speak up? I can hardly hear you.

MR. ROLFES: I sure can.

MS. TRIPLETT: Thank you.
MR. ROLFES: Let me know. Is this a little bit better?

MR. KATZ: Much better.

MR. ROLFES: Okay.

MS. TRIPPLETT: Yes, it is.

MR. ROLFES: All right. I apologize. There were no AEC operations or contractors from 1966 through 1975. And then in 1975, monitoring and remediation began and lasted up until 1984.

The operations at the Weldon Spring Plant, the primary activity involved the conversion of natural uranium ore concentrates into other uranium products. Let's see. They basically did some short-term thorium campaigns in the late 1960s. And the ore concentrates processed at Weldon Spring Plant were a relatively small source of radon because most of the radium in the ore concentrates was removed at an offsite mill prior to the materials being sent to the Weldon Spring Plant.
Basically, some of the assumptions that we've put together in our radon exposure model came from the reference of Meshkov 1986, I believe it was. And they're laid out in the next couple of slides here.

Basically, at the January 2011 Work Group meeting, NIOSH and SC&A agreed on the bounding radon exposure conditions for process workers. We had indicated that all radon release during the processing of the ore concentrates would be recirculated back into the process areas. And we assumed that the radon was steady state and that minimum ventilation would be involved in the buildings.

This approach establishes a bounding intake to perform dose reconstructions. Some of the bounding conditions from the Meshkov 1986 reference include the average annual uranium containing material being processed in the buildings. That was 12 million kilograms of uranium. The
radon that was released was directly related to the amount of uranium being processed each year.

We assume that 70 percent of the material being processed was uranium and that the radium activity in the ore concentrates which were processed was approximately one percent, which we believe is a conservative and upper end estimate of the radium content.

We've assumed equilibrium between radium and radon. And within this Meshkov reference, the radon release estimate for Weldon Spring Plant for the materials being processed at the site were in between 12 curies per year and 34 curies per year. NIOSH chose the upper bound value of 34 curies per year.

And I know there was a concern previously expressed about whether surrogate data had been used. And there was no surrogate data that were used in this model.

And just the final slide is the
history of some of our discussions on the radon issue. And in January 2011, there was an agreement reached that the scenario in which all the radon released during processing was recirculated into the facility would be a bounding assumption. The maximum concentration of radon based upon the release estimate would be assigned for the intake.

And then in May 2011, there was some discussion and clarification and that's why these slides are being presented just to sort of recap and summarize the proposed model. If there are questions related to the slides or any other questions? I'll hand it back to you, Dr. Lemen.

CHAIRMAN LEMEN: All right. This is Dick Lemen. Ron, is there anything from SC&A on this?

DR. BUCHANAN: Okay. Yes. This is Ron Buchanan, SC&A. We have looked over this model and I've had several SC&A experts in radon look at this.
And just to summarize it real simply, there was no radon measurements taken at Weldon Spring during the operational period. And so this is a radon model which takes the throughput of uranium and then puts in an enclosed room where there is no ventilation. It lets it build up to maximum and then assign that intake.

So that's obviously an overly conservative model and assigns a higher dose than anyone probably received. And SC&A looked at the details, and the information comes from Weldon Spring and facilities and the throughput and such, and we do not have a problem with the model.

We brought it before the work group because in the past there had been problems, issues, with using a strictly modeled radon intake as opposed to having any benchmark measurements of radon.

And this was different from some of the other models brought forth to the
Advisory Board in that this does not take into any consideration or take any allowance for decay or ventilation. So there is stagnation and that sort of thing, separation, stratification, in the layers of radon.

And so this is an overly conservative model which we don't have a problem with. It's just if the Advisory Board will accept a radon model based on calculation as opposed to any benchmark measurements being made.

CHAIRMAN LEMEN: Is that all you had, Ron?

DR. BUCHANAN: Yes. Thank you.

CHAIRMAN LEMEN: Dr. Field, do you want to comment on that? Hello? Dr. Field?

MEMBER FIELD: The mute got me again. Yes, just had a couple questions. More clarifications than I guess anything else.

For some of the assumptions, the 70 percent of the materials assumed uranium.
I was just wondering where that came from.

MR. ROLFES: This is actually out of the Meshkov reference as well, I believe.

Monica, could you confirm that? I believe that was one of the assumptions, and that's a pretty bounding assumption I want to say because most uranium content is -- that's a pretty good ore concentrate to have 70 percent uranium in it. Let me see if I can pull that reference out.

MR. MORRIS: This is Robert Morris. Mark, do you think I can help that?

MR. ROLFES: Yes, please go ahead.

MR. MORRIS: Yes. You know, the uranium would have been mixed in with some kind of oxide and so those are consistent assumptions with some kind of part of the module as oxygen.

MEMBER FIELD: I see. So when you're talking about 70 percent you're talking it could be 100 percent uranium oxide, the yellowcake?
MR. MORRIS: Sure. Yes. But radon would come from uranium atoms.

MEMBER FIELD: Right. So the 30 percent then is just the other -- it's the compound that's associated with uranium, right?

MR. MORRIS: I think that's -- if I recall, it's been a long time since I looked at that one, but I'm pretty sure that's how we did it.

MEMBER FIELD: Okay. I'm just trying to figure out. If you think about yellowcake, you think about higher percent. But I see what you're saying with the compound. So you just looking at the, almost the elemental content.

MR. MORRIS: Right.

MEMBER FIELD: Okay. And then Meshkov, I remember looking at this about a year ago or so. And I sent an email in just a short while ago. They assumed -- I thought it was 30 percent equilibrium, but then Mark said
it was 50 percent.

MR. ROLFES: Yes.

MEMBER FIELD: What I heard it sounded like there was 100 percent equilibrium that you just discussed today.

MR. SMITH: This is Billy Smith. The equilibrium that Mark was talking about was that the equilibrium was between uranium and radon was 100 percent. So we had full equilibrium.

MEMBER FIELD: I see.

MR. SMITH: All of the radon in the uranium was released in the refining process.

MEMBER FIELD: And the equation you used for the tables is based on working levels or is it based on radon gas?

MR. SMITH: It's based on working levels.

MEMBER FIELD: Working levels.

MR. SMITH: Now the paper that you probably read has -- hold on just one second,
please.

MEMBER FIELD: Yes.

MS. HARRISON-MAPLES: IREP operates on working levels.

MEMBER FIELD: That's what I thought.

MS. HARRISON-MAPLES: Yes.

MEMBER FIELD: What I was wondering was what was the equilibrium ratio between the radon and the decay products assumed in the room.

MS. HARRISON-MAPLES: Yes.

MEMBER FIELD: I assume that's 100 percent?

MR. ROLFES: That was 50 percent.

MEMBER FIELD: Fifty percent.

MR. ROLFES: From the EPA document that I had sent to you. I think I sent it.

MEMBER FIELD: Right. Based on home, right?

MR. ROLFES: Yes. Correct. For indoor air.
MR. SMITH: It's much lower than that for outdoor materials or in materials in buildings where the turnover rate is much higher. So we went conservative. I assume that the equilibrium back there was 50 percent.

MEMBER FIELD: Okay.

COURT REPORTER: This is the court reporter. Who is this speaking, please?

MEMBER FIELD: I was just saying, when you assume that it's all decay and there was stagnation, that's why I assume you were using 100 percent. That there's no played out or nothing occurring.

MR. SMITH: No, that's not true.

MEMBER FIELD: Well, that's why I just asked you for clarification on that.

MR. MORRIS: Dr. Field, this is Robert Morris.

MEMBER FIELD: Yes.

MR. MORRIS: We have looked at our model and I've just in the last day or so made
sure that we had it right. And we assumed that if all of the radon from the material of interest escaped into the building, completely mixed into the breathing air of the building, and was available for workers to breathe 2,000 hours a year, we assumed 50 percent equilibrium between radon and radon progeny.

MEMBER FIELD: Okay.

MR. MORRIS: And we assumed variable ventilation rates, like you would see in a home, for example. So that all of the radon was removed from the ambient air exhaust. None of it from the process. Local exhaust ventilation, that would have been associated with capture velocity, fume hoods or unit process ventilation.

So when you take flow rates as low as that, then you're not going to get low equilibrium ratios like you would from a very highly ventilated building. Does that make sense?

MEMBER FIELD: I guess what I was
just trying to figure out was the discussion -
- I understand completely why you use 50
percent, because generally in larger building
there are areas where there's work occurring
like this. You have much higher air exchange
rates than what you find in homes. So 50
percent, I agree would be bounding.

But I thought what I heard during
the presentation was that there was nothing
assumed as far as ventilation. That it was
assumed that it was a closed system. Maybe I
misheard that.

MR. MORRIS: We may have said that
a long time ago. In fact, I think we probably
did a long time ago.

MEMBER FIELD: Okay.

MR. MORRIS: As it's written, we
went through and made it more clear what our
assumptions. We do have one air change per
hour ventilation which is a minimal, sort of a
tight home, kind of ventilation rate. And
that would be very, very conservative for an
industrial facility.

MEMBER FIELD: Right, I agree. And then for the Meshkov, I have to look again, but did they say what the emanation rate was based on the material as far as moisture content, that kind of thing? I'm just curious. These are some of the details I just hadn't checked up on.

MR. MORRIS: Do you mean how Mr. Meshkov came up with the 34 --

MEMBER FIELD: Yes, I'm just wondering because the emanation rate from the material is going to depend on the content? And if it's yellowcake, you already assume a certain moisture content. I'm just wondering that there's a lot of differences with emanation rates from materials based on what the moisture content is.

MR. MORRIS: I don't remember how Mr. Meshkov came up with that.

MEMBER FIELD: Okay. I'll look over that again. Just trying to clarify some
of those issues.

MR. MORRIS: If you want, we can sort of look over that, too, and give you a written response, if you choose.

MEMBER FIELD: Yes. And that's all I had, Dick.

CHAIRMAN LEMEN: Could I ask you, Bill, one last question? And that is: what do you feel about using a model such as this without any actual measurements?

MEMBER FIELD: Well, if these other questions make sense that I was asking just for clarification, I think it is bounding. You know, we went through this at other sites. Is this -- are the assumptions reasonable? And, yes, we had a lot of discussion just centered around previous sites like this.

I think this should be a bounding estimate based on assuming a rather low ventilation rate. It's something we want to look over, because the slides don't go into
detail, but I think the report does. There are other documents that I've seen.

CHAIRMAN LEMEN: Okay. At this time, do any of the Petitioners have any comments? Karen?

(No response.)

Tina?

MS. TRIPLETT: No, I do not.

CHAIRMAN LEMEN: Okay. Does NIOSH have any further comments at this time?

MR. ROLFES: I don't believe so.

CHAIRMAN LEMEN: Ron from SC&A, any further comments?

DR. BUCHANAN: No.

CHAIRMAN LEMEN: I propose, as Chair of this Working Group, that we bring this up to the full Committee and see what their feeling is on using this model. If there are no dissensions from the Petitioners at this time, I suggest, Ted, we put it on the agenda as part of what the Weldon Spring presentation will be at the Board meeting in a
couple of weeks.

MR. KATZ: This is Ted. Weldon Spring is on the agenda already.

CHAIRMAN LEMEN: I understand.

But I mean, with this comment, that we bring it up to the Board.

MR. KATZ: Right. I mean, you'll be leading up the discussion.

CHAIRMAN LEMEN: Correct.

MR. KATZ: I guess one suggestion is: there are some useful clarifications about the model in the discussion from Robert Morris which sort of laid out the parameters more clearly, and that might be useful to add to the presentation, Mark.

CHAIRMAN LEMEN: I agree.

MR. KATZ: Yes, because the full Board was very interested in hearing more about the radon model. And I think the whole discussion here this afternoon was helpful in understanding how that model was designed.
you put that in your presentation at the Board meeting?

MR. ROLFES: Yes, we could definitely -- there's a lot of information in the slides that might not even be important. I presume that I'm being asked to give this presentation to the full Board. Is that what I'm hearing?

CHAIRMAN LEMEN: Yes.

MR. ROLFES: Okay.

MR. HINNEFELD: This is Stu. We'll provide that presentation or modified presentation that actually focuses on the radon model and the specifics of the radon model.

CHAIRMAN LEMEN: That would be good.

MR. HINNEFELD: Yes. And we will present that at the Board meeting.

CHAIRMAN LEMEN: All right. Are there any other questions on this radon issue at this time?
(No response.)

If not, I think we've completed the agenda. And if there are no other questions or comments from the Petitioners, I would call this meeting to a close at this time.

Ted?

MR. KATZ: Okay. Very good. And, Dick, you're prepared to sort of lead off the discussion of this at the Board meeting?

CHAIRMAN LEMEN: Yes, I am. And I'm a little concerned about the first issues that we talked about. But I'll talk to some people about that. So that's all I have at this time.

MR. KATZ: Sure. And we'll have a little bit more follow-up on the first issue after they've had a chance to talk with Tina and the Johnsons.

CHAIRMAN LEMEN: Right. But I would like to show the Petitioners that are on the Board that as far as I'm concerned, we...
need to move this through and get a decision made. Because I agree; it's been too long in the making. And I'll do everything I can to push that forward.

MS. K. JOHNSON: This is Karen. We truly appreciate it, because we have, we've been here since the beginning. So we appreciate some closure at this point.

CHAIRMAN LEMEN: Well, I'll work towards that, and I'll address this again to the Petitioners, I guess, at the Board meeting and to listen to NIOSH's presentation and hear what we have to resolve some of the issues on the first part of our agenda today.

With that, I'll close the meeting and thank everybody for participating. And we'll talk later.

Any final comments, Ted?

MR. KATZ: Nope. Thanks to everyone.

(Whereupon, at 2:48 p.m., the above-entitled matter was concluded.)