U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND WORKER HEALTH

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WORK GROUP ON TBD-6000

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THURSDAY
JANUARY 16, 2014

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The Work Group convened telephonically, at 10:00 a.m., Paul L. Ziemer, Chairman, presiding.

PRESENT:

PAUL L. ZIEMER, Chairman
JOSIE BEACH, Member
WANDA I. MUNN, Member
JOHN W. POSTON, SR., Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
NANCY ADAMS, NIOSH contractor
DAVE ALLEN, DCAS
BOB ANIGSTEIN, SC&A
SAM GLOVER, DCAS
DEKEELY HARTSFIELD, HHS
JOHN MAURO, SC&A
DAN MCKEEL
JIM NETON, DCAS
JOHN RAMSPOTT
LAVON RUTHERFORD, DCAS
MUTTY SHARFI, ORAU Team
JOHN STIVER, SC&A
BILL THURBER, SC&A

T-A-B-L-E O-F C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

(10:02 a.m.)

MR. KATZ: Well it's time to start so if everyone is ready let's get going. This is the Advisory Board on Radiation Worker Health, TBD-6000 Work Group. Just some general things to say before I do roll call.

We have the agenda for the meeting. It's posted on the NIOSH website under the Board section, under today's meetings, or scheduled meetings for today. So the agenda's there, there are a number of documents that should be posted there.

There's a presentation for Joslyn that should be posted there and maybe one other document, I'm not sure. I don't think so actually, I think it's just the presentation for that.

And then later today we have GSI and we have a couple documents posted for that. SC&A memo, an updated matrix, I think

that should be it.

So roll call, let's just start with Board Members. We're speaking about specific sites, so please for everybody agency related, speak to conflict of interest as well when you register your attendance. Let's start with Board Members.

(Roll call.)

MR. KATZ: Okay, very good. Again I think, Dr. Poston will register his attendance when he joins us in a few minutes. And Paul, it's your agenda.

CHAIRMAN ZIEMER: Thank you very much, and welcome everybody. I will officially call the meeting to order. You all have the agenda. We have two facilities to deal with this morning. First, Joslyn Manufacturing of Fort Wayne and then General Steel Industries.

We're going to begin with Joslyn. And we have first the presentation by Sam Glover, dealing with the SEC Petition

evaluation. And the issue of extending the time for the SEC period. So Sam, it's all yours at the moment.

DR. GLOVER: Thank you, Paul.

MR. KATZ: And Sam, just before you get to that effort, I failed to mention for everybody, when you're not speaking please, mute your phones.

And use *6, to mute the phone if you don't have a mute button on your phone, *6 will then take it off of mute as well. Thank you. Go ahead, Sam.

CHAIRMAN ZIEMER: Let me also, this is Ziemer again, let me also mention that Sam's PowerPoint presentation was distributed a day or two ago.

Sam, I don't know if you were planning, I guess you're also going to put that up on Live Meeting as well, so that those that don't have a Live Meeting, I think it was distributed generally as well by email.

MR. KATZ: Yes, well it's, Paul it's also, it's posted on the website.

CHAIRMAN ZIEMER: And on the website.

MR. KATZ: For today's meeting.

CHAIRMAN ZIEMER: Right, thank you. Go ahead, Sam.

DR. GLOVER: Thanks Paul, yes we, I apologize for the lateness, but because we had to put the addendum together, and get it reviewed. We didn't, we weren't able to get this out to you further ahead of time.

I do want to mention that you should have all received a copy of the, I think the entire Board received a copy of the presentation. It is on the website.

I also put in AB Document Review Folder, the summary of all the action items that were generated. As well as all the supporting material and the addendum, Paul, to try to make it as easy on you guys as possible to review the changes.

With that, then I guess we'll start with the presentation and see what you, what else, what other questions you have. Or if you have any other questions about the supporting material and I'll let you go from there.

So I'm going to briefly go through the Joslyn Manufacturing Supply Company, this our addendum report to SEC-200, and I'm going to try to remember to control the slides with this. I'm going to Slide Number 2, for anybody who might be following along on a different piece.

So it's been about a year ago since we talked about the site. Joslyn is listed as an Atomic Weapons Employer. A little bit of background here, from 1943 to 1952. And they were the primary commercial rolling facility for the AEC, prior to Simonds Saw and Steel.

Their principal operations include machining and rolling of uranium

rods. They did some very small, very limited thorium machining operations before 1948, in the 1946,'47 time frame.

Next slide, Slide Number 3. So based on Jim's various recommendations, I slimmed up this presentation so there is not a whole lot of extra ancillary things in here, but just a little history.

We did do, in December 2012, we presented at the Board meeting our Class recommendation for Joslyn. And we recommend the period March of 1943 through December 31 of 1947 as infeasibility.

And then after that we said we believed that we could do dose reconstruction from January 1, 1948 through the end of 1952. Advisory Board agreed with that, as far as the SEC Petition portion. But withheld judgment from '48 to '52. Requested SC&A prepare a report, and they did that.

And that report was summarized

into 11 issues for resolution and the folks over there summarized that into a Issues Resolution Matrix on December 18th, but it was well broken out in the report, but certainly that matrix is also in the folder setup that I put up on the AB Document Review Board for you.

Going to go to Slide Number 4. Joslyn Manufacturing is located in Fort Wayne, Indiana they have a long history of producing stainless steel. Participated in a number of radiological operations for the Manhattan Engineer District and later the AEC.

And these included hot rolling, quenching, straightening, cooling, grinding, waste burning, abrasive cutting of uranium billets into metal rod.

Slide Number 5. So much of the early work at Joslyn, pre-1948, was related to production of uranium for the Hanford site. And Hanford oversaw those operations.

Numerous experiments to develop procedures for rolling uranium metal for use in nuclear reactors. They performed rolling operations at Chalk River, for the Chalk River experiments and also for the British government.

Slide Number 6. So one of the things when you have an SEC, the question you sort of ask yourself is all right, '48, December 31st, 1947 and then I go to 1948, what changed?

And so when I thought about some of the things maybe that are unique to Joslyn that gave us some concerns, and we wanted to make sure we addressed them very well.

On Slide Number 6, this is a diagram that was extracted from the Health and Safety Report in 1952. And it shows the proximity of three separate rolling mills.

If you were to look at those on their side, they're like if you took a 250

gallon drum laid on its side, one on top of the other, they would roll in the same direction with grooves.

So you see three mills, an 18 inch, this one, labels a 12 inch but at different times it was, I believe also was a 16 and an 18, depending on what size rolls they put on there. And then there's this nine inch rolling mill that we talk about.

And that was the, you see the furnaces they had. I believe ten, eight to ten electric, I'm sorry, gas fired furnaces where they heated the billets. That's at the top of the slide.

I don't know if you guys can see my pointer, but that's at the top, the top corner is the furnaces. And that's only about 25 feet away from these.

So you can see these are very closely in a row, and it's well, it's documented in this high production time frame, that not only were they rolling one

rod, they could be rolling up to three rods in this section, simultaneously. So that gave us some pause.

Also that, some concerns that in high throughput, you had this later in 1952 data, but these rolls are water cooled. They are, from the very beginning they discussed the steam and smoke in this area.

So it's sort of a unique operation that we want to make sure that the 1952 data, which we have a good study by HASL, reflects the conditions that go back.

So that we'll talk about that as we go to Slide Number 7. So let's go on to the source of exposure. We have principal sources, include the inhalation and ingestion of natural uranium oxide from production and shaping of uranium metal rods.

It was a hand-operated shop, compared to like Bethlehem Steel this was, you drug a rod, manually reinserted the rod

into the mill, they packed it back over, and so they pushed this thing through.

And so the people on the inside, you may see an east side or west side of a rod, what's on these, so they're seeding, and as that rod comes in, that oxide is perhaps going to be higher on one side.

Joslyn operated these three mills simultaneously. They were co-located and they were conducted on, again, rollers which were water-cooled bearings. And they produced steam and high levels of contamination.

In addition to the rolling, they, many of the operations required additional machining and preparation steps, including centerless grinding, cutting, heating, quenching, and an unusual operation, they threaded them for various operations at various facilities within the Joslyn plant.

Billets were also stored onsite for relatively long periods of time. They

maintained an inventory. Uranium waste was noted to be collected and burned outside.

And so we spent a lot of time with worker interviews and trying to make sure we understood the burning of waste.

In the '45 time frame, they even described an explosion where they didn't properly oxidize the material and it got wet and actually blew up in an offsite location.

I updated this graph to reflect some new documents we collected in the last year. And essentially what it is, is that we found better documentation on the second half of '49 and the second half of 1950.

Those about 30 tons of uranium rod exposure, or rolling per Chalk River. You can see that through, they had about 300,000 pounds up through 1947, maybe 400,000 pounds of total uranium that was onsite and rolled and or machined.

The first half of 1948, they did 600,000 pounds of uranium in 42 days, of

actual onsite operations. Those may have been 42 days of two, you know they may have had two back-to-back sets, two different shifts running to get that done. But that was the calendar days of operations.

And then after that, there's very few rollings, those 30 tons were done in a couple, in only two days in each time. And you'll see those reflected in our actual reports.

I'm going to go to Slide Number 10. So there is no routine air monitoring or bioassay program. We have limited air samples taken on three different occasions.

In '43 and '44, and even in October of 1951, they were very limited in scope, mostly GA samples. And the early data was done with an electrostatic precipitator which was not comparable to the HASL equipment.

And the people at the time, reflected that there was some potential

bias. So we did not feel we could, very comfortable with those who bound the dose.

Again, I mentioned there was this January 8, 1952 study conducted by HASL and they developed a time weighted average study of the various operations at Joslyn.

Slide Number 11. And so, why add seven months? I think Jim or Stu, summarized this, so what changed? So we previously recognized that TBD-6000 approach needed validation for specific practices and methods used at the Joslyn.

And these were performed under the MED operation. So they were done under Hanford supervision with the conditions and the limits at the time.

So we have an extensive data collection in 1952. How far back can we justify that they represent the conditions and practices at the site?

So we recognize that practices and standards were rapidly evolving in this

time frame. In '48 Joslyn had that same oversight. It's still Hanford in this large, that 600,000 pounds, we see the same oversight and the same kinds of activity being conducted through the end of July '48.

Operations after July of '48 are clearly done under the auspices of the AEC. You can see in the contracts and the people who are present, these are AEC officials.

We've got that tie then, you know, HASL was clearly taking, you know, obviously were getting the reports from Simonds Saw and Steel.

The other facilities that support TBD-6000, we get that change over from just, this is always how we've been doing things, to being done under the auspices of a new entity.

Slide Number 12, please. So three closely co-located rolling mills, so pre-'48, after July of 1948, we have the documented practice of rolling multiple rods

simultaneously on the same, and not just adjacent mills, but they may, you could actually run multiple rods through the same mill is what they were documenting.

And so this practice was needed to handle nearly 600,000 pounds of uranium rod processed as I said, in 42 days. NIOSH does not feel that the data collected in 1952 are directly comparable to this high production phase which required different operational practices.

Slide Number 13. Something, and then also the type of work that was done. We carefully looked at the additional documentation received regarding Canadian -- it was still AEC, it was done for Chalk River.

These rolling days, particularly the several campaigns that were, that represent most of the material after 1948, were done in what's called the alpha phase uranium dimensional stability.

And that meant why wasn't the uranium either expanding or shirking? That's why they started rolling material to begin with is that the extrusion process was causing the Hanford reactors to shut down.

And they wanted to understand why that was that was doing that, so they began operations at different facilities to understand should we be rolling this to get better product, better uranium that wouldn't cause our reactors to shut down?

Alpha phase is cool, it's not, you can't get it too hot or it changes the metal characteristic. So they had to do careful temperature control. So you can't be running a whole bunch of rods and they get hot and you're not controlling that.

They represent much smaller efforts because they were test efforts in both, approximately 30 tons in '49 and '50 each. They were specifically done only on the 18 inch mill.

And that is of note because the nine inch mill was noted by the 1952 study as being much, much higher than the 18 inch mill. The 1943 or '44 data while it was still done with electrostatic precipitator, also shows the same very large difference.

So it's supported a couple times in different conditions, that the nine inch mill really was a huge source. And that was one of our major concerns and what the exposure would be at the nine inch mill.

And you don't see that because they simply didn't do it. They needed the, they rolled it I think 28 passes through a 18 inch mill, to get into the specifics. But they were very detailed in the procedures.

Slide Number 14. So after July of 1948, beginning August 1, we proposed to use the data from TBD-6000 and the known rolling days to determine internal and external dose.

Dose reconstruction methods were summarized in a White Paper. Unfortunately that's currently still in ADC review.

It's not particularly difficult to discuss, we could walk through it, but that would be at your discretion. Whatever you want us to do, we'll be happy to give you the details.

We'd propose to get these medical X-rays for, using the OTIB-0006, using the TBD-6000 tabulated data converted per calendar days. The standard dosing construction method for TBD-6000.

One of the things I did want to note is that while rolling days are, you know, are listed and that's what the TBD -- we're still including uranium machining as an operation.

There was a lot of machining done and we're still using the TBD-6000 machining data. And that was actually higher than the rolling data.

Even though the HASL data does not bear that out, we're using that as the basis because of the different practices at the site. And we're just using that as the default. And that is actually a higher than the rolling operation.

Next slide. So, I'm not going to read the entire Class. Essentially what this does is it adds, we're proposing to add from January 1 of '48 through July 31st of 1948 to the existing Class. This Class would essentially revise the previous one. It would run from March 1 of '43 through July 31st of '48.

Slide 16. And just a brief summary, why the Class? Workers were potentially exposed to uranium and thorium who were not monitored, nor does suitable dose reconstruction method exist prior to, what should be August of '48, at Joslyn.

Based on the adequate biological monitoring data, sufficient air monitoring

information, and differences in operational characteristics from other metal working facilities. No appropriate surrogate data.

Why everyone? Based on reports by the AEC and facility layout, the process areas were broadly distributed. And controls for preventing movement in these areas was not enforced.

Why stop in July? NIOSH feels that the surrogate data from TBD-6000 which was, surrogates at the time, it wasn't collected at the, it was still within that facility, it's just that it's two years later.

Coupled with the known operational data and source term information provides support that a realistic dose can be determined.

And for employees not included in the SEC, we use any internal monitoring data that becomes available. And we're not saying we can't do external.

We're still going to use the rolling days and the TBD-6000 approach to reconstruct the external dose before this. So that's a brief run through. Paul if you have any questions?

MEMBER POSTON: Paul.

CHAIRMAN ZIEMER: Okay, thank you.

MEMBER POSTON: Paul.

CHAIRMAN ZIEMER: Yes.

MEMBER POSTON: This is John Poston here.

CHAIRMAN ZIEMER: So John Poston.

MEMBER POSTON: I just was at a class.

CHAIRMAN ZIEMER: Thanks John, just for the record, state any conflicts with Joslyn or GSI.

MEMBER POSTON: No conflicts.

CHAIRMAN ZIEMER: Thank you. Okay, you've heard the presentation. Work Group Members do you have any questions?

MEMBER MUNN: None here.

MEMBER BEACH: Sam, this is Josie. I have a, one question. I, looking through all the documents, what kind of cleanup did they do after '48? Was there anything discussed?

DR. GLOVER: Yes, there, we have measurements in '49 where they talk about a cleanup, but they still had operations after that. The method we're basing the, I call it, I misname it often, I call it the residual contamination, but really it's the between operation days.

Contamination is basically just the TBD-6000 approach of containing of a facility for 30 straight days, at 100 MAC air, and essentially leaving that as a constant contaminated area from 1943 through the end of operations in '52.

Now I know you guys have discussed that, probably at length, about how much activity that is at a facility.

It's several million dpm per 100 square centimeters.

MEMBER MUNN: Yes, we have discussed that.

MEMBER BEACH: Yes, we have.

DR. GLOVER: So that is our default. And that is what's we're going to rely on to do internal dose between rolling days after that time frame.

But we have a, what we've done for the external dose, and I apologize the White Paper is not available, but essentially you have the direct exposure for a machinist or rolling person handling uranium rod.

And also for none rolling data assigning dose as if you're being, to be exposed to the material that was stored onsite.

Because where it was located, which roughly is a millirem per day. So we're providing direct exposure for, to the

material that's stored onsite.

CHAIRMAN ZIEMER: Okay. Other questions? Sam, and Work Group Members, it seems to me that one of the options here that would be similar to what we did before.

If we were to add this to the SEC, we still might want to defer action on the later group, as we did the last time until, for example that White Paper is not available yet, and that Sam referred to it.

And also that we do have the Issues Matrix to deal with. I'm wondering if we should take a look at the Issues Matrix before we actually take any action on the SEC recommendation?

MR. KATZ: Yes, Paul. I would recommend that you do that, yes.

DR. MAURO: Paul, this is John Mauro. I just have one question also if I may?

CHAIRMAN ZIEMER: Sure.

DR. MAURO: Yes, during the time

period covered by the SEC, '42 to '48, there will, and you have someone, you know, that shows up with a skin or prostate cancer.

Will you be using, making an effort to try to assign doses? I think you said you would, but I was wondering if the, you would be using in other words, in theory you have two options.

One, this is what we have, we were unable to reconstruct those doses for the reasons you described. Or alternatively, one could argue, well we believe that TBD-6000, if anything would provide one way to estimate those doses.

They may not be upper bound, I mean because you can't place a plausible upper bound for the reasons you described, but there's a, you can assign some doses that might be reasonable.

So is it your position that you're going to try to assign some internal and external doses to prostate, skin

cancers, people not covered during the covered period?

DR. GLOVER: So the, John it's a good question. What we're doing is we're going to use TBD-6000 to assign the external doses. And they are particularly for like in skin cancer --

DR. MAURO: Yes.

DR. GLOVER: –- they're very large, as you are well aware. If I were a machinist, the base, the faults, we're going to still assign those.

We can't assign, because we've decided you know, the uranium is the infeasibility, can't assign that as a dose unless we have somebody's past monitoring data. We would not discard that, we would use that, but we can't use the, because that is the infeasibility.

DR. MAURO: Okay, I got you. So I just wanted to make sure we got that on the record, because I think it's important.

So you're going to assign external, during the covered period, for non-covered cancers, but not internal. Is that what I heard you say?

DR. GLOVER: Exactly.

DR. MAURO: Okay, thank you.

CHAIRMAN ZIEMER: Okay. Other questions? I'm not hearing any. Let's take a quick look at the Issues Matrix and then we can proceed from there.

The thing that had the document, it was distributed, when was it distributed? I'm looking for the date here. On, in December, mid-December, December 18th is the date of the Issues Matrix, and it's actually a fairly base document.

MR. KATZ: Paul, do you want SC&A to walk them through, all of you through that matrix?

CHAIRMAN ZIEMER: Yes. I think it would be useful to do that. I'm just staring at the issues here because some of

these are fairly straight forward and NIOSH can to respond to them right away.

For example, incorrect units of measure, that's certainly straight forward. But why don't go ahead and SC&A, if you want to just step through those and NIOSH give us your responses here.

MR. THURBER: I can do that if you want.

DR. MAURO: Bill, please. Yes.

MR. THURBER: Yes, the first two issues are just questions of what we believed were incorrect units of measure used in a couple of the tables. And it's not terribly relevant to the SEC discussion, but was something we felt needed correcting. The third issue, we said that --

CHAIRMAN ZIEMER: Well and very quickly, does NIOSH, is okay, you understand those and agree?

DR. GLOVER: Yes, and Paul I did want to mention that our responses to the

findings are in that folder.

CHAIRMAN ZIEMER: They're in the file, but I --

DR. GLOVER: We agree, he was wrong.

CHAIRMAN ZIEMER: –- corrected. Right.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: Okay. Issue 1 and 2, NIOSH agrees with the finding. Okay, go ahead. Issue 2 is the start date.

MR. THURBER: Yes, and we raised the question at the time because there was some incorrect citations indicating that some of the basic literature actually said that the measurements, the HASL measurements if you will, began in 1948. And so that was the original basis upon which we made this finding.

Now as Sam has explained, that is kind of moot because rather than relying on some of the basic information sources,

particularly Harris and Kingsley, they have circumvented that with the approach that Sam described.

So in point of fact, the question as to when TBD-6000 data, the background data that underlies the document, began to be accumulated is still unresolved. But the NIOSH approach as I said, bypasses establishing that date.

CHAIRMAN ZIEMER: You make a good point. NIOSH, any comments?

DR. GLOVER: I agree, I appreciate that Bill. And I did want to mention the upper on the Kingsley document, if you look at that upper rolling mill data. That 13,700, that is directly from the first Simonds Saw and Steel, October 1948 HASL air monitoring data.

And so I would contend that, that data goes all the way back into '48, when they started doing studies.

MR. THURBER: Great. I'm glad

that you have pin pointed that. I think that's important to all the uses of TBD-6000. And I'm glad you were able to make that correlation.

I mean, our initial finding was that, that needed to be looked into further. And I'm glad to hear that you did find some positive correlation that fixes the date for the Harris and Kingsley data. That's great.

DR. MAURO: Let me second that because I think it's important. Not so much here, but TBD-6000. Now Paul --

CHAIRMAN ZIEMER: What?

DR. MAURO: –- as you know we have been, this is John, you know TBD-6000 has been well reviewed and is the rock we're standing on for lots of these facilities. And there has been the general sense, and this is sort of something that I was not aware of until now.

That you know, when you look at Harris and Kingsley. That's the one that

deals with it, now of course Christofano and Harris, because sometimes there's a confusion.

When you look at Harris and Kingsley, and look at all the great data that is the foundation upon which TBD-6000 is based, one of the things Bill and I, and Bill alerted me to this also.

He said, gee, when you look at that, I don't really know when it starts. We've sort of been walking around with the sense that it's 1948.

Because that's when Christofano and Harris cites, which deals with conversion and chemistry. But you know, not too sure about when a good starting point is for, you know, Harris and Kingsley, TBD-6000 for metal working.

And I have to, Sam thank you, pointing us into the direction that is Simonds Saw data, which is part of the foundation of all this is a 1948 data set

relative to machining, grinding, rolling and I think that further reinforces our understanding and use of TBD-6000.

CHAIRMAN ZIEMER: So pleased, thank you, good point, John. And thanks for reinforcing that. I think with the finding and the response there, are important to us.

Issue 4 is another correction on the table. It has to do with table 7-1. And the units. Let's see. SC&A first, any amplification of that?

MR. THURBER: Not really.

CHAIRMAN ZIEMER: Okay. NIOSH.

DR. GLOVER: I just want to say, I know we do appreciate that he caught those. They were wrong. Issue 5 is the same typographical error.

CHAIRMAN ZIEMER: Right.

DR. GLOVER: And we made those, in the addendum we have officially corrected them on the record. So that they're out, they're truly in this addendum so that they

have been officially corrected and not just out there incorrect.

CHAIRMAN ZIEMER: Okay, very good. And then let's look at Issue 6, which has to do with the, how prescriptive TBD-6000 is for dose reconstruction. SC&A, you want to clarify that any further?

MR. THURBER: Well I mean this is a kind of comment that we often have made in the past. Basically we agree that the TBD-6000 is a source to do the dose reconstructions.

But we would like to understand responsibly specifically how you're going to apply it? Because there are obviously a number of options as to how the document can be used in dose reconstruction.

And we've as we say, on several occasions we've said that we'd like to hear a little bit more about just how you're going to do it.

CHAIRMAN ZIEMER: Okay, let me

ask this question. A part of this issue had to do with the pit burning, and we resolved that previously.

MR. THURBER: Right, that part I'm satisfied. Yes.

CHAIRMAN ZIEMER: That part is clear, but then the general sufficiency of TBD-6000 is kind of a broader issue than Joslyn is it not? And I think you're asking that in more of a genetic sense. Is that correct?

MR. THURBER: That's true. And I suspect from what Sam said, that, that, there may have been some further comment on that in this, the document that is in the works.

DR. MAURO: Can I, this is John again. I just want to help out. I guess my recollection is, when you implement TBD-6000, it's a very large matrix. And you have choices regarding categories of workers, job categories, things like that.

And there are, and really his question was, if you, my understanding of this issue is that we're not really, it's not really clear what particular job category is going to be adopted, you know, in TBD-6000?

You know, and the time, how much time? I know that you have your concentrations and your exposures et cetera, but of course embedded in that are questions, okay now when you apply it to Joslyn's, so it's not generic really.

Is that as you apply it to Joslyn, are there any questions regarding a duration of exposure for each category? That sort of thing? Am I correct that, that's the nature of this Issue 6?

I guess this first a question to Bill, I'm sorry. Something that we could have talked about earlier but I wasn't available. Is that what's at play here?

CHAIRMAN ZIEMER: Bill, can you

answer that?

MR. THURBER: I think you need to go back to our report from which this Issues Matrix was derived. And in there we provided a description, a much more detailed description about exactly what we're talking about.

CHAIRMAN ZIEMER: Okay, well again I'm trying to determine whether you need to close this issue specifically for Joslyn, or if it's a broader issue?

I mean, you understand what I'm saying? It seems, there seems to be a genetic portion to it, asking for the extent to which TBD-6000 is prescriptive?

DR. NETON: Paul, this is Jim. I don't think that's the case here. I think what they're saying is, you need to describe in more detail how you're applying TBD-6000.

MR. THURBER: Yes, it's your job to --

(Simultaneous speaking.)

MR. THURBER: -- kind of things about whether you assume the 95th percentile, or the geometric mean and the full distribution, and --

DR. NETON: And what you do on non-rolling days, that sort of thing.

MR. THURBER: And how to treat the non-rolling days, it --

DR. NETON: But Sam, I suspect that we've addressed this in this White Paper. Is that not correct?

DR. GLOVER: That is correct and we've left in rolling and cleaning.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: Yes, that's what we're waiting to see though, right?

DR. GLOVER: Yes.

DR. MAURO: Jim, a couple quick questions. Will you be working with a upper bound centerless grinding? I think you said you would be.

In other words are you operating,

when you make your choice, what I think I heard you say, is that you are going to be picking the upper end of the distribution of airborne dust floating, for example. That come off the Matrix in TBD-6000 with the --

(Simultaneous speaking.)

DR. MAURO: –- the data line.

DR. GLOVER: The White Paper describes both the rolling and the machining operations.

DR. MAURO: Okay.

DR. GLOVER: So you know, it's descriptive. In this case it only does the post, because in SEC the standard practice is they start from July of '48.

DR. MAURO: Right.

DR. GLOVER: If you look at how, you know, Dave Allen, there's, the cases have been done. We got a large number of cases that came in.

And if you look what Dave did, he took the rolling operator and assigned a

geometric mean at 12th, you know, on the days afterwards, up until that point for the external exposure loads.

It's at that machining operations, external even for the, in the SEC. There is a slight new revision to that because they didn't include the, dose from metal left onsite. We've included that in this, was part of our original dose reconstruction to the Board.

And David actually come up with a method for doing external dose for thorium rods. Again in the SEC time frame.

DR. MAURO: Oh, okay.

DR. GLOVER: So he's including that. And so essentially John, the machining operations is what's going to be used.

DR. MAURO: Which is abound, it turns out that is I believe, at least for internal, that's bounded if I remember correctly.

DR. GLOVER: Yes, the centerless grinding is the worst case, pretty much. I think if you see, when we take this and we do the implementation. You go and you look at our cases, then you're going to see a bounding approach was applied.

DR. MAURO: Thank you.

CHAIRMAN ZIEMER: Thanks for that clarification. It seems to me though, that SC&A is going to want to see that actual White Paper before they kind of give their final a, view on this. Is that correct, SC&A?

DR. MAURO: I know I would. Yes, just to see how it all closes out, right. You know, it sounds to me that this, we're in agreement in principal.

And what I'm hearing is that, yes, sounds like you're taking the task and implementing TBD-6000 in a way that's certainly is claimant favorable. But I think it's appropriate for us to actually

see that White Paper and maybe later on, look at a few cases.

CHAIRMAN ZIEMER: This particular one is going to have to remain in progress here, it looks like. What's the time frame on that White Paper, do we know?

DR. GLOVER: It's in review, DOE has it, we're just waiting for it come back from Classification Review.

CHAIRMAN ZIEMER: Right, right. So that may or may not be imminent. We'll have to wait and see I guess.

MEMBER MUNN: What's been our recent experience on that? On review time for DOE?

CHAIRMAN ZIEMER: Yes, has that changed with the sequestration?

MR. RUTHERFORD: Paul, this is LaVon. Yes, we have, we did have longer review periods from the September to December periods.

However, I think that based on

discussions I'm hearing at least is that funds are opening up and they should be able to get those reviews completed fairly quick.

And it'd be, KCP evaluation, Kansas City Plant Evaluation Report went through pretty quick. The Joslyn ER Addendum went through pretty quick, so I think they'll be more standard review periods in it, from this point.

CHAIRMAN ZIEMER: Is it likely we'll have anything prior to the next Board meeting, which is coming up quickly?

MR. RUTHERFORD: Yes.

DR. GLOVER: I think so too, Paul. They turned the addendum around in about six days. So the more, a pretty focused issue, we've asked for a five day turn around as a, you know, requested an expedited review. And so I would expect that, that's going to be back with us very quickly.

CHAIRMAN ZIEMER: Very good.

Okay.

MEMBER BEACH: Well, Paul, this is Josie. This is Josie, the other part of that, SC&A may want to look at a couple of cases after reviewing that White Paper is what I heard from John.

DR. MAURO: Is there a PER? Specifically for Joslyn, where you're going to revisit some cases that were done? Or is that not necessary here?

MEMBER MUNN: I'm not aware of it.

DR. GLOVER: It wouldn't happen yet.

CHAIRMAN ZIEMER: I don't think there would be, there's not a PER yet. There wouldn't be, would there?

MEMBER MUNN: Why would there be?

DR. GLOVER: Well, eventually there would be John, it just hasn't gone through, I'm sorry.

MEMBER MUNN: Well you look --

DR. NETON: That comes after the fact. After we make these changes.

DR. MAURO: Right. Right, well I guess that's a question really, what I'm hearing is, we're going to have a revision. But basically you don't have a Site Profile, you've got an SEC Petition Evaluation Report. I believe that's the case.

And in that is your protocol, with this White Paper, which will be a little more explicit in how you're going to do those reconstructions.

For both, you know, for covered and non-covered people, claimants. And there, I presume, there are a number of cases that have already been, DRs performed.

If not, then it becomes a moot point. But if there are, and they have been denied under the old paradigm, then wouldn't it be correct that with this new paradigm, a PER would be triggered, eventually?

DR. NETON: Yes, that's right,

John. But I think right now, we need to be careful, we're getting off into sort of Site Profile Review Issues.

DR. MAURO: You're absolutely right. You're absolutely right.

DR. NETON: And I think it would benefit us to focus on, and dispensing with any SEC issues first, and we could close the book on this Petition.

DR. MAURO: Okay.

DR. NETON: And then, you know, then certainly the Site Profile type things will follow, but, because otherwise we'll leave this thing open until we nail every, you know, every finding.

MR. KATZ: Right, and so, this is Ted. So the question on the table, I think, right now should be, does SC&A need to review the White Paper to close the book on the SEC issues? Or is that a Site Profile related review?

DR. MAURO: Could I take a shot

at that?

MR. KATZ: Yes, please do.

DR. MAURO: I would say, really we're interested in seeing, we know it can be implemented. In other words, we have no doubt that TBD-6000 if used appropriately as applied to this site, that you can place plausible upper bound. It depends on how you implement TBD-6000. So in my opinion, we're dealing with a Site Profile issue, not an SEC issue.

MR. KATZ: Okay, thanks, John. And then just to be clear, I mean when this paper comes out, John, just consider yourself tasked to review that.

DR. MAURO: Thank you.

MR. KATZ: Thanks.

CHAIRMAN ZIEMER: Right, and as we've done in many other cases, the Site Profile issues don't have to be closed prior to action on SEC.

MR. KATZ: Right. Correct.

CHAIRMAN ZIEMER: Okay. Any other comments on this particular issue? Okay. Issue 7, Uncertainty In Air Concentrations. This one's fairly straight forward in terms of the finding.

To address uncertainty, as to whether air concentrations are dependent upon production rates, NIOSH should consider using the 95th percentile values in TBD-6000 to reconstruct doses.

This is similar to comments that have come up in other situations. SC&A, any other comments on that?

MR. THURBER: Well, I think that this comment was in part, based upon the fact that there was this very intense period of rolling activity in the first half of 1948, that Sam described.

Given the fact that the recommendation is to include that period within the SEC cohort, kind of makes this finding moot.

Because it was, it was made to provide some comfort that the very high activity that might not have been normally captured, you were sure to capture it. That was the point.

CHAIRMAN ZIEMER: Okay. NIOSH any comments? It sounds like this one we would be able to close as well, as it's considered moot by SC&A.

MR. THURBER: Yes, I would think that the approach of using the full distribution for the remaining period in those reconstructions, given the operations are again, as Sam described them in that, the post '49 through '52 period basically as being kind of modest is not unreasonable at all.

DR. MAURO: I'll second that, this is John. I think Issue 7 becomes moot by the fact that you have extended the period to cover the time period where we were a little concerned. So we could

withdraw this in light of what we just heard.

CHAIRMAN ZIEMER: Okay, I'm going to deal with these all at one time. The Issue 8, we already dealt with and have resolved. So we'll be able to close that issue.

Nine is sort of simple, it would strengthen the report if the basis for the 90 percent coverage of the uranium source term was documented.

MR. THURBER: That was just, it was a statement of fact without a reference, that was made. And we said, please just tell us where the number came from.

CHAIRMAN ZIEMER: NIOSH, is that something we can do readily? It almost doesn't sound like a finding, where it says it would strengthen the report.

DR. GLOVER: So our intent really was just to say basically that 90 percent of the uranium, the activities were done in

just a few days, or under this, processes. And so we actually have a response to it.

It's, intended statements to indicate the bulk of the materials processed at Joslyn can be described by a limited number of activities.

A more fully detailed list is in these references, where you would in it provide the SRV documents. Measure rolling centerless, grinding activities included, 166,000 pounds in 1943 and '44. 206,000 pounds in '45, and then the 660,000 pounds in the '48 time frame.

So if you add those very few things up, that is a million pounds of material. And so we're just saying that for just a, most of the activity is related, that material on site was associated with just the rolling and machining of the uranium.

So we weren't trying to be too -- it could do too much with that phase. It

was probably just more clear when we said it, what we were trying to get to.

MR. THURBER: Yes, as I say, it was just a matter of clarification. It's a weak finding at best.

CHAIRMAN ZIEMER: Okay.

DR. MAURO: Clearly not an SEC issue.

MR. THURBER: No, clearly not.

CHAIRMAN ZIEMER: Okay. My question is, are we satisfied that we'll be able to close that, based on that kind of explanation?

MR. THURBER: I am.

DR. MAURO: Me too.

CHAIRMAN ZIEMER: Yes. Thank you. Issue 10. Need for Revised External Exposure Assumptions. SC&A comments first or clarifications?

MR. THURBER: I don't. Well we had in our report, we had a number of comments. We, the NIOSH report said that

there was, it was assumed there was 95 days of centerless grinding. And we felt that a, some documentation of the basis for that assumption was required.

NIOSH assumed that the centerless grinding work would go forward contemporaneously with the rolling work. And we felt that, that might understate the total exposure time because the, it's certainly possible that the centerless grinding work would be done after the uranium rolling.

We had some comments about the fact that the 50 percent of the uranium processing occurred in '48. Now that's kind of been talked about and addressed with the new, with the proposed change to the SEC.

And we thought that the, that the way that the monthly production rate was calculated, needed to be reconsidered. And because it was in large measure based on that spike in the first half of 1948.

So those are some of the kinds of things that we felt needed to be clarified and that's what was behind our findings, Sam.

CHAIRMAN ZIEMER: Well there is a mix of things you had. You had some issues on the units used, millirem versus --

MR. THURBER: Right.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: The, this is external exposure in '48, early part of '48 and I, let's see, external exposure, NIOSH says they're still going to do it even in the early periods if needed. NIOSH, what's your response on this one?

DR. GLOVER: Yes, Paul, this one is tied up with, you know, because it's sort of that, one of the details of dose reconstruction. So we bundled 6 and 10 together. Because it seemed to be, you know, they're sort of tied.

I think we did try to do our best

job to estimate how many roll, machining days. Hanford actually tells you how many days they were onsite.

If you go to their monthly reports, they provide, and they were rolling a day, maybe two shifts of two eight hour days, they were there to get this done.

And so a guy didn't roll and machine, so seemed to us, that to do it, to calculate the external dose if we provided them, you know, the appropriate number of hours per day at the machining rate, that we had done an appropriate amount.

We recognize that a calendar day may represent two shifts of work, it just wasn't the same guy.

And in those documentation, they ran for, in 1944, they ran 16 or 18 days of 16 hours a day, centerless grinding, to get done the first loadings for the Hanford reactors.

They documented very clearly, so

you can see when Hanford's onsite. You know, the guy right in his reports, we ran the centerless grinders 16 hours a day, non-stop.

MR. THURBER: This is, help me Sam, this is new information that you have developed since the original, since your original report. Is that true?

DR. GLOVER: Yes, some of the things were captured by us as we went down to Oak Ridge, and pulling excerpts from their records. So I think probably it was always our concept that you know, that was the number of days.

And how we, as far the, where I'm finding this new information, I certainly have done a lot of looking in the last year to understand the operation, so you may consider it new, Bill.

MR. THURBER: Okay.

DR. MAURO: And this is all implementation issues, how you --

MR. THURBER: Yes, it's implementation, but it's good that there is, that there has been some additional information distilled from all these resources to help clarify some of this stuff.

CHAIRMAN ZIEMER: Okay. So NIOSH, you going to provide that information? Is this going to be included in the White Paper or is this separate? You talked about tying this to Issue 6.

DR. GLOVER: I think they'll be able to see whether they feel we've implemented their suggestions about the number of days. Again I think that's an implementation. We've bundled 6 and 10 together though Paul, yes.

CHAIRMAN ZIEMER: Okay, very good, that's it. So we'll leave this one open then.

DR. MAURO: This John, I'd like to ask a question, and I could certainly use

a little help from Bill on this. I recall in the past, in looking at the TBD-6000 lookup tables, where they give you these exposures for different, external exposures now, the different categories of machining, so forth.

And the last sentence, or last couple of sentences in this item, Issue 10 has to do with, the labeling of the columns in TBD-6000 as to whether they're millirem per year, or milliR per year?

And Bill help me out if I got this wrong, but is it our understanding, maybe those columns are mis-labeled? And it could be significant on how you convert?

MR. THURBER: That's what's the end of this findings, suggests.

DR. MAURO: Yes.

MR. THURBER: Is that they should be labeled, that we thought they were incorrectly labeled as mR per year. When they should have been millirem per year

based on how the data in those tables was arrived at.

DR. MAURO: Yes, and I think that this might actually be a situation where if you're labeling them as mR per year, in the Matrix Tables of 6000. And then if you use, and then if you, okay so now you're about to, say calculate the dose to a person's liver.

And you go to the OCAS-IG-001 their conversion factors, if you go from mR per year, to organ dose as opposed to go to, let's say, to a millirem per year organ dose, you're going to overestimate the dose.

I think that's, so in other words what I'm getting at is, could you take a look at that? It's unfortunately it is a TBD-6000 issue.

And Paul, I'm sorry to raise this now, but I guess we do have some question whether or not there needs to be some consideration of, are those columns properly

labeled?

And because they may end up resulting in an overestimate, which is I guess you know, anyway, Bill, am I --

MR. THURBER: Well I mean that's basically the question that we posed in the finding.

DR. MAURO: Yes, and I agree.

MR. THURBER: Is this table properly labeled or not?

DR. MAURO: Yes, and it's a TBD-6000 question is actually what it comes down to. And I'd like to see, because I think we came across this not only in the, did we bring this up in the TBD-6000 review, or did this come out as a result of looking at some cases?

MEMBER MUNN: Well, I've heard it discussed, I guess it was in the TBD-6000 review.

DR. MAURO: Okay.

MEMBER MUNN: Because this is not

the first time this has risen to the fore. And it's always a question of, you know, what kind of badge, what kind of dose? And whether or not you're dealing solely with gamma. But right.

DR. NETON: This is Jim, I don't recall there being an open finding on TBD-6000.

DR. MAURO: I agree with you, Jim. And that's why --

CHAIRMAN ZIEMER: There wasn't. There wasn't Jim --

MEMBER MUNN: No, I think it was well resolved. That's why I was saying, I feel quite sure we've addressed it before. I just don't remember where or what the outcome was.

CHAIRMAN ZIEMER: Yes, it's an interesting question because some of us determined where the data was originally generated. If it’s the '48 data, and the user of that has it right, because the rem

didn't really exist then, as a unit.

If you go back to '48, it hadn't been defined as far as I know. The rem really didn't come into use until sometime in the '50s.

They were using other things in those days. But yes, but I think the question's an interesting one, is given that even the original information that had, in terms of mR, you can figure out conversions for that depending on the situation.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: -- for the most part, tissue for gammas, your rems and rads, and roentgens are all very close within about seven percent, but anyway.

DR. MAURO: Well, it has to do with when you get to the point where you've picked the number.

CHAIRMAN ZIEMER: Right.

DR. MAURO: Then you look up a dose conversion factor.

CHAIRMAN ZIEMER: Exactly.

DR. MAURO: They're quite different depending on if you look at the mR per hour, or the Hp(10) number.

CHAIRMAN ZIEMER: Right.

DR. MAURO: Yes, right now there's a little, I think, at least in my mind, maybe right or wrong, we do have some question regarding, you know, what does that column really mean?

It may be labeled MR, but maybe really isn't millirem. I mean I, or the reverse. I'm not sure.

CHAIRMAN ZIEMER: Right.

DR. MAURO: I remember this coming up. It would be nice to put this to bed.

CHAIRMAN ZIEMER: Right, well we'll leave this issue open in any event, and try to clarify that as we go forward.

DR. MAURO: I want to be fair. I don't think it's an SEC issue. I just, you

see --

CHAIRMAN ZIEMER: No.

DR. MAURO: I guess we've got to get this clarified?

CHAIRMAN ZIEMER: Right, right. Okay, let's move on to the last one. Issue 11, Documentation of Thorium Hazard Sources. NIOSH should document the sources of information they propose to use regarding the relative radiological hazard from thorium.

MR. THURBER: Right, and what NIOSH said in their report was that they had information on the radiological hazards associated with the thorium, relative to uranium, and all we were saying is fine, tell us what those, what that information is.

How you going to do it? How you going to use uranium information to characterize thorium exposures, so it's just a, again not an SEC question, but an area

where some additional --

CHAIRMAN ZIEMER: Right.

MR. THURBER: -- technical input should be included.

MEMBER BEACH: Paul, this is Josie. There was quite a discussion back and forth between SC&A and NIOSH on this in an email. And basically I thought the bottom line was that, there wasn't anything addressed in TBD-6000 for thorium, and --

CHAIRMAN ZIEMER: That's true. Well this again, may be site specific as well I think. Are you asking this, you're asking this for Joslyn, right?

MEMBER BEACH: Of course, yes.

MR. THURBER: Yes.

DR. GLOVER: So Paul, what Dave did, since this is in the SEC time frame, I will apologize the White Paper just the format, the way we do business is that it addresses from after the SEC forward. So it's not going to talk about thorium.

When you get into our actual implementation for the entire period, what sort of comes after this, you know, it resolved.

Dave has already come up with an implemented, a five day basis, two and a half days for each year of exposure to these rods. He used an MCNP model to ratio the rates, the exposure rates from, the dose rates from TBD-6000 for metal operations.

And roughly a whole body dose is about 52 millirem per year for this, this is 11 rods in two years total that were run.

Five days, gives them five days of exposure for 11 rods, there were, it's about 150, maybe 200 pounds of thorium total. Looking at about 52 millirem per year in '46 and '47.

Hands and arms, 121 millirad per year, and other none skin with 16 millirad per year. I'm just reading off of the values that he generated for implementing

this on existing dose reconstruction.

If you look in the existing DRs, this was POW, they've been done. We've had 57 cases done. So we did, we're responsive, he did come up with a methodology for that. And I think I put it in the folder.

DR. MAURO: He did try to, I'd like to say that this is very much important, Site Profile issue. To see exactly how, it's clearly, it cannot be an SEC issue because what this is, if the SEC, the thorium activities occurred during the SEC period as I understand it.

So the fact that, nevertheless you've elected, so it doesn't affect the decision on the SEC, but nevertheless you've elected to say listen, we're going to do our best to assign some thorium exposures because, externally now, I understand, externally.

And yes, we'd be very interested in looking at that part of your Site Profile

protocol in your White Paper, to see how you came at the problem.

CHAIRMAN ZIEMER: SC&A hasn't seen that information yet that's in there, in the files, right?

DR. GLOVER: It will not be unfortunately addressed in the White Paper because it's already in the SEC --

CHAIRMAN ZIEMER: No. No.

DR. GLOVER: -- time frame. But we do have files that support this and so we can share those, and, absolutely.

CHAIRMAN ZIEMER: Yes, so this is not a SEC issue at that point, but it will remain open. Okay, I'm going to ask for a formal motion to close all but Issues 6, 10, and 11 unless there's further discussion first.

MEMBER MUNN: This is Wanda, I'm glad to so move.

MEMBER BEACH: I'll second it, Paul.

CHAIRMAN ZIEMER: So Wanda moves, and Josie seconds that we close all the Issues except Issue 6, 10, and 11 on the Issues Matrix. Work Group Members, quick vote, Wanda?

MEMBER MUNN: Yes.

CHAIRMAN ZIEMER: Josie?

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: Paul, yes. Okay, we're recommending closure of those issues, the others will remain open. But we've agreed that they are not SEC issues any longer. And they have to do with the implementation of dose reconstructions.

Starts with dose reconstructions for the early years and dose reconstructions for, the time period following July 31st, '48.

And okay, now I think we're ready for our recommendation on the NIOSH proposal

to add seven months to the SEC Class, that the seven months would be January 1st, '48 through July 31st, '48.

MEMBER BEACH: Paul, this is Josie. I'd like to make that motion.

CHAIRMAN ZIEMER: Thank you, second?

MEMBER MUNN: So, I'll second.

CHAIRMAN ZIEMER: Any discussion?

(No response.)

CHAIRMAN ZIEMER: And then I'll call for votes. Wanda?

MEMBER MUNN: Aye.

CHAIRMAN ZIEMER: Josie?

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: Ziemer, yes. We will recommend to the Board that seven months be added to the SEC Class. Now preparing for the January Board meeting.

I think Sam, we'd like you to

present basically the information that you presented today.

And then I would follow that with the recommendation of the Work Group on, and also I think I would summarize where we are on the Findings and Matrix.

And Members, Work Group Members do you have any further suggestions on the presentation to the Board?

MEMBER MUNN: No, I think that's appropriate, Paul.

MEMBER BEACH: I do too, Paul. One request I would have is that SC&A if possible, would update the Issues Matrix to combine all the information.

CHAIRMAN ZIEMER: Yes, we need to add the SEC, or the NIOSH comments to the Matrix now, and then we can show the closure actions. SC&A can you take care of that in the near future?

MR. THURBER: As soon as we get the White Paper, yes. And the information

on the thorium that Sam described.

CHAIRMAN ZIEMER: Right. Okay, thank you.

MR. KATZ: Right, this is Ted. Just, and to be clear as sort of implied by what Bill just said.

I mean, you might as well ask SC&A when you're updating it, include whatever, your follow on analyses that were attached today too, if you can, if the timing works, you might as well include those too, like on the thorium.

MR. THURBER: Okay.

MR. KATZ: Yes. Paul, I just want to get a little bit of clarity though, your motion was to add the seven months, but you didn't speak to the remaining part of the SEC Class. I mean petition specifically, so I think you need to address that specifically.

CHAIRMAN ZIEMER: Well that, right. We can have a separate motion on

that probably right now.

And then the issue would be, whether to recommend to the Board that the remainder of the period be, I guess I'd use the word, denied, because it was in the original review by NIOSH for the rest of the years.

And then they have indicated that from August '48 on, that they can reconstruct dose. Now one, we can make that determination now, or we can wait until we get the White Paper and hold it open as we did last time.

MR. KATZ: I mean right, but you've made the determination that what's remaining is not, there are no SEC issues remaining here, dependent on that White Paper.

CHAIRMAN ZIEMER: Right. I think that's what we established but everything in the White Paper's going to deal with, it's basically none SEC because, SC&A and NIOSH

had both agreed that they can reconstruct dose for that period.

MEMBER MUNN: Yes, now I'm confused. I had thought our motion was to accept the previously identified time period and include the additional seven months?

MR. KATZ: Wanda, that is what the motion was. But the petition --

(Simultaneous speaking.)

MR. KATZ: -- so you've been silent about what happens after '48 to the rest of the petition.

MEMBER MUNN: Oh, all right. Yes, it should be --

CHAIRMAN ZIEMER: Yes, recall that when we took the original action, and the Board for the SEC, we in fact left the rest of the time period open.

I think at the request of NIOSH since they were still looking at the later period. Now they, I don't know if you --

MR. KATZ: I don't think that --

CHAIRMAN ZIEMER: -- completely recommended this Sam, but the implication was that you are recommending that, or you are stating now that you can reconstruct dose beyond July, from August '48 onward.

DR. NETON: Paul, this is Jim. I think our original recommendation was that we could do everything past 19, past the middle of '47.

We were pretty definitive in that regard. And then we decided after the fact, to add the six month period, but we didn't leave it open.

I think what happened was the Working Group decided, or the Board decided to turn it over to the Working Group for SC&A to review the remaining time period that was, we were recommending be denied.

MR. KATZ: Right, and Jim --

CHAIRMAN ZIEMER: I believe that's correct. That's correct.

MR. KATZ: I'm sorry I was just

going to say, that to remind Jim I guess, in the Board discussion of this petition, you know, there was some uncertainty on the Board about the remainder of the period, which is why they specifically set it aside to draft a little bit later.

DR. NETON: But our original recommendation was it be denied. We didn't withhold a recommendation at that point.

MR. KATZ: That's correct.

MEMBER BEACH: So then, we need, oh --

CHAIRMAN ZIEMER: Yes, for clarification then we need to take action on the rest of the period. Either to accept what, basically NIOSH has just moved that, the marker from January 1st to July 31st, is how the recommendation is changed. Am I interpreting that correctly, then Jim?

MR. KATZ: That's correct.

CHAIRMAN ZIEMER: Yes. So the rest of action would be to accept the rest

of the recommendation then, which would be from August 1st, '48 for the rest of the period, to extend through --

MEMBER MUNN: December.

CHAIRMAN ZIEMER: –- NIOSH's recommendation that they can reconstruct dose.

MEMBER MUNN: Well it's my personal opinion that our discussion ought to clarify that, but just for the record, if it's felt that it's needed I'm glad to specify that.

We move that the entire recommendation by NIOSH be accepted, including the fact that following July 30th, I mean July 31st, 1948, it is assumed that dose reconstructions are possible to be completed.

CHAIRMAN ZIEMER: Thank you. Second.

MEMBER BEACH: I guess, this is Josie, I'll second that.

CHAIRMAN ZIEMER: Okay, any discussion?

MEMBER BEACH: I do have one question for SC&A. Are they comfortable that there's no outstanding SEC issues during that August 1st, 1948 through December 31st, 1952 time period? I guess that's for John.

DR. MAURO: Yes, this is John Mauro. I agree.

MEMBER BEACH: Okay.

DR. MAURO: I cannot see any reason why they cannot reconstruct doses using TBD-6000 and of course using it, you know, in a claimant favorable way.

I cannot envision under any circumstances, unless some new information emerges that we're not aware of, that based on everything we have in front of us, certainly doses can be reconstructed, you know, from the time periods we just discussed.

MEMBER BEACH: Thank you, John.

CHAIRMAN ZIEMER: Any more discussion? Okay. Let's formally vote on it so it's in the record. Wanda?

MEMBER MUNN: Yes.

CHAIRMAN ZIEMER: Josie?

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: Ziemer, yes. Okay, motion carries. I think, so at the meeting we'll have Sam present the --

DR. NETON: Dr. Ziemer, just a point of clarification, I'm going to be presenting for Sam at the meeting.

CHAIRMAN ZIEMER: Oh, okay. Thank you. Jim Neton will present. And then I will summarize the recommendation of the Work Group, and also review the status of the Finding Matrix. Ted, will that cover it for us?

MR. KATZ: Yes, that's perfect.

CHAIRMAN ZIEMER: Okay, very good. Let's move on in our agenda to the next item, which is General Steel Industries. And we have a number of documents that have been distributed and are on the website as well.

And we're going to begin with SC&A review of the calculations for external exposures. And I think we have read a memo from SC&A, from Bob Anigstein and John Mauro. And Bob are you going to go through that for us?

DR. ANIGSTEIN: Will do. There is a, okay, I just put up my briefing, can everybody see it, is that visible on Live Meeting?

DR. MAURO: Yes, Bob I don't see it. I'm still looking at the slide.

MEMBER BEACH: I see it, Bob.

DR. MAURO: You have it, yes.

MEMBER BEACH: Yes.

MR. KATZ: Yes, I see it too.

DR. ANIGSTEIN: Okay. Are you using --

MEMBER BEACH: It's large, it's large.

MR. KATZ: You just have to shrink it, Bob.

DR. ANIGSTEIN: Oh, just a second, hold on.

CHAIRMAN ZIEMER: Yes, it is very large.

DR. MAURO: Oh, yes. There it is, okay.

DR. ANIGSTEIN: How is this?

CHAIRMAN ZIEMER: Better.

MR. KATZ: But smaller. You need to --

DR. ANIGSTEIN: I mean is it, okay, let me just get the Title Page. Okay, now is this visible, or should I shrink it?

(Simultaneous speaking.)

MEMBER BEACH: Some of it runs off, you might want to --

DR. ANIGSTEIN: Hold it, okay, wait a second, I can go, how is this?

MR. KATZ: That's better.

DR. ANIGSTEIN: You see it completely, or should I go --

MEMBER BEACH: Yes, no that's fine.

MR. KATZ: Okay, thank you, Bob.

DR. ANIGSTEIN: Okay, so we, I won't bother with the Title Page. This is, we recalculated, as I explained last time.

We did some of the MCNP runs, and this a complete review of the external doses, excluding the triangular distribution based on the radiography that was done during the years, October, I believe it's on October '52 through 1962.

So that's a settled issue that has been adopted, and so I'm not mentioning that here. So all of these doses are in addition to, or alternative to that set of doses.

There were two things that were settled on, actually three things I should say. One was the external doses, the limiting external exposure during the years as I said, '52 to '62.

The exposure of the administrative personnel during the entire period of AEC operations that were proposed by NIOSH, and was agreed to by SC&A. And those are a limited number of people.

Only those administrative people who are, clearly had administrative jobs and who were not located in the plant area. We're not excluding someone who might have a desk job, but his office is in the plant area. And who did not frequently visit the plant area. So we're, you know, we're agreeing on that.

And then we're also, reached agreement on skin doses from beta, from beta radiation from the steel and the radiated uranium. So those are settled already.

So now we're limited, so this discussion is limited to what's technically called, external exposure to penetrating radiation. So in this case, that includes, that comprises photons and neutrons.

So now the photon exposure, it's already been agreed to, together with NIOSH, is that there is an unconfirmed report, I mean a single report with no further evidence, just an indirect evidence about possible radiation from the betatron apparatus after it shutoff.

We did a very extensive, we hired a special consultant, who was a physicist, accelerator expert, and we could find no physical scientific explanation for that.

But nevertheless we say, well it could have happened, so, and yet it didn't show up on the film badges. And that was when film badges were almost all, M, meaning below 10 mR per week.

So we hypothetically postulated

that if the worker had his back to the apparatus, this is not new by-the-way, I'm just reviewing for completeness.

Had his back to the apparatus, the betatron apparatus, and wore his film badge on his chest, as normally would do a chest or belt, front of the body, then how much dose could his body receive and still have the film badge receive no more than 10 mR?

And we calculated that it could be as much as 26 mR per week, or millirem per week. So we assigned that, I call that hypothetical exposure, the only summary table later.

Now then the neutron exposures were calculated with new calculation. And there were three sources of neutron exposures. One is the betatron operator, betatron operating crew, handled the uranium slices after they had been irradiated.

And you'll have short lived

radionuclides generated. They're sort of process of photo activation of the uranium, also photofission of the uranium, and other and perhaps secondary neutron activation.

Then these are short lived, and everything is gone within five or 10 minutes after the exposure of the uranium.

But since we postulate that the operator could be coming out of the control room, walking quickly through the uranium, he could be there in as little as five seconds, which is just to be claimant favorable, really, it probably would be more like, would be a little longer.

Then there is also neutrons being given off by the uranium while it was being radiographed. Now the operator's in the control room, but the control room walls were really designed to stop photons and they're not as effective against neutrons.

So some neutrons would get through the, and expose the operator in the

control room. And since the badges, the film badges were sensitive to high energy betas, and photons, but were not sensitive to neutrons, we have to calculate the neutrons.

We can't rely on the film badges, to limit neutron exposure. And then also there is some neutron radiation given off during the radiography of steel.

Not as much as during uranium, but the steel also gives off neutrons which are very, very short lived. So handling the steel after radiation, does not give any neutron exposure, but during the actual irradiation, it does.

And also we show, just to clarify how we did that, we drew diagrams, here is a, all of these by-the-way are in the report. So here is just the geometry if anyone is interested, of how we modeled the uranium.

So here's the uranium disk, we

just assumed it's sitting on a table. We don't have any details, so didn't include a table itself in the model. So the table's assumed to be about 39 inches off the floor, it's working height for a work bench.

And the uranium is, you're looking at a cross section of the uranium, so it's four inches thick and about 18 inches high. That's not quite the proportion here, the reason being -- maybe it's correct.

And this is a portion of the betatron, we don't model the entire betatron, but here is the chamber in which you put the, the vacuum chamber in which you have the electron beam coming out.

This is the, several aluminum plates put together on the ion chamber, so we can monitor, ionization chambers that could monitor the beam intensity. And this is the beam flattening cone, so that the, otherwise the beam is very strong in the

middle and weak along the sides.

So here you have aluminum to absorb the sensor and not, and less absorption as it goes inside. So it's rather flattened, to be, make it more uniform.

Then, and oh, these are merely two locations. This is one foot from the uranium, and this is one meter from the uranium. Of course the operator is standing here, after the beam is shut off. But the apparatus is still there, so we left it in place.

And then, this is the same picture only now we are bringing the entire shooting room of the old betatron building, which is where a good portion of the uranium radiography took place.

And in here is the operator behind our one meter, away from the wall, behind the wall in the most exposed position. Directly, exactly in line with

the uranium.

The uranium now is, the betatron itself doesn't give off much in the way of neutrons, but once the beam hits the uranium, the neutrons come off in all directions. And they are hitting the operator here. Those are passed through the wall.

Next we use the picture, and this is not in the current report, it was taken from an earlier report of the new betatron building.

It was taken from those FOIA documents when they were obtained from the Atomic Energy Commission's application.

And the purpose of this is just to show the location of the desk in the control room. It's the new betatron building, but its structure is basically similar.

And here is the MCNP model of the same building, showing the important part of

it, we truncated it into, there's walls out here.

And again, here's the betatron. This time they're radiating this heavy steel casting, that gives you about as much scattering as possible, for this heaviest item that GSI ever made. This is just a portion of it.

And here is the operator sitting at his desk. These would be longer exposures, he presumably would be spending time at his desk.

He may very well, with an hour exposure, leave the control room, there will be a door in this direction where he might leave, and be getting even less exposure. But this seemed to me like a reasonable compromise.

And then the final one. Okay, so here is the doses to the operator. If we presume 26 millirem per week, as this hypothetical upper limit from the betatron

residual operation, this is the neutrons from uranium handling, .5 millirem per shift, for eight hour shift.

We assumed they are like an average of 6., if exposed. Each uranium shot is 75 minutes, now so 60 minutes of, for the radiographic exposure, 15 minutes in between handling.

So if you take the 75 minutes, divided into 480 minutes for a full work day, not even allowing time for lunch, you get 6.4 shift, uranium exposures per shift average.

So this is what he gets from the handling, this is what he gets in the current uranium radiography, this is in the control room, and this is during the radiography of steel per shift.

And then when we add them up, here's where we come up with annual doses. So we don't list any, betatron photons during the first ten years because those

would be superseded by the triangular distribution, which is a much higher dose.

So any dose he gets from, the betatron operator, would be subsumed by that limiting distribution.

So we only list this, since uranium, the use of radium stops in '62, we only list these for '63 through '66, or the middle of '66.

And then the number of shifts on uranium, devoted to uranium, based on the Mallinckrodt purchase orders, we only have it from '58 on.

And these we assume to be the maximum of any 12 month period, which is not actually calendar year, because they continued to issue purchase orders, some of them were like, June 30, July 1st to June 30th of the next year.

So we took the highest 12 month period, and assigned that to this period where we don't have any purchase orders. So

it's a limiting, and this is, I mean NIOSH has already previously agreed to. And then the balance is steel.

So the same worker can't be doing, we're just assuming, again for conservative, the same worker spends all the time allotted to uranium, on uranium, and then the rest of his shift on steel.

So we're presuming to work 30 to 50 hours a year, we get the steel by subtraction of the uranium.

And then the neutron dose is just going to the previous table and multiplying by the number of shifts. Here we have the uranium handling.

Uranium, the radiography of uranium while the worker's in the control room. The balance of the time, the radiography of steel, in the control room. The new betatron, and here we have the total.

So you see by far, the highest

neutron exposure is from the steel. Simply because more time is spent on steel, even though during a given shift, uranium gives off more neutrons.

It penetrates, neutron dose is higher per shift, but because there are many more shifts of steel, the annual dose is higher from the steel.

And then finally we get to the exposure of the layout man. And this is again from an older report because it's already been reviewed.

But I, just for reference purposes, this the new betatron building based on that previous drawing that I showed.

And we modeled two positions of the layout man. On, here is the railroad track, going straight down the center.

So he's, he can't be on the railroad track because he'll be blocking access to the control room. So we assume

he's ten feet to the side of the railroad track.

I put him on both sides, and it turns out that the dose, the photon dose is much higher on this side, than on this side. Because actually, if you were to draw, take a ruler and draw a line, he's actually within, straight line visual of the actual betatron.

In reality, there is a this thin door, which is part of our model, but it is so thin that on this scale, it doesn't show up. But that's essentially, it's almost transparent to high energy protons.

So what happens is the beam from the, the x-ray beam from the betatron goes forward primarily. But it has a little scatter-off at the end. It just it doesn't go to zero. It just trails off as you go further and further from the center.

And it can actually get here. And then the neutron dose, it turns out is

actually higher when he's on this side of the tracks, because the neutron dose, the proton dose comes from the betatron itself, the neutron dose comes from the steel. So he sees more of the steel when he's over here.

But the difference isn't that great, about 12 percent more. And since the photon dose is twice as high, almost twice as high in this position, as in that position, we assign all the, he can't be in two places at once, we assign all the doses from this position.

So and then here is a summary of the exposure of the layout man. So he's also getting dosed, no neutron exposure from radiated steel, because the neutrons die very quickly.

He does get some proton exposure from handling the radiated steel, but it's trivial compared to what he gets directly from the betatron.

So we did the calculation anyway, but it's a very small amount. And he does get some, some neutron exposure and we assume he spends all his regular portion, 6, shifts a year doing this work and this would be his exposure in roentgens per year, nine roentgens per year. And this is the neutron dose in millirem per year.

And this exposure just as a point of reference, this applies only to the years '63 through mid '66, because it's based on the location of the new betatron building. Whereas the new betatron building is right alongside the Number 10 Finishing Building.

This is the door that simply separates the two. And the Number 10 Finishing Building starts right around here. But it wasn't built until '63.

So with the old betatron building, it was about a quarter mile away, and I'm just going by memory, it could be not quite accurate.

From the, what do you call it, machining and finishing buildings, which is where most of the work was done, so there would be no significant exposure from that source.

So, but during that time you do get the exposure to the radium. This will happen as the two are adjacent. At least since NIOSH decided to find an entire year that the radium was in use, even though the radium stopped in the middle of '62, NIOSH said we'll just give it for the entire year.

And the new betatron opened up late in '63, but NIOSH agreed to use it again, for the entire year.

So you have this very convenient adjacent period of '52 through '62, the uranium dominates. And '63 through mid '66 the betatron dominates and the doses are about the same.

Because the mid-point on that triangular distribution is, I think it's at

9.69 something like that. And depending which end point you use, 12 rem for the later years, 15 rem for the earlier years.

On average, it comes out roughly 9R, 9 rem per year. In those days they assumed rem and roentgen were the same, but they're not. That was what the initial AEC regulation said.

So you had a fairly consistent roentgen exposure for this entire period. So that's basically it.

CHAIRMAN ZIEMER: Okay, thanks Bob. Now one of the big issues we had at the last meeting was differences between your calculation and the NIOSH calculation.

And you and Dave Allen were exchanging input files and trying to make sure that you were all doing things the same way for the same for the same model.

I want to get some feedback from Dave now, to clarify where we are in terms of the numbers coming out the same for both

of you, for the same inputs.

MR. ALLEN: Yes, this Dave. Bob sent me his files and we reconciled. I think most of that was done on the beta. On this last round, Bob sent me the files.

It was primarily neutron and some photon. And I think all the assumptions have been discussed in the past, and I was able to reproduce his numbers. So I think we're all on the same page.

CHAIRMAN ZIEMER: Okay, so the numbers that Bob has shown us here today, represent what NIOSH also is using?

MR. ALLEN: Yes. I mean there may be a difference in round-off, you know, with the third decimal point or something, but they are essentially the same numbers. Yes, for what we will be using.

(Pause.)

MR. ALLEN: Did I drop off?

MR. KATZ: No. You're still there.

MR. ALLEN: I'm okay?

MR. KATZ: Paul may have, sometimes Paul has trouble with his phone. Paul, are you still there?

I think he might, whatever, but it's a problem that he has sometimes. I think he's having it right now. But Paul, we can't hear you, you may have gone to mute, or you may have been dropped completely. In which case, he can't hear this.

MEMBER MUNN: Well at least he was able to get back okay last time.

MR. KATZ: Yes, I'm sure he'll get back again, as soon as he --

CHAIRMAN ZIEMER: Can you hear me now?

MR. KATZ: Oh, there. Paul.

CHAIRMAN ZIEMER: Yes, I must have gone to mute and not realized it. Okay, I want to make sure that we're getting the same numbers for the same input, for

each of our components.

So, I think this was the last memo, we had disagreements with, on this, on the external calculation, is that correct?

MR. ALLEN: I think that was correct, yes.

CHAIRMAN ZIEMER: We have agreement in numbers on the internal. And for external, agreement on the models in, with the, we talked last time about the Landauer information and the fact that NIOSH was not going to use the film badge information in the model any more. Is that correct?

MR. ALLEN: That's correct.

CHAIRMAN ZIEMER: Okay. I want to make sure that we're in agreement in terms of --

MR. KATZ: I'm sorry Paul, did you go to mute again, because we can't hear you?

MEMBER MUNN: I thought he was

just thinking a lot.

MR. KATZ: He might be thinking, I don't know.

DR. ANIGSTEIN: Well he stopped in mid-sentence.

MR. KATZ: Paul, you're on mute again.

MEMBER MUNN: Or it's long drafting, one or the two.

MR. KATZ: Yes.

CHAIRMAN ZIEMER: Can you hear me now?

MR. KATZ: There you are, you're back. Okay.

CHAIRMAN ZIEMER: I don't know what happened, it went onto hold. Who knows how these smart phones operate. They're smarter than everybody I guess, or not so smart.

Anyway I wanted to make sure that we're on the same boat, not only with the MCNP outcomes, but also with the functions

used prior to the calculations in terms of all the assumptions about locations and so on.

So I, it appears to me that SC&A now is in agreement with all the assumptions that NIOSH is using. Is that correct?

MR. ALLEN: Yes, this is Dave.

CHAIRMAN ZIEMER: Bob or John?

DR. ANIGSTEIN: I believe, I think that NIOSH has agreed to adopt the SC&A model. Of course we had some discussion back and forth, so it was some compromise. But --

CHAIRMAN ZIEMER: Dave.

MR. ALLEN: Yes, this is Dave.

CHAIRMAN ZIEMER: Okay. Now let me open this part to Board questions. What do you question?

MEMBER MUNN: All of the outstanding issues seem to have been resolved to me. I was able to follow Bob's presentation well. So if that’s acceptable

to NIOSH I have no questions.

CHAIRMAN ZIEMER: Josie or John.

MEMBER BEACH: Yes, Paul, this is Josie. I have no questions either.

CHAIRMAN ZIEMER: And John.

(No response.)

CHAIRMAN ZIEMER: Okay, now I want to go to Appendix BB and we have a very recent update, where basically what was done in the update was just to incorporate the actions from our last meeting into the Matrix. And we have an Appendix BB Matrix, which is dated January 15th.

DR. ANIGSTEIN: Yes.

CHAIRMAN ZIEMER: Actually, it, I guess you updated it again January 14th to include the December actions and yesterday as well to -- apparently you got the minutes from the last meeting. Is that when you went and updated it again?

DR. ANIGSTEIN: That's correct. What the 14th update, I was very cautious

because I didn't want to put words in NIOSH's mouth. I wasn't sure what was exactly, I didn't take, I was too busy participating to take notes.

So then since Ted forwarded the minutes to me yesterday morning, I was able to review it, and I was able to add material.

So nothing from the, so the 16th supersedes the 14th, by just some additional material and actually the email, distributing that, summarized where the changes are so the Board Members wouldn't have to read the whole thing.

They could just focus on the, I gave the page numbers and the location where additional material was added.

So I did my best to summarize the NIOSH input from the last meeting, to the point where every issue now is, either closed, either the old issues that SC&A recommends closure, or they're in progress.

We used that term for anything where we have verbal agreement, or perhaps written agreement, yes we will adopt that model.

But we haven't actually seen a White Paper or seen of course the revised Appendix BB, to see what their actual numbers are, so we consider that in progress.

We don't anticipate any problems, but that's how we labeled it, so, of course the Work Group will make the final decision.

DR. MAURO: Paul, this is John. I'm sorry to interrupt, Bob. Usually when we agree in principle, with, you know, as we are right now, we don't call it in progress.

We actually call it in abeyance. And if course, I leave it to the judgment of the Work Group, whether or not we do have it.

See, usually in progress means we're still debating the issue and we still

have issues to resolve. That's my understanding of the term.

DR. ANIGSTEIN: That's not the way we've been doing in the past. That's not the way Paul has ruled in the past on other issues.

DR. MAURO: Okay, then I --

CHAIRMAN ZIEMER: This is Paul, well let me just clarify. If something's in abeyance, it means that it's been agreed to. For example, in the case of the change in the number of work hours, it hasn't shown up because the revision didn't occur.

So it means that, now, we've all come to an agreement on it, but it has to show up in the revised document. But the issue from the point of view of action is basically closed. That it hasn't, it's going to remain in abeyance until we actually see the change in the final document.

I think that's the same

terminology now that the Procedures Work Group that Wanda heads up is using. Wanda, you can confirm that I think, right?

MEMBER MUNN: That is correct. You've characterized the situation properly, Paul.

CHAIRMAN ZIEMER: Okay, so let's see if we can quickly go through the matrix and see if we have any outstanding issues. And there is a summary of the Issues Matrix in the front end of the document.

On the new document, it is on Pages 8 and 9. And then if you need that for reference. But I'm looking now at the final item, the final status of Issue 1 on Page 12 of the updated matrix.

And it says, in progress, pending NIOSH revision and limiting external exposures and limiting neutron exposures and skin doses during the entire operational period.

And that revision, I believe is

the one we just had this morning, is that not correct?

DR. ANIGSTEIN: I'm sorry, Paul. I didn't follow that.

CHAIRMAN ZIEMER: I'm looking at your last statement on Issue 1.

DR. ANIGSTEIN: Okay. Yeah, I'm just putting that on the screen now. So, Issue 1 is, you're right, in progress pending NIOSH revision of limiting exposures. So, is that how you would characterize it? Or should you --

CHAIRMAN ZIEMER: Well, if NIOSH agrees to that, if NIOSH has agreed, then it goes to -- it'll be in abeyance and we basically that --

DR. ANIGSTEIN: Okay.

CHAIRMAN ZIEMER: I think we heard Dave agree to that.

MR. ALLEN: Yes, this is Dave. We have.

DR. ANIGSTEIN: Very good, I will

update that.

CHAIRMAN ZIEMER: So, that issue -- well, let me ask the Work Group. Do you agree that that issue now is, for action purposes, is closed and goes into abeyance until the revision appears in the revised Appendix BB?

MEMBER MUNN: Correct. Based on what we've heard today, this is currently in abeyance.

MEMBER BEACH: I agree with that, Paul. This is Josie.

CHAIRMAN ZIEMER: John?

MEMBER POSTON: Fine with me.

CHAIRMAN ZIEMER: So, they consider that to be in abeyance, which means that we have closed the action and that the revision has to appear in a revised document. Issue 2, I'm looking at Page 13.

DR. ANIGSTEIN: Top of Page 13.

CHAIRMAN ZIEMER: Top of Page 13, Issue 2. This is the addition of the added

year of covered employment and SC&A recommends now that this issue be closed. Is there agreement that the issue be closed?

MEMBER MUNN: Yes.

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: And I'll say yes, and we'll close Issue 2.

Issue 3: Underestimate of Betatron Beam Intensity. And this issue, NIOSH recommends be closed.

I'm taking each one at a time so we can show action in the minutes. Everybody in agreement? I think I heard Wanda. Josie?

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: And John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: And Ziemer, yes. Okay. Underestimate of Stray Radiation from Betatron. Fairly extensive.

DR. ANIGSTEIN: It ends on Page 7.

CHAIRMAN ZIEMER: I'd like to point out now, on this particular one -- but I'm looking for a page number here. But SEC Issue 2, SEC Issue 6 and SEC Issue 8 have been included in this now. And these were SC&A's items. And in their judgment, and they were SC&A's findings, SC&A believes that SEC Issue 2, SEC Issue 6 and SEC Issue 8 are part of this issue in the matrix. And I'm all the way to the top of 17.

And the status says, “in progress, pending revision by NIOSH of neutron doses to GSI plant workers and external exposures to the layout men.” Again, those are the issues that were agreed upon between NIOSH and SC&A in our earlier discussion here today.

And I guess, SC&A, are you recommending then that this be put in abeyance?

DR. ANIGSTEIN: Correct.

CHAIRMAN ZIEMER: And, NIOSH, do you agree with that?

MR. ALLEN: Yes, this is Dave. We agree.

CHAIRMAN ZIEMER: And Work Group Members?

MEMBER MUNN: Yes, Wanda.

MEMBER BEACH: This is Josie. I think we had a paper from John Ramspott on this issue, if I'm correct?

CHAIRMAN ZIEMER: We have an issue, and for those of you -- and we can still close this from the findings point of view and still deal with John Ramspott's issue, which has to do with the lost neutron source.

MEMBER BEACH: Okay. So then I'm in agreement with putting this in abeyance.

DR. ANIGSTEIN: You mean lost radium source.

CHAIRMAN ZIEMER: Right, I meant

lost radium source. Because that was not part of the finding, per se. We can close the finding and still deal with that issue, is all I'm saying. We're dealing with SC&A's issues right now.

MEMBER BEACH: Okay, I'm in agreement then, Paul, thank you.

CHAIRMAN ZIEMER: And John?

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: Okay.

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel. I'm having trouble following what you just --

CHAIRMAN ZIEMER: Oh, I'm sorry.

DR. MCKEEL: I'm fine up to Issue 3. But I'm not sure what you did with 4, 5, and which one we are on right now.

CHAIRMAN ZIEMER: Oh, we're on 4.

DR. MCKEEL: Ah, okay. Got you.

CHAIRMAN ZIEMER: And I just was pointing out that Number 4 --

DR. MCKEEL: I understand that

includes several SECs, former SEC.

CHAIRMAN ZIEMER: Right, right.

DR. MCKEEL: Okay, I understand that.

CHAIRMAN ZIEMER: Yes, yes.

DR. MCKEEL: Thank you.

CHAIRMAN ZIEMER: Thank you. Issue 5, and I'm looking for a page number here now. Issue 5 also included SEC Issue 3.

And so I want to sort these out as we go because there are going to be questions about, when we transferred to SEC issues, where the SC&A put them, because they're an SC&A finding, so they can put those findings, if they believe it's the same issue, then they have combined them. And --

(Simultaneous speaking.)

MEMBER MUNN: -- 20, Paul.

CHAIRMAN ZIEMER: Pardon me?

MEMBER MUNN: Status is on Page

20.

CHAIRMAN ZIEMER: Yes. So in the latest version, SC&A recommends that this issue be closed.

MEMBER BEACH: Okay, Paul, this is Josie. I thought that that Issue 3 was actually transferred and covered by Issue 11.

CHAIRMAN ZIEMER: Well, you know, it's SC&A's finding and their judgment. I'm looking. I see that they have included it here. Maybe they included it in both, I don't recall. But if you look back on page, let's see. It's the top of Page 20. It says SEC Issue 3.

MEMBER BEACH: Okay.

CHAIRMAN ZIEMER: Is that correct? That's what I'm assuming in the matrix, that it includes SEC Issue 3.

DR. ANIGSTEIN: I guess that was our judgment because the Work Group voted that the issue should be closed and moved to

the Appendix BB Matrix.

And since the Issue 3 was lack of documentation, and since, yeah, let me just go quickly to Issue 11. No, no, Issue 11 is Underestimate of Doses to Other Workers, so that's not the same.

MEMBER BEACH: Okay, this is Josie. I probably just had it noted wrong in my --

CHAIRMAN ZIEMER: We may have originally thought -- I think originally when we transferred these, we thought maybe different ones would go in different places. But it's basically SC&A's call, because it's their findings.

MALE PARTICIPANT: Sure.

CHAIRMAN ZIEMER: Yeah. So that's where they chose to put it. You know, they had the choice of including it with existing findings, they're saying it's different from all them and keeping it separate.

So, anyway, that's where it ended up, and the recommendation is to close this Issue 5.

MEMBER BEACH: I agree.

MEMBER MUNN: I agree.

CHAIRMAN ZIEMER: John, you're okay on that? I'm not hearing John.

MEMBER POSTON: Oh, could you hear me?

CHAIRMAN ZIEMER: Yeah. You okay on this one?

MEMBER POSTON: Yeah, I'm okay.

CHAIRMAN ZIEMER: Okay. And so we will close Issue 5.

Issue 6 includes SEC Issue 9, I'll just point that out. And SC&A is recommending that Issue 6 be closed.

DR. ANIGSTEIN: No, we did not recommend it be closed --

CHAIRMAN ZIEMER: Oh, oh.

(Simultaneous speaking.)

DR. ANIGSTEIN: SEC Issue 9 --

CHAIRMAN ZIEMER: Oh, I'm on 7 --

DR. ANIGSTEIN: -- which is virtually the same, the Work Group voted to have it, agreed to have it transferred to the BB Matrix.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: And basically they're the same. One is Underestimate of Skin Dose, the other is Neglect of Skin Dose. It's not that different.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: And then we said in progress. And I would suggest, based on the other actions, perhaps it should be in abeyance now?

CHAIRMAN ZIEMER: Oh, yeah, actually, I was looking at your previous version, where you recommend that it be closed. Right, this would be -- this is Skin Dose --

(Simultaneous speaking.)

CHAIRMAN ZIEMER: In your

previous version, in the December one, you said to recommend closing. But, no, the current version you say in progress.

But based on the agreement now today, we would be finished with the action and it would go into abeyance, which means that the change has to show up in the document.

That action would be closed, but it would go into abeyance, the way we're acting on these. Josie.

MEMBER MUNN: This is Wanda, I agree.

CHAIRMAN ZIEMER: Wanda, okay.

MEMBER BEACH: Josie, I agree.

CHAIRMAN ZIEMER: And John.

MEMBER POSTON: Agree.

CHAIRMAN ZIEMER: Okay. And I agree.

And then Issue 7 is Betatron Exposures. Issue 7, I'm looking to see if that included any carry-overs. I don't

think it did. And that one SC&A recommended closure.

MEMBER MUNN: We did that quite some time ago, closed.

CHAIRMAN ZIEMER: Right. And it's still showing up here as recommending closure. I thought we had closed it, too.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: Right, in 12, yeah. But just to make sure we had the action recorded, let's reconfirm closure. Wanda.

MEMBER MUNN: Yes, I agree.

CHAIRMAN ZIEMER: Josie. John.

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: Yes, okay.

MEMBER POSTON: Okay.

CHAIRMAN ZIEMER: The Underestimate of Worker Dose is closed. It was closed. In a sense, that's in abeyance also because it has to show up in the final document. We're closed as far as our action

is concerned.

MEMBER MUNN: Yes.

CHAIRMAN ZIEMER: So we don't have to do anything more. That's long since been handled. Mischaracterization of Steel Work Practices.

MEMBER MUNN: The same is true.

CHAIRMAN ZIEMER: SC&A recommends that this action be closed. That was an old one, too. Let's see, is there anything -- that would be truly closed. There's not an abeyance here, is there? Yeah, it does involve revising the model. Let's see, I guess we'll show this in abeyance as the others. Is that agreeable? Wanda?

MEMBER MUNN: Sure.

CHAIRMAN ZIEMER: Josie? John?

MEMBER BEACH: Which one?

CHAIRMAN ZIEMER: This was 9. Again, the times of exposure duration is still going to have to show up in the final document. So --

MEMBER BEACH: Okay, I understand.

CHAIRMAN ZIEMER: Yeah. Even though they recommended closure, I think we'll show it in abeyance, if that's agreeable.

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: And John, okay. Okay, I'm not hearing John again. Are you there, John?

(Simultaneous speaking.)

CHAIRMAN ZIEMER: John, we didn't hear you on that one. But we have Wanda and Josie amenable.

MEMBER POSTON: Paul.

CHAIRMAN ZIEMER: I'm hearing you now, John.

MEMBER POSTON: Okay. I'm having trouble remembering whether I'm on or off.

CHAIRMAN ZIEMER: Right. You're agreeing that 9, we're done with that and it'll go in abeyance.

MEMBER POSTON: Yes, sir.

CHAIRMAN ZIEMER: Okay. Issue 10, let's see. Page 24.

MEMBER MUNN: Again, in abeyance.

CHAIRMAN ZIEMER: Yes, this is the neutron doses. This we just completed, would go in abeyance. Wanda, okay?

MEMBER MUNN: Yes.

CHAIRMAN ZIEMER: And Josie.

MEMBER BEACH: Yes.

CHAIRMAN ZIEMER: And John.

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: And Paul, yes. Issue 11.

(Pause.)

MEMBER MUNN: I believe we essentially closed it last time.

MEMBER BEACH: Yes, I agree. We did, Wanda.

MEMBER MUNN: Yeah.

(Pause.)

MEMBER BEACH: I think we lost

Paul again.

MEMBER MUNN: Sounds like it. Are we out here all alone?

MR. KATZ: No, no, you're there. Like you said, Paul's probably on mute again.

MEMBER BEACH: We need to get phones with large flashing lights on the mute button.

MEMBER POSTON: Well, the guy that talks on my phone, I can't tell the difference between on and off.

MEMBER MUNN: And we need to get a microphone for you.

MEMBER POSTON: When I do *6 and it says mute on, mute off, I can't tell the difference between on and off because it's not clear.

MEMBER MUNN: That's why I said we need a large flashing light on that mute button.

MEMBER POSTON: That would be

really great.

MEMBER MUNN: Yeah.

CHAIRMAN ZIEMER: Okay, I'm back.

MR. KATZ: Welcome back, Paul.

CHAIRMAN ZIEMER: I think my ears were touching something turning this off. Who knows what's happening on these things. Sorry about that.

MR. KATZ: You were on Issue 11. And while you were trying to get back on, the Members were saying that they believe this was closed at the last meeting.

MEMBER MUNN: Page 25.

CHAIRMAN ZIEMER: Right. Right. And, right, 12/10/13 we recommended closure --

DR. ANIGSTEIN: This is Bob. I don't believe it was actually -- I went through the minutes of the last meeting. I don't believe there was an actual decision made to close it.

CHAIRMAN ZIEMER: Okay. Let's

just formalize it. This was the issue of the residual period, was it not?

DR. ANIGSTEIN: No, this is the Underestimate of the Other Workers. It was other than betatron operators --

CHAIRMAN ZIEMER: Oh, oh. Oh wait, I'm looking at 12. We're talking about 11 here.

DR. ANIGSTEIN: Yes, okay. Right.

CHAIRMAN ZIEMER: So I'm looking at the wrong one. Right, okay.

MEMBER MUNN: Talks about admin people.

CHAIRMAN ZIEMER: Right.

MEMBER BEACH: Well, it’s the admin and assigning the most favorable exposures.

CHAIRMAN ZIEMER: Right. The admin people, we had that -- the agreement was that there not only could not have a workstation there, but they couldn't

frequent the active area regularly and they would have to -- that would have to be established. That was all agreed to.

I'm not sure whether this goes in abeyance. Probably does in the same way because it's going to have to show up in the final document that we could close our action on this. Is that agreed?

MEMBER BEACH: Yes. This is Josie. I agree with the abeyance.

MEMBER MUNN: I had thought we could close it.

CHAIRMAN ZIEMER: Well, all of these have to show up in the final document in any event.

MEMBER MUNN: All right, I just --

CHAIRMAN ZIEMER: Our action is -- basically we're done with the action. But it has to show up. And so abeyance will work. You agree with that, John, as well?

MEMBER MUNN: Just add his

instruction to the dose reconstructors?

CHAIRMAN ZIEMER: Right, right. Okay, the next one, that's the residual contamination, surface contamination, resuspension. We agreed to that. And closure was recommended. Again, it would have to go in abeyance, I think, in the same way. Is there agreement on that?

MEMBER MUNN: All right.

MEMBER BEACH: Yes, there is.

CHAIRMAN ZIEMER: And John, okay? We're not hearing you, John.

MEMBER POSTON: Yes.

CHAIRMAN ZIEMER: Okay, we're all okay on that one.

And then 13 was done long ago, the incorrect units. That correction will be made as well. So I think that updates us on the matrix.

DR. ANIGSTEIN: Excuse me, what's the final decision on 13?

CHAIRMAN ZIEMER: Well, that was

done long ago.

DR. ANIGSTEIN: Is that in abeyance or closed?

CHAIRMAN ZIEMER: Well, I --

MEMBER BEACH: In abeyance.

CHAIRMAN ZIEMER: Yes, it's in abeyance in the sense that they have to put the correct units in. They've agreed to that long ago, yeah. Probably in abeyance. All of these things have to show up in the revised Appendix BB.

Now I want to move to the public comments. And I think you've all gotten a number of comments from Dan, and we also have the request from John Ramspott to address the lost radium source. And I think Dan also endorsed that.

I would like to -- I think it's a valid question to ask. And, I don't know, I assume NIOSH and SC&A both got a copy. John, did you copy SC&A and NIOSH on your request?

DR. ANIGSTEIN: I saw all the correspondence.

CHAIRMAN ZIEMER: I'm wondering if any of us have given any thought to how this might be handled? Originally -- let me make some comments here and then I would like to get some other input.

Originally my thought was, well, if someone, as part of their calling, says, you know, I'm the one that took this source or I found it or whatever it was, we could deal with that in an individual way as an incident.

However, John has raised a point which I think is worth considering, that, especially the lost source, and it was characterized, I think even in the news article, as being lost in the plant.

Although, I guess it showed up in somebody's home later, I don't recall that. John, you might be able to clarify. But if it was lost in the plant, how might it be

handled in terms of saying, okay, what do we do during that week where there might have been additional exposure?

DR. ANIGSTEIN: Can I -- this is Bob. Can I comment on that?

CHAIRMAN ZIEMER: Yes.

DR. ANIGSTEIN: The information that -- first, we heard about this and the information that we got from the supervisor who was -- I mean, he was later a supervisor, I believe at that time he was the assistant metallurgist.

But, anyway, he attended this meeting in Collinsville in 2007. And he described the incident, you know, quite plausibly. I think he was -- he forgot it was radium. He referred to it as cobalt.

But other than that, he simply said that the source was missing, they searched the entire plant, you know, using Geiger counters, whatever, most likely.

They thought that maybe it had

just gotten ground up and put into the casting, which of course would be of major concern to them.

And, finally, he clearly described that his senior supervisor or manager, who was also a metallurgist, actually hired an airplane and they flew around the town with a Geiger counter and they found it. They found the location where it was, and they recovered it.

So it was definitely, you know, taken offsite. And then according to the -- that it could have been as long as, I think according to the information from John Ramspott, it could have been as long as a week that it was kept out of the plant.

And then this same account was confirmed by a radiographer, this part-time radiographer who was not employed at the time. He was in the military at the time. But when he came back, he heard the story. And his account was very similar to the

account of the metallurgist/supervisor. So we consider that plausible, believable.

I have to confess that I did have a moment of doubt when we found out that a similar thing happened at the GSI Eddystone plant years earlier and got us thinking, gee, maybe someone just heard about one and the story somehow got transferred to another location. But it turned out, well, apparently it happened twice. Probably it happened other places.

MEMBER MUNN: Yes, Bob, I can attest to the fact that there are similar instances of sources having been lost in transit.

You know, so many of the sources were bounced around in the back of pickups and when they bounced out of their pick-ups, well, from industrial sources.

And I know of at least one other case where a similar kind of airborne surveillance was used to locate a source

that had been lost in the western states in transport from one site to another. So it wasn't uncommon, apparently.

DR. ANIGSTEIN: Yeah. Now, I think what needs to be kept in mind though is we did a little back of the envelope calculation, that this vessel was a 500 milligram or 500 millicuries of radium -- the two units are about the same -- source.

And the rule of thumb, it's actually a calculation that's been around in all the handbooks, at one meter from such a source, you would have an exposure rate of approximately 400 mR per hour.

And so if someone had this source for a week, which would be the upper limit, is it plausible that he would be very near the source the whole time? Could be somewhere in his house, could be someplace. But if you say, just for the sake of argument, he was two meters from it, then the exposure rate would be 100 mR per hour.

And during 168 hour week, we're talking about something like 17 rem, which is almost within the boundary of our triangular distribution which ends at 15 rem.

And this is a really, really, really extreme scenario, 168 hours at two meters, about six feet and two inches away the whole time.

And so in SC&A's opinion, and I think John would agree with that, the rate of triangular distribution would more than likely capture this instance.

CHAIRMAN ZIEMER: My question is, I don't think if it was in somebody's house it's going to count anyway. I think it has to be in the facility, if I'm not mistaken, legally.

But I was looking at this article that John Ramspott distributed, that had indicated that the officials thought it was within the plant, but --

DR. ANIGSTEIN: That was when they first reported it lost. But then it was found. The testimony of two people, the one virtually firsthand, meaning I was working there and my colleague -- I think his name I shouldn't mention -- is the one who went and hired the airplane. So it was very, very clear that it was taken offsite.

CHAIRMAN ZIEMER: So let me ask John Ramspott. John?

MR. RAMSPOTT: Yes, Doctor?

CHAIRMAN ZIEMER: Do you know whether, when it was lost, do you have any additional information beyond the news article that you distributed, that in fact it was outside the plant, then?

MR. RAMSPOTT: Yes, actually I would like to comment on a couple of those last remarks. The two -- my thought is in having researched this, the date on this was in '53.

First off, I thought, okay, where

was this supervisor that Bob just mentioned? And in 1953, that gentleman had nothing to do with radiography. He was a supervisor of a totally different area of the plant.

And he's definitely not a site expert on radiography. And then the second person who was stated -- and the one gentleman's deceased, Jim Burgess, he's the person we just talked about. Jim Burgess had nothing to do with the radium, didn't know about the radium. He was a metallurgist. He had nothing to do with NDT. So he's not an expert, in my opinion, just because of the time frame.

The second person that was mentioned, [identifying information redacted], I've talked to [identifying information redacted] as recently as two weeks ago and he has confirmed multiple times, he had nothing to do with radiography until 1957.

This incident happened in '53.

Now, with further research, and I'm going by the people who ran that plant, which everybody accepts as gospel as far as Dr. McKeel's FOIA information.

These guys are all considered experts, and we take their word for it. And they say it was in the plant. I have to take their word for it. It was in the plant, because unless we talk to the guy who may have eventually picked it up and taken it, we don't know when he picked it up and took it.

Was it lost in the plant for six and a half days, and the last day maybe he picked it up and he took it home? We don't know that.

Now, with further research, New York Times is one, they report as many as 350 of these sources having been lost or stolen. And I just found that recently.

And that tells that you're right, it definitely was not an infrequent thing to

happen. And we definitely know it happened at General Steel in Eddystone, Pennsylvania. That's documented in The New York Times as well, and in some law cases where the employee actually sued the company.

But I guess the main thing is it was out in that plant. We accept management's word on everything else. I think we have to accept or consider accepting management's word on this.

We have no proof of when, if anybody took it out of the plant. Now, Mr. Burgess, if he doesn't know the difference between radium and cobalt, and he's supposed to be an expert, I would question that, too.

But I do know, the incident he's talking about, was later. I think more than one source and more than one radium source was misplaced at GSI on multiple times.

So, we just have proof of one, just by a little bit of luck and persistence, I guess, about this radium,

which, I agree, it does sound like it could be hearsay, or it could be -- but I have too many people telling me the story. I knew there was something there and then just got lucky and found it.

DR. ANIGSTEIN: Well, what I might -- now that you've mentioned names, both Burgess and [identifying information redacted] said it was found by going up in an airplane. That was always consistent.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: Bob, was it in '53 that they were talking about it?

DR. ANIGSTEIN: Yes, okay. [Identifying information redacted] simply said he heard about it when he came back to GSI. He had been in the service. He got out of the service in '56.

He had worked at GSI briefly, was laid off, you know, got drafted, joined or got drafted into the Army, it was the time towards the end of the Korean War.

And he came out in '56, went back to GSI, took a job as a lab technician and then moonlighted on weekends doing radiography. But he simply said he heard about this, and his account of it to me was that it was taken out of an unlocked cabinet. It was left -- it was where it should have been, but it was not secured.

And he said when he came back, there was a lock on the door -- by that time they took the precaution and it was kept in this radiographic facility in the Number Six Building, and there was a lock on the door.

MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes.

MR. RAMSPOTT: If I could correct that point. We now have eyewitness proof from two workers that that Number Six Building, NDT building, was built in 1957, or '55, I forget which.

DR. ANIGSTEIN: I think it was the earlier time because [identifying

information redacted] said it was there when he came back.

MR. RAMSPOTT: It was '55, okay. This source was stolen or taken or misplaced in '53, gentlemen. There was no building, no lock on the door, no cabinet. Management said it was lost in the plant.

CHAIRMAN ZIEMER: As I understand it, the case, Bob, you're describing someone who came back and found a lock later and wondered why it was there and was told that this incident perhaps initiated locking it after that, is that --

DR. ANIGSTEIN: That was his conclusion.

MR. RAMSPOTT: Well, that would be a second incident, then. That building didn't exist in '53.

DR. ANIGSTEIN: He didn't say it was. All he said was, when I came back, it was under lock and key. That's what he said.

MR. RAMSPOTT: What was?

DR. ANIGSTEIN: When he came back from his time in the service.

MR. RAMSPOTT: You had just said the Non Destructive Testing Building. And it wasn't there, Bob, in '53 .

DR. ANIGSTEIN: But it was there when he came back. That's all we're saying. When he came back --

MR. RAMSPOTT: When he came back in '57, maybe there was a lock on the door. But that guy's saying --

(Simultaneous speaking.)

MR. KATZ: Don’t interject, please. One at a time.

DR. ANIGSTEIN: I don't think that makes any difference. I think it was missing while he was gone and he came back, and now, you know, now they got their act together and maybe locked that up.

CHAIRMAN ZIEMER: Well, let me ask you this. So his information --

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel.

CHAIRMAN ZIEMER: -- was hearsay. Let me ask you now if there was any firsthand knowledge of the plane search and so on. Was that the same individual that gave you this information, Bob?

DR. ANIGSTEIN: The plane was first reported by Jim Burgess.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: And then it was echoed by a [identifying information redacted] who had heard about it when he came back a couple of years later.

CHAIRMAN ZIEMER: I got you. So Burgess was there during the '53 time frame?

DR. ANIGSTEIN: Yes, he was there. He was working there. And --

MR. RAMSPOTT: He was not a radiographer in '53.

DR. ANIGSTEIN: Well, he was never actually a radiographer. I don't --

he never actually never went in and handled the controls on the betatron.

CHAIRMAN ZIEMER: Well, I'm not asking you whether -- I'm asking if there was someone there who had firsthand knowledge of this plane search?

DR. ANIGSTEIN: No one.

DR. MCKEEL: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes?

DR. MCKEEL: This is Dan McKeel.

CHAIRMAN ZIEMER: Yes, Dan.

DR. MCKEEL: Since I provided part of the input on this --

CHAIRMAN ZIEMER: Sure.

DR. MCKEEL: -- can I please comment? I've been sitting here. I think there's several things that need to be highlighted that really are being passed over.

Number one is that the answer to your question is was there anybody who was an eyewitness? The closest we have to that

is that this story was reported in three newspapers.

And two of them came out of the same Intelligencer newspaper, and presumably that reporter talked to GSI plant administrators and got the story about the -- the official story from GSI that there were sources lost in the plant.

And I need to underscore that if you accept that statement, you must also accept the fact that there's nobody, including Jim Burgess or [identifying information redacted] or any other person that we've yet found, that knows exactly where it was in the plant, what it was taken from, where it went in the plant, how many people handled it in the plant, all of those things.

So, that's one point. The second point is that John Ramspott had found another newspaper account that described the recovery of the source. And so maybe he can

tell us whether that source included an airplane radiologic survey, flyby, and recovery and so forth.

He also talked to people who had gone over to the site where it was presumably recovered. And I'm just blanking on the name of the street, but that's very well-known, as well.

But the other thing I wanted to point out that I included in my codicil to John, my comments to the Work Group and the Board, was that there is a section of the Act that's posted on the DCAS website, Section 83.9, which I included in my codicil.

And, to me, as I read through that language, it definitely says without any equivocation that a radiation overexposure instance, which this was, this was not just a single individual, could have involved many people.

That NIOSH, regardless of whether the

petitioners supply affidavits or other information, NIOSH needs to investigate the instance. And, the way I read it, they have to calculate a dose, they have to bound the dose for that.

And so it seems to me that here again we're hearing this morning, I respect Dr. Anigstein and SC&A, but it's not their primary job to bound the dose delivered by that radium source.

So I think that NIOSH, just to cut to the chase, needs to recognize that this is a plausible incident, as Dr. Anigstein said. It's backed up not only by the worker testimony, but by three newspaper accounts in two separate newspapers, contemporaneously, at the time the incident occurred.

We know that it went missing from GSI on October the 27th, 1953. That's pretty specific. And so I think NIOSH needs to proceed to calculate a dose and write a

White Paper or memo, and tell the Work Group and the Board what dose they're going to assign for people who might have been involved in that incident.

John Ramspott and I have absolutely no way to know if anybody filed a claim that might be one of those persons. The only people I know that could try and date that information are Department of Labor and NIOSH. And we don't have any access to that kind of information.

So the other thing is we had some talk about lost radium sources, whether that was common or not. And I think John mentioned one source. But he also alerted me to an article that I referenced in my codicil from the IAEA, pretty respectable organization, where a very nice summary was provided of all experiences with lost, stolen, and transport incidents of radium sources that had been documented in the United States.

And, you know, I think the number was, like, 367 of those from 1913 to whenever that was written, in 2006 or something like that. So there have been lots of instances like that.

They give the number that were involved with medical sources and some with industrial sources and some with transport and so forth. It's a very common occurrence.

And then, finally, there's another article that John sent me that I thought was pretty interesting. A second instance in 1914, and of interest, that article, just like the two newspaper accounts from the GSI instance, mention the cost of the radium. In the 1914 instance it was $4,500, and in the GSI instance, it was $5,500 worth of radium.

And then this IAEA article gives the cost of radium since 1929. It's something like $120,000 per gram. And so by

interpolating all of those data, you might figure that -- and the point of the 1914 article in the newspaper was that that $4,500 worth of radium was a potentially lethal dose.

And so, you know, Dr. Anigstein can use as an assumption and make statements to their plausibility, like suppose the person carried it at one meter and would get 400 millirems per hour.

Well, I would say suppose that person, like I do sometimes around here down on a farm, wear a pair of pants for a week and put it in my pants pocket, you know, and wore it all during the day and took it off and put those same pants on the next day. He could have gotten a much higher exposure.

So I think playing with that sort of thing, if you want to do it correctly and be indeed claimant-favorable, then you have to find a much higher dose. Why don't you put it at one inch from the person's body

for, say, 12 hours a day for a week and see how that dose turns out?

Anyway, I think the bottom line here, that's a legitimate radiation overexposure instance covered by Section 83.9. And NIOSH needs to bound it, and I hope they will decide to do so and send us a memorandum or a White Paper about how those calculations turn out.

CHAIRMAN ZIEMER: Okay. Let me add some comments here. And, you know, in my mind, and you're quite right, there have been many such incidences that have occurred. Even if none had occurred elsewhere, we still have this one and I want to deal with it.

I notice in this article, I'm reading the one from -- I think that's the one, John, that you distributed to us. At the time that this one was written, it says that this Bob had been looking for a week, and they still believed it was in the plant.

So at least at the time that this article was written, that plane search must not have yet occurred. So it was missing for a while. Now let me ask. John, did you have some -- John Ramspott.

MR. RAMSPOTT: Yes.

CHAIRMAN ZIEMER: Did you have some follow up information about was the plane search directly connected with this incident, and can you fill us in on any more information on that?

It seems to me you may be very correct that it may have been missing for a week before they found it. But we don't know if it left the plant right away, or at the end of that time. I'd certainly want to answer that, if it is true. What can you tell us about the other articles, because I only have this one.

MR. RAMSPOTT: Dr. Ziemer, the only mention I've ever heard of an airplane was from Jim Burgess, and he's also the

gentleman that told us they were worried about it possibly being ground up, because they got a low radioactive reading. That ended up being some of the silica sand they used that was radioactive. So, the airplane story, absolutely know nothing about it.

CHAIRMAN ZIEMER: Thank you.

DR. MCKEEL: John, this is Dan McKeel. Don't you have a third, a newspaper article that describes the recovery of --

MR. RAMSPOTT: Yes, I'm actually scanning now in my old computer.

DR. MCKEEL: Well, just what does it say?

MR. RAMSPOTT: If I can find it, because I wanted to find out how all was lost. So they say it's been lost a week in this one, and as soon as I can find this as we're discussing and going through, I've got about, it says I've got 5,200 articles here.

DR. MCKEEL: This is Dan McKeel. My recollection is that the follow up

newspaper article about the recovery, please pardon me if I'm incorrect, but the way I remember it, it did not mention an airplane recovery.

(Simultaneous speaking.)

MR. RAMSPOTT: The airplane is a Jim Burgess reminiscences only, period. Never mentioned by [identifying information redacted] --

DR. MCKEEL: Correct.

MR. RAMSPOTT: -- never mentioned by any of the other workers.

DR. MCKEEL: And I've got to say this, if a worker has no idea --

DR. ANIGSTEIN: Hold on, wait a minute. I completely --

DR. MCKEEL: -- of the difference between cobalt and radium, then they're not a very credible secondary source.

DR. ANIGSTEIN: I completely disagree with John. It was [identifying information redacted] told me --

CHAIRMAN ZIEMER: I don't want to debate those details --

DR. ANIGSTEIN: [Identifying information redacted] told me about the airplane.

CHAIRMAN ZIEMER: I just want to get the framework because I would like to figure out a way that this can be dealt with. I'm sort of in agreement that I may want to think about having us ask NIOSH to consider this again.

I know we've looked at it in the past. We've gotten some additional information that I've always thought that it was out of the plant and they didn't have to deal with it.

Maybe it was there for a week. If they knew it was missing for a week, it's suggests to me that they might have been searching for it.

MR. RAMSPOTT: They searched in the plant, Paul. That's what the article

says.

CHAIRMAN ZIEMER: Well, and if you're searching for a radium source, you search with Geiger counters. And this would make me think that it was somewhere where it wasn't giving high exposures.

I mean, I could make that argument, but I guess I kind of agree with the suggestion that Dr. McKeel made that maybe we should ask NIOSH to just kind of --

DR. NETON: Jim, I mean, I can give our opinion right now.

CHAIRMAN ZIEMER: Oh, okay. Well that's good. If you can do that right now, we're --

(Simultaneous speaking.)

DR. NETON: -- we actually did discuss how we handled incidents in that October 2010 meeting way back in October of 2010 where we got into a discussion about incidents.

It started off with a discussion

about cobalt 60, but then it kind of went into a wide ranging discussion about how do you handle, like, off-normal situations?

And that's covered on Page 209 through 224 of the transcripts of that meeting. And if you read the whole thing, you know, we portray the sense that the TBD-6000 is designed to cover normal operations, allowing for characterizations, or allowing for the uncertainties that are associated with our lack of knowledge.

And that's why we have, for instance, the triangular distribution in the '60s that, you know, goes all the way up to 15 rem per year.

The case of the lost source would be handled like we would handle all incidents on a case by case basis.

And in this particular case, I think there's so much conflicting information that, I don't know, there was no evidence to us, at least me, that this

source actually overexposed people.

As you suggest Dr. Ziemer, the dose rate coming off of this source would have been extremely easy to find if it was in a place where it was just out in the open. I mean, it would be a no-brainer.

So even if it was in the plant, I can't believe that people were being exposed to high levels of radiation unknown to the plant personnel.

DR. MCKEEL: But pardon me, isn't that basically supposition on your part?

DR. NETON: Well, we can't engage in speculation also that the plant was sitting out in the open and irradiating people to doses that would cause lethality almost.

DR. MCKEEL: Well, if you want to comply with 83.9 and be claimant favorable, that's exactly what you have to do.

DR. NETON: No we don't. NIOSH is required to come up with reasonable

estimates of dose allowing for the uncertainties associated with those estimates.

Right now, all we have is an article that says they believe the plant, the source was missing in the plant. They believe it was missing in the plant.

They don't think it was stolen, but then there's also worker testimony that says it was recovered off site. So there's all kinds of conflicting information.

And we're often in the position in this program of people asking us to prove a negative. You just can't do it.

DR. MCKEEL: No, this is a positive. Three newspaper accounts, two people, two workers that corroborated it --

DR. NETON: And there's no suggestion that anyone in the plant was exposed at all. None.

MEMBER MUNN: Wait a minute with that, may I make a comment?

DR. NETON: Yes.

MEMBER MUNN: Or insert a question? Some of us have a real problem accepting newspaper accounts as very reliable.

Certainly those of us who were in, anywhere near the Hanford Reservation in the 1970's know what the East Coast newspapers did when we had an incident where a chemical separating column just in a laboratory exploded and exposed one of the workers rather seriously.

We had people calling from, I believe it was the Boston Globe wanting to know where the crater could be located.

And we had a wide variety of newspaper reporters from some of the major newspapers in the United States taking early flights to our location to try to identify what catastrophe had befallen us.

The question that I have with respect to reports from the missing data

from the site we're concerned with is this, I've just heard for the first time today that there is an IAEA document apparently in some way reporting, or at least outlining, information with respect to what is known of missing sources in the U.S.

If that report exists, and I have never heard of this before, but if it exists then my first question is, and does the IAEA material include documented evidence of this particular event?

If it did, I think it would be of real consequence for us to look at it. It would be the only documented evidence that I've heard about.

Contrarily, if the IAEA report does not include this specific incident, to me that would be evidence that whatever occurred, it was not of major consequence.

DR. MCKEEL: All I can say, this is Dan McKeel again. All I can say is I included the complete reference to that IAEA

report. It's online. You can download the complete PDF.

What it does say is that the number of recorded lost, stolen, transport source reports that they list are clearly the tip of the iceberg.

And that there must be thousands more. And they give some idea of how many thousands of radium users there were up through 1975 and some through the '80s and so forth.

But this particular instance, there is no comprehensive index in that article of all 367 incidents. It's a review article. And it’s very useful, but it certainly won't pass Wanda's test of having information of this instance.

But all I can say is the following, the description of what happened has clear cut what in my world we used to call face validity.

Workers heard the story, three

newspaper accounts documented the story. There's no reason for the newspapers to have made up those stories. And they had specific details.

Now as I'm saying, no we don't know who was involved and so forth. But I will go so far as to say this, this Work Group and this Board and NIOSH and SC&A are in the business of assigning doses with no other information other than a source term.

You do that all the time. You claim that you're quite comfortable doing that. And then on top of that, you have to make some claimant favorable assumptions, I would say.

Somebody is not muted.

Then you have to make some claimant favorable assumptions.

But if Dr. Neton is saying that NIOSH cannot comply with Section 83.9 and Wanda's position is that she doesn't trust newspaper accounts enough to even give this

plausibility, then I'm going to be honest with you, I don't know what to say except to say that I'm going to take the matter to the full Board, and perhaps beyond, and try to enforce what I believe the Act says needs to be done.

So you know, I wanted to get it on the record. I think it is on the record and I hope there will be some follow up. And I will say this, I remember quite clearly the 2010 numerous pages that we spent talking about instance.

But I want to remind everybody, in 2010, you know, that was when I got, for this group, the NRC FOIA 2010-0012 that for the first time ever proved that there was two radium sources at GSI.

And so you know, all the time we were talking about those instances and everything, and I carefully looked back at Dr. Anigstein's satellite meeting in October of 2007 and all the affidavits and

everything. Not a soul mentioned radium 226 sources at GSI, nobody.

It's not there. And I would be most pleased if it would. They talk about a plumb bob. And for a long time I thought that well, plumb bobs were exclusively radium 226, but now I know that's not true.

Some plum bobs, or what we call plumb bobs contain cobalt 60 sources. But anyway, that's kind of where things stand. I think this is a valid overexposure instance and I think it needs to be accounted for.

CHAIRMAN ZIEMER: Okay, so we've heard from Jim Neton, the approach that NIOSH would take on this and similar kinds of situations.

So I think the only other thing then at this point would be to ask the Work Group Members if they wish to pursue this issue in any further detail?

MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes.

MR. RAMSPOTT: This is John Ramspott. Can I make one, just final comment here.

CHAIRMAN ZIEMER: Yes, John.

MR. RAMSPOTT: You know, if this is laying out in a plant, obviously, I mean, there was no other place to do this non-destructive testing with this. Management said it was out in the plant.

And this is directed to Dr. Neton. I respect you. But how would people know if they were exposed to it, if there were a chip, or a bowl, or a blank, or they had nothing to do with NDT, they'd just been in the area.

They wouldn't know. They're not going to tell some dose reconstructor well oh, by the way, I was over there when it was lost.

DR. NETON: I'm not saying that, John. I'm saying that fact that this

source, if it was laying out in plain view of a radiation detector would be easily have been detected.

MR. RAMSPOTT: They had one radiation detector in the betatron --

(Simultaneous speaking.)

DR. NETON: The thing could be measured from dozens of yards, a hundred yards away, if it was out in the open with a sensitive Geiger counter. It would have been --

MR. RAMSPOTT: This is a 127 acre plant.

DR. NETON: Yes, and this thing is close up and personal. This thing is in the R per hour range. It is huge. And the Geiger detectors can detect 10/5 millirem exposures.

It would not be plausible in my mind that, that source could be laying out and significantly irradiating personnel the entire time period, and no one would know

it.

MR. RAMSPOTT: They probably wouldn't go looking for it, until they knew they lost it.

DR. NETON: That is true.

MR. RAMSPOTT: And maybe they didn't use it every day. I mean they didn't do --

DR. NETON: The other thing that bothers me, John, about this is there is no follow up that I have seen. Now you say you have a recovery article.

MR. RAMSPOTT: Boy, I am scanning right now, and I am looking --

DR. NETON: All right.

MR. RAMSPOTT: But I know where it is. I can find it.

DR. NETON: I am looking at newspaper coverage of this and I found the original document that you did.

MR. RAMSPOTT: Yes.

DR. NETON: But no follow up that

said it was found and here were the consequences to the workers. And I thought you would think that would be very --

MR. RAMSPOTT: Jim I actually, yes I do have that.

DR. NETON: And --

MR. RAMSPOTT: I'll find it.

DR. NETON: I'd love to see what that says.

MR. RAMSPOTT: Yes. Oh maybe, I know management's position. Oh, nobody was hurt. It was a piece of cake. It is. That's how they talk about it

I'll find that document because the original one came from Edwardsville and the one where it was located and found.

DR. NETON: Yes.

MR. RAMSPOTT: I actually went to the Granite City Public Library and went through their microfiche footage about that date and scanned a month or so forward, backwards, and then I found it.

DR. NETON: So your recollection from scanning that, or reviewing that article, is that it was found in the plant?

MR. RAMSPOTT: You know what, until I see the article I can't tell you. I got the feeling that --

DR. MCKEEL: This is Dan McKeel. I sent the Work Group, months ago, a White Paper about that radium --

MR. RAMSPOTT: Yes you did.

DR. MCKEEL: -- 226 instance, with that and, John Ramspott, mailing to you included that paper. And I also, so you know, you all have gotten that radium 226 Edwardsville Intelligencer article and --

DR. NETON: But that's all we have Dan. There's no follow up.

DR. MCKEEL: No. It was up to you to do the follow up once you got the information. It’s not up to me.

DR. NETON: Well, and I spent some time. I could not find anything in the

news press that responded to a follow up. Now apparently John has found that.

MR. RAMSPOTT: Yes, and I'll find it again. In fact I'll go over to Granite City and I'll get it cause I know it's there.

DR. MCKEEL: Right. When I wrote my paper and sent it to you guys, that was the fourth time I found this recovery article and --

MR. RAMSPOTT: Right.

DR. MCKEEL: But he definitely did. I just --

MR. RAMSPOTT: At Granite City --

DR. MCKEEL: And if he would have put it in my hand, I would have put it in my paper.

CHAIRMAN ZIEMER: Okay, well let's do the following. John if you will get that information through NIOSH to Jim Neton, I'd appreciate it.

I think what I'll propose that we

do on this particular issue, because we know how NIOSH proposes to handle it, and it's in keeping with how they handle similar situations.

But for the benefit of the petitioners when we report the actions of this meeting I will take this issue out. Dan, you will have an opportunity to add to it and make sure that the full Board understands how, what this issue is, and how NIOSH proposes to handle it.

And if something different is proposed that will, unless the Work Group has something at this point to propose, but I think until NIOSH gets that follow up information from John, perhaps we'll sort of put this in the back burner until we can do anything additional with it.

I think we know what the issue is. We've heard the petitioner's views. We've heard NIOSH's approach and we'll have to perhaps leave it at that for the moment.

I don't think there is anything further we can do here on the phone to address this.

I myself would be interested, and John if you will share that with the rest of the Work Group --

MR. RAMSPOTT: Absolutely. I thought I already had it, but it's, and I will find it. I have a lot of data here and --

CHAIRMAN ZIEMER: And I'll go back through mine, maybe we got it before and I didn't pay, put it in a different place. But I don't seem to have it here with my, radium source information.

But let me see if other Work Group Members have additional comments or questions on this issue.

MEMBER BEACH: Paul this is Josie. I agree with, we will pass forward on this issue.

CHAIRMAN ZIEMER: John do you have any comments?

MEMBER POSTON: I don't have any standing comments. I'm with you. I just did a computer search and I haven't been able to find that document.

CHAIRMAN ZIEMER: Okay, Let --

DR. MCKEEL: When you all say that document, what document are we talking about that couldn't be found?

MEMBER POSTON: The newspaper report that's missing.

DR. MCKEEL: Oh so, are you doubting that it exists?

MEMBER POSTON: No, absolutely not.

DR. MCKEEL: Okay.

MEMBER POSTON: I said I couldn't find it.

(Simultaneous speaking.)

CHAIRMAN ZIEMER: John will provide it to us, okay?

DR. NETON: Just to be clear, this is Jim, we have the document from the

Edwardsville Intelligencer about the lost source. We know that.

DR. MCKEEL: Yes.

DR. NETON: I'm talking about the one that John Ramspott recently found in Granite City in the library.

MR. RAMSPOTT: That's correct.

DR. NETON: About the recovery operation. That's the one that no one has.

DR. MCKEEL: I understand that.

DR. NETON: I never got that.

DR. MCKEEL: It's understood.

DR. NETON: John just found it apparently.

DR. MCKEEL: Good.

DR. NETON: Okay.

CHAIRMAN ZIEMER: Okay. Let me proceed now. I think we're still on public comment. And I think Dan, I know you have other comments, so let me give you the floor again.

DR. MCKEEL: All right. I'll try

to make it fairly brief. But I do have some things to talk about.

The first thing that I want to talk about is I was very interested in the memo that Dr. Neton circulated about the conversations, the calls, and the emails that Stuart Hinnefeld had with Craig Yoder about how the Landauer GSI film badges were handled.

And I understand that that series of communications clarifies how the control badges were handled and so forth.

What I found interesting about that was, and I wanted to make sure that my interpretation was correct, that there was some information exchanged in that memo, which by the way, I didn't get until actually more than a month after it had been circulated to the Work Group.

But when I did see it, the thing that struck me was that M, for a minimal detectable level, might indicate a dose

level as high as 50 millirems a week.

Not 10 millirems a week. Now, I know that 10 millirems a week value has been used for a very long time for, as being equivalent to what M stands for.

But I have seen other articles that talk about M, minimal detectable levels being higher, particularly for anything but low MeV protons.

So I just wanted to see if I understood that Craig Yoder was saying that Landauer M could be assigned for doses up to and below 50 millirems a week, rather than 10 millirems.

So I guess I would pose that to Dr. Neton. Is that part of the conversation?

DR. NETON: I don't think that's what he intended to convey. What he was saying was that the M would be listed for the control badges if when you subtracted -- the M for a worker badge does not mean that

it could be as high as 50 millirems.

That's for certain. It still stands at 10 millirems. But the M was for the control badges only where he was applying that.

DR. MCKEEL: I see.

DR. NETON: And if you subtracted the transit from the badge rack background and it was non-detectable, if it was listed as M meaning it was not above the detection limit of the badge system.

DR. MCKEEL: Well may I ask you this question, I'm just, it's a point of curiosity. If Stuart Hinnefeld had all these discussions with Craig Yoder, why wouldn't he have written up his, a write up of what he discussed and convey that? I'm just wondering how that task fell to you.

DR. NETON: Because I work for Stu.

DR. MCKEEL: Okay.

DR. NETON: I took on my duties,

because one of my responsibilities is to consolidate what you learn.

DR. MCKEEL: Okay, that's fine. All right, the next thing I want to mention is, I did have some comments. And specifically about the White Paper that was discussed earlier by Dr. Anigstein.

And I had, I sent you all my comments in an email, which I will refer you to again. And I just want to mention that I had some rather specific and serious concerns.

And I understand that by now you all seem to have been comfortable with everything that paper had to say. But I just want to run through, extremely quickly, the things that bothered me.

The first thing was that the method, the assumptions, that SC&A used in its MCNPX modeling were not stated in detail. And that's a criticism that applies to all such modeling.

I think they need to be layered in much more detail. I also noticed in that paper something that I found very ironic. And that was that the sketches of the betatron Building model and so forth, the wall thicknesses, the materials, the concrete formula, the betatron, neutron dose assumptions, basically were of the same caliber as in the NYO 4699 Pelican Safety Laboratory papers I referred to this Work Group for review. And which Dr. Neton said were inadequate to characterize, that, those papers as having useful data.

And along with that it seems to me a serious mistake that, that paper just totally ignored, NYO 4699.

So I guess it means that SC&A also concurs that there's no utility in neutron and proton measured data from three betatrons similar to those used at GSI.

I believe that both betatron facilities need to be modeled separately to

assign external doses. I think that the old betatron was after all, present from 1952 all the way through 1953.

And, you know, that was the only betatron at GSI. So when you model only the new betatrons, you are taking a great big leap in saying that was, that gave identical data, which you'd get if you modeled the old betatron.

I think you have to, like all things in science, you can't assume that. You have to show that it's true, and then you can say that.

Third is, I thought the paper was very confusing because it, some of the data in it are brand new, like the neutron calculations, some of it is old from other MCNPX models.

And once again, you cannot take that paper and read through it and follow the train of progression of how the betatron doses changed between 2008 and 2012, and now

2013-14.

I also thought that the idea that you can bound the external doses between '63 and '66 based purely on the betatron, ignores the fact of all the other sources that were present during that time period. And again I heard it done again this morning.

The assumption is that, and just like the assumption was, you don't need to model the old betatron during 1952-62 because the radium 226 source would far outweigh the doses from the betatron.

You know, by the same token, the betatron was supposed to overwhelm all other sources that you might have during the non-radium era. So I just think that's difficult to follow, reasoning.

I think that the paper that Jim made into policy, actually, IG-003 is that all sources must be accounted for.

And there are numerous other

sources that really have not been accounted for at GSI including the iridium 192 sources from GSI, Saint Louis testing. But then actually used the same source over at American Steel, wearing their badges.

Its 250 kVp x-ray machine and the two small cobalt 60 sources have never been modeled adequately by NIOSH, I don't believe.

The other point is that I have made before, and it does it again is external doses are assigned to three groups, radiographer, layout worker, and administrative.

There is no official job category of layout man at GSI, but more important, there were no workers at GSI who held that job category exclusively.

So that puts NIOSH and Department of Labor in the odd position of having to take a single individual and divide their time so that part of the time they will be

assigned the dose of a betatron radiographer, and the rest of the time they will be assigned the dose of a layout person.

And there will be no way the Department of Labor will have to know how much time a particular individual spent as a layout worker or as a betatron worker. It's just impossible to assign, to administrate the Class based on that kind of thinking.

I want to point out that repeatedly this morning, that extended operational period, GSI from October the 1st 1952 through December 31st, 1952, that earlier modeling doses have simply been back extrapolated to cover that period and with absolutely no new analysis of what happened during that last quarter of 1952.

However, if you look at the documents that NIOSH used and that I produced under FOIA, it led to that extension of the covered period.

You will see that the betatron work done was quite different than we believe was done at other times at GSI. And in particular, it was described as research and development work done between GSI, with its old betatron which has not been modeled, and doing that work for the Atomic Energy Commission.

It was a cooperation of Mallinckrodt, and they were trying to improve imaging quality of uranium. And for that they used slices, center elongated pieces of billets, uranium billets.

They also used a new uranium field that had been built at Mallinckrodt and somehow was used to manipulate the beam of, they used a collimator or something for the betatron.

All the same, it's quite different from the normal operating betatron work at GSI. And I think that 1952 period needs to be addressed, and the old betatron,

for that reason alone.

The other thing is there seems to be a fixed idea that the description of how uranium was handled at GSI began and ended with the October the 9th, 2007 meeting.

But we've sent you new testimony from other GSI workers, including [identifying information redacted], that say that it was really different in some of the time frames and so forth for exposure and handling of the uranium were different from what was described. And I think that needs to be factored in.

And a final footnote on that paper was that John Ramspott alerted me to an article from The Hitchhiker's Guide to the Galaxy, which was actually a reprint of the Wikipedia article on General Steel.

And what struck me was that we've used, repeatedly during this research on GSI, a maximal workforce number of 3,000 people. That Hitchhiker's Guide has a

reference to a 75th Anniversary, Granite City, Illinois publication which says that there was a peak of 5,200 workers at GSI in World War II.

And in 1964, which is highly relevant, there were 4,400 workers. So we have always claimed that this small subset of film badges on 89 people in the covered period from Landauer was a very small sample.

This makes it an even smaller and non-representative sample, 89 out of, say 4,400 people, in 1964. So anyway, let's see. So that's the main comments I have about that particular paper.

I wanted to mention to the group that I am in the midst of doing a new paper that reviews all of Landauer film badges used. I hope this will be useful to the group and to the full Board.

And I, in that paper I point out that when you compare the Landauer data that

I got, the Landauer data that SC&A and NIOSH got, and the Landauer report from various GSI workers that we obtained from them and they got through the Privacy Act, that there are some really significant, I would call them, variances and discrepancies that need to be explained and dealt with.

And I hope to get back to all of you all within the next week. And the final thing I wanted to mention was I have definitely, obviously, followed the discussion on Appendix BB, and really have been working since the Board voted to deny the SEC back in December of 2012.

I have been working to make sure that the Rev 1 of Appendix BB is as claimant favorable as possible.

And I listened carefully this morning to how each and every Appendix BB Matrix Issue was either closed or put in abeyance with unanimous consent by all the Work Group Members.

And I listened quietly. I didn't interrupt because I just wanted that process to take place without being, without my intervening. But I do want to say, just as an overall reaction, I could not disagree more with the closing of many of those items.

And so I do want make just, speed through and talk about that a little bit. In the first place, I do not accept that NIOSH simply saying we agree with SC&A's model is satisfactory.

And when they say that we ran their input file and it came out exactly the same, I don't think that's sufficient.

I think that they have to write a response, which puts them in the very odd position I think once more, of NIOSH doing the initial modeling work, and NIOSH saying we agree with SC&A's model, which I think is 180 degrees from how the work should be done.

I think NIOSH should have modeled their doses externally, independently. They can use MCNPX. And then have NIOSH give their, or subject their, analyses to a review by SC&A. So that's one comment.

So I don't think just saying, Dave Allen saying yes, we agree. But we know for example back in 19, I mean 2008, when both groups modeled the betatron, NIOSH started using Attila then it switched over to MCNPX.

SC&A used MCNPX, the earlier version, and even their doses that they came up with for external betatron photons, turned out differently. And so did the neutrons. And so did the superficial, the beta doses.

So I just can't accept that they are the same. What does the same mean? Does that mean no disagreement, exactly the same? Was it ten percent, twenty percent, et cetera?

So anyway, it pretty much goes down through the whole thing. The period of covered employment has been closed. I think the 1952 period needs to be considered and it really hasn't been.

The betatron beam intensity. I have sent you all numerous papers that show that a clear cut explanation for that to be, that as those betatrons bombard the target, and the column, and so forth for month after month, year round, that all of the components in that machine get activated.

And that residual radioactivity of the column and the beam spreader and the target, and the whole apparatus, the whole camera head, to be expected. And so this idea that it couldn't be accounted for scientifically, there are just too many papers saying that, that's the explanation for it.

The Underestimate of Stray Betatron Radiation, once again everybody

votes to close that, because basically SC&A has modeled it. I say that on Issue 4, I say that NIOSH needs to do their independent modeling.

If you have other radiation sources, I've already covered that. I think that NIOSH, for a very long time has ignored multiple of the sources at GSI.

And I do not think it's sufficient to simply say, oh well, the doses are very low and they are bounded by the betatron or the radium sources. You have to show that. I made that point many times.

The skin dose, again, we have Dave Allen's word that he took an SC&A input file and got similar or the same doses. I'd like to see that in a paper.

He talked on Issue 7, the residual radiation from the betatron apparatus. I think the work hours should be closed, but I will note this. That the consensus 65 hour average work week was

used, was agreed on in October of 2007.

And here we are in January of 2014. That very helpful parameter has not been used for any dose reconstruction. And dose reconstructions at GSI are basically completed. There haven't been any new ones in quite a long time. So it can be in abeyance.

But you know, that's too many years to pass by without giving that highly claimant favorable finding, voiced in a revised Appendix BB. I don't have any comment about the work practices, but that's closed.

Dose rates from uranium. I think it's interesting that we're just now thinking about neutron exposure from uranium. You know, why is that?

And I guess while we're talking about neutron exposures, I have to comment that maybe one of the things I really didn't understand about Dr. Anigstein's comments

this morning is he listed three sources for neutrons. And the neutrons from the betatron target were not listed. But he later went ahead and said, well the reason he didn't cover that in his paper, that is betatron neutrons from the target, was because the radium sources, the doses from those, 1952 to '62 would far outweigh the betatron neutron doses.

Well, see I am not sure about that. Radium doesn't really give off any appreciable neutrons, whereas the betatron itself gives off lots of neutrons, again referenced in NYO 4699 --

DR. ANIGSTEIN: Excuse me, this is Bob. Let me correct that statement.

DR. MCKEEL: I don't actually want to be interrupted Dr. Anigstein.

DR. ANIGSTEIN: Excuse me?

DR. MCKEEL: If this is all right with you? You know, I listened to you all carefully and quietly this morning. I'd

like to finish my presentation and then you can say whatever you want to.

Issue 12 being closed, all I can say is, I know that SC&A and NIOSH has now created ten to the minus 5th is a good number for the resuspension factor during the residual period.

I wrote a whole White Paper on why TIB-70, it supports that idea, really isn't adequate for GSI. And I point out in there that Dr. Mauro in the past has said that resuspension factors is high and 10 to the minus 4th might be appropriate in a site that had lots of work going on and stirring up the dust and so forth. So at any rate, that's about what I have to say about that.

Anyway I have enjoyed the discussion today and I appreciate as always the chance to address the Work Group and hopefully, in a couple of weeks, the Board as well.

CHAIRMAN ZIEMER: Okay, thanks

Dan. I do want to ask you a follow up question. You did mention in the early period, that '52, the new front end as it were of the period, could I just ask.

Maybe ask Jim Neton or Dave Allen, has NIOSH looked at that separately at all? Or are there sufficiently different work practices there that actually weaken it? Or are you comfortable that what you have already done encompasses that in the earlier period. I kind of assumed that you found it encompassed it, but I just want to clarify that is, does anything new come up there that we've overlooked?

MR. ALLEN: This is Dave, and yes we felt that it was encompassed because the models essentially for the later time frames aren't that variable by the size and shape of the uranium.

I think we have said that a number of times in the past and it just comes down to the work practices, as far as

how often they are doing that. And I don't think there is any specific information for that last quarter as far as how often they were x-raying uranium versus later time frames.

DR. MCKEEL: Well, I guess I would comment, this is Dan McKeel again, that's exactly my point. By including data for that period, it is automatically assumed that it's just one more cell in a spreadsheet and let's fill it in with whatever you had for 1953.

But I've tried to tell you that the work practices were different. And that's defined by documents that I have not seen, that you all supplied to Department of Labor for October '52. And that, I certainly have seen that I supplied for November and December of '52, and they were doing different kind of work.

I know you say that it doesn't make any difference what kind of uranium

they were using, that is something that I simply don't agree with that.

But because, for example, in the mid-section, it looks to me like they took a rod out of the middle. You know, a cylindrical piece out of the center of a billet and then used that as their research and development radiation target with a betatron using this new uranium field.

So the very fact that there was a uranium field probably altered the beam geometry. I guess I am just saying that I'm not sure that actually, and I guess I've got to make this comment.

Everybody is perfectly willing to say that almost every issue is an appendix issue, and not an SEC issue. But I would say if you can't reliably, with sufficient accuracy, bound the doses from the betatron in that 1952 quarter, maybe you ought to rethink about giving an SEC for that quarter.

So I just think that idea that work practices are about the same, no they weren't about the same. The work in 1953 forward was contract work for specific purposes with that uranium, either to look for structural flaws and/or determine the cropping point, or both.

Whereas the work process for 1952 was to improve imaging using this new shield and a type of target, uranium target that to my knowledge was never used again at GSI. So anyway that is my comment.

CHAIRMAN ZIEMER: Okay, it's a little hard for me to really judge from either of your comments. It is not obvious to me whether it was different than last June requiring different analysis, but I guess Dave, are you saying you guys have looked at that and you've satisfied yourself that it's sufficiently similar, that it would be encompassed? Is that what I am hearing you say?

MR. ALLEN: Yes, in our opinion it was sufficiently similar.

CHAIRMAN ZIEMER: Okay, I just want to make sure that it got looked at and evaluated.

DR. MCKEEL: Well Dr. Ziemer, that's my point. I don't think that a comment made at a meeting like this. That it was looked at, is anywhere near the same as, even if you wrote a one page memo on, it was looked at, can be defined the same way any scientific paper does by giving a short background, a short message, a short result, and a short conclusion.

And then you can read that. We all do that. That's what we do professionally. We look at something and we write it up. If it's a single experiment or a series of experiments, or you know, a whole career, or a grant that extends for many years, you have to do it the same way.

And I just think those steps are

being skipped. It's not a great big effort to write up what is meant by, you know, we looked at it.

I think that's fine if it was looked at, and there are no differences. But I think looked at, actually means assigning a dose and showing that for that kind of a billet, the only thing that bothers me about it is, I mean, there's this great document that we sent to Department of Labor which convinced them that the covered period ought to be extended.

So there are documents to be examined. It's not just, there were operational reports for three months, you know October, November, December of 1952, and each and every one of those had some new little bit of information.

I don't know what the information was in the October '52 NIOSH document. I haven't filed a FOIA for that one yet, but NIOSH should know what was in their own

document. So, you know, I just think that it ought to be written up, that's all.

CHAIRMAN ZIEMER: Well, let me ask any of the other Work Group Members if you have any additional comments on that early period. I actually was frankly a little uneasy about it and that's why I raised the question.

MEMBER BEACH: Yeah Paul, this is Josie. I always thought that the early period should have been an SEC. But beyond that, the items that we left in abeyance today, it is my understanding that once that document is rewritten, then we will have a chance to look at that document and the changes that were made. Is that correct?

CHAIRMAN ZIEMER: I believe that is correct, procedurally. Let's see, Jim or Ted help me out on that. What's the process?

MR. ALLEN: Yeah, I think --

CHAIRMAN ZIEMER: I don't know

that we see it in advance, do we?

MR. ALLEN: No, not in advance, but it will certainly have a chance to review it or to ask SC&A to review it to make sure that it actually incorporates what we agreed upon.

CHAIRMAN ZIEMER: Well, let me just express it this way then. Could we ask NIOSH to address that if they do the revision? To be sure to include a justification or a kind of a, if that only period was somehow different than the way described, justification for it. Why it would be included in the overall modeling or why it is sufficiently encompassed? And is this something that can just be included in the narrative?

MR. ALLEN: This is Dave Allen. Yes, I think something like that can be included in the, you are talking about in the appendix revision?

CHAIRMAN ZIEMER: Well however

you would do it. You know, I have to agree with Dr. McKeel that it would make sense to have a justification. In part it revolves around why this period was even added.

There's something going on. If it looks like it's different from what happened afterwards, let's include it, and make sure that what you just said when you say looked at it, yes, okay.

Somehow you have evaluated it in some way. And just share that evaluation with us so it's clear that, if it's encompassed by the overall modeling that there's good reason for that. That would be a more effective --

MR. ALLEN: All right.

CHAIRMAN ZIEMER: Go ahead.

DR. MCKEEL: Dr. Ziemer this is Dan McKeel. At this I would comment.

CHAIRMAN ZIEMER: Yes.

DR. MCKEEL: It puts me, puts the petitioners, and the workers in a very bad

place because the fact of the matter is there is no appeal to whatever NIOSH includes in the next revision of Appendix BB.

And given the fact that Rev 0, was published in June of 2007, and here we are in January of 2014, and that revision has governed all of those responses to date.

I don't think I will be alive when the next revision of Appendix BB comes up and there will be absolutely no recourse to that.

And I could see whichever person, if there's another person who undertakes this sort of thing I've been doing and John has been doing, and the workers have been trying to do with this Work Group for the last many years.

If they ever want to undertake it again, they are going to have a record of what we ran into and how hard it will be to get even the simplest thing like work hours

put into operations.

There is no reason that I can see that NIOSH could not show this Work Group and the Board a draft of Appendix BB, Rev 1 and let them make comments.

And then, after all the comments have been made, let the whole Board weigh in on it. Then have it finalized. Now, I understand that, that may not be the way it's, quote, "done", but that would be a better way for it to be done.

It would be more fair to the workers and to the petitioners, because like I say, you know, if you look at the matrix update, it was just published by SC&A, and you look through there, and you look through the timeline, and you look at the references, it is amazing to me.

It's astounding, that after all these contributors, and I'm talking about site experts, workers, myself, all those fifty plus papers, not a single one of those

things is mentioned in the SC&A narrative as if they never happened, they never existed.

So I think that, you know, it is unfortunate that I have to be arguing and saying that, that extended coverage period needs to be addressed.

And I understand what you are saying. But you know, I want to say this. One of the key points I make in my administrative review of GSI, which has been underway since last May, was that certain promises made to everybody on December the 11th before the final vote on the SEC, I think that the ensuing year has shown that those things simply weren't true.

So for example, we now are told that NIOSH is going to assign the radiographer's dose to basically everybody in the plant, except for the administrative personnel.

I'm very uncomfortable about that because when I actually got the figures on

how many people under Rev 0 they're going to assign the radiographer's dose and how many the lower dose. It turns out that 162 people had gotten the radiographer's dose.

And it's true, that is more than the number of radiographers that held that job position. But 82 people got a lower dose. And we have no idea how that was assigned. Was that just a whim and whimsy of particular dose reconstructors and so forth?

So all these promises of things that are going to wind up that are in abeyance, you know, I'm just telling you, at 74 years of age, after all I have been through, when somebody promises me something and I don't see it in writing, I respect them, I have utter confidence in their honesty, and integrity, but all I can say is, something happens along the way between something that's uttered verbally and what actually emerges in that final document.

And it's beyond any individual's control. And so, you know, I just, I'm going to make this my final comment, maybe to this Work Group, that you should consider, you would be doing the workers a big, big favor if you would consider taking a, something like a Rev 1 of Appendix BB and circulating a draft, and let people make comments.

And yes, it would delay it several more months. But that's the way they do things in the CERCLA world. It wouldn't be a bad way to do things in the ABRWH, EEOICPA world at all.

And what would emerge would be a better document, a more true document that really represented people's feelings and aspirations and would be as maximally transparent and fair to the workers as you could possibly be.

But I'm telling you what's happened today, my view of all of this, and

my view of all those closed Appendix BB issues that as I say need more work, that simply won't be represented.

And Rev 1, will ignore those things. And it's going to probably turn out that Rev 1 won't have a single reference to anything that I have ever had to do with this Work Group or with GSI.

And I saw it happen in the last rev, Rev 0. Think about that. There was no mention of film badges because NIOSH didn't have any film badges until I alerted them about it.

There was no information in Rev 0, about neutrons. How could that possibly happen? Neutrons were known to be part of the betatron beam combined press work in 1939.

You know, it shouldn't be up to me to say that. That wasn't in Rev 0, at all. So I'm really, really, really, really worried about what's going to be in that

final Rev 1.

And I have overstayed my welcome and I'm going to say goodbye.

But I needed to say that.

CHAIRMAN ZIEMER: Yes, and of course, this Work Group doesn't have any control over the federal process on these documents, that, I think it's considered work product. You know, your view is on the record.

I don't think the Work Group can do much about that, because what really happens of course is the NIOSH document comes out, and then our contractor helps the Board review that. And there would be findings.

And Dan if you're not around, I probably won't be either because I am older than you.

DR. MCKEEL: I don't think any of us will be around.

CHAIRMAN ZIEMER: But anyway, I'm

going to agree.

DR. MCKEEL: I think this is like the third out of the 9th inning.

CHAIRMAN ZIEMER: Yes, well anyway your view is on the record.

DR. MCKEEL: I appreciate that.

CHAIRMAN ZIEMER: And I do ask NIOSH to make note, to at least, and I think Dave Allen's committee, to add some specific language to address that early period.

Now I'll, we need to close by talking about what will be presented at the Board meeting. And Ted, I think what we owe the Board at this point is a report on where we stand on the Matrix Issues and the close of those Matrix Issues which would go as a recommendation to the Board.

MR. KATZ: That's correct Paul. I don't know if you were waiting for me or, it sounds like you might have just dropped off.

CHAIRMAN ZIEMER: No I'm just

asking, the Work Group report to the Board, does it require Board action, or it is a report?

MR. KATZ: Well, I mean --

CHAIRMAN ZIEMER: Report on the --

MR. KATZ: Yes, they are reports. I know we tend not to do, I know unless there is some action the Board believes is necessary, we tend not to do individual votes.

We have in the past in some cases, the Boards all just sort of voted that they agree with the Work Group, or whatever. But, it hasn't been totally consistent how that's been handled.

CHAIRMAN ZIEMER: Okay, well what I propose to do is to report to the Board on the closing of the Matrix Issues, which in turn would allow NIOSH to proceed with the revision of Appendix BB.

Also I will report on the issue

of, I have committed to report on the concern with the petitioner on the lost radium source. And I will ask Jim or Dave, I assume it will be Jim, to control how NIOSH handles, will handle this just so that, that's on the record.

And if we have any new information on that source that, before the Board meeting that would be helpful as well. But --

MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes, and at this point I am not going to ask the Board to take any action necessarily. But I do, I made the commitment to make them aware of the concern of the petitioners on that issue.

MR. RAMSPOTT: Yes Dr. Ziemer, I found that article.

CHAIRMAN ZIEMER: Oh good. Okay.

MR. RAMSPOTT: And I'll read it verbatim. This is from the Granite City

Press, and it's hard to read the date. I think it's October 21st or maybe 19. I will have to find the original copy.

This is a scan. But it says, "Missing plumb bob returned to plant. The $5,500 radium filled plumb bob missing from the General Steel Castings Carburetion Plant for over a week turned up yesterday."

"The details of the recovery were not disclosed. All that was reported was that the valuable instrument had been recovered from outside the plant and that it is certain no individual had suffered any burns from the dangerous radium rays. The plumb bob similar to the type used by carpenters is needed for x-raying steel castings for flaws."

Then in the previous document that I found from the Granite City Press about it being lost, it says, and so this will give you an idea.

And Dr. Neton you were correct.

They were looking for it with Geiger counters. But then, here's what's happening, they were looking in the wrong place.

Let's see, they find it. It looks like they were looking for it out in the dump. That is definitely, I am not imagining this, and you guys know it now. And I will be glad to get you copies of whatever I have.

DR. NETON: Okay, but it does sound like it was lost off site, not on the property.

MR. RAMSPOTT: Oh no. No it says it was --

DR. NETON: Turned in to the plant.

MR. RAMSPOTT: Initially, it was found off site. It doesn't say when it went off site, and when it was returned. It wouldn't be lost off site.

They wouldn't take it off site. It was lost in the plant and somebody

eventually did take it off site, or it could have just been on the other side of the fence. Who knows?

MR. KATZ: Paul, can I bring this back to --

CHAIRMAN ZIEMER: Yes, we're just --

MR. KATZ: -- reading what you found and presenting it, so everybody can read the whole article about --

MR. RAMSPOTT: Yes, you got it. As long as you guys know I wasn't imagining this.

MR. KATZ: No, I don't think anyone thought you were imagining that you had that article. It's just that others don't believe they have received that article.

MR. RAMSPOTT: Yes, sure, I understand.

MR. KATZ: That's all. Thank you.

MR. RAMSPOTT: You got it.

MR. KATZ: And Paul, I just wanted to check with you, so do you have a PowerPoint presentation?

CHAIRMAN ZIEMER: Maybe a simple one, yes.

MR. KATZ: Okay, and then so, just you know, if you can get it in. Well, whenever you can get it in. I know you have pretty little time to work with. That'll be great. We'll deal with the timing.

CHAIRMAN ZIEMER: Yes, okay, very good.

DR. MCKEEL: Dr Ziemer, this Dan McKeel, final request. Could somebody please send me a copy of Dr. Anigstein's presentation today because I don't have access to Live Access and I would like to see what he presented to the Work Group today.

MR. KATZ: Yes. Bob, just let me just check something, because I may be able

to do it very expeditiously. Bob, are you still on the line?

DR. ANIGSTEIN: Yes I am.

MR. KATZ: Your presentation, is that all taken from the PA cleared version of the article that --

DR. ANIGSTEIN: Yes, sure, if you --

MR. KATZ: Okay, then I can just, I can send that right out then.

DR. ANIGSTEIN: Yes, except you don't have it.

MR. KATZ: Well, I don't have it. That's right. I don't have the presentation but, if you, thank you. Good point. If you will send me that, I will send it out to Dan and John and --

DR. MCKEEL: Very good, very good.

DR. ANIGSTEIN: This will be, I mean, this is sort of like a private communication. It's not going to be posted

on the web because we have this 508 compliance.

MR. KATZ: No, I understand, I understand. And that's fine.

DR. ANIGSTEIN: You don't have to bother with the 508 --

MR. KATZ: Dan would like to see the thing exactly, so that will work.

DR. ANIGSTEIN: Excuse me?

MR. KATZ: So you just need to send it to me, it's fine. I don't need 508, I'm not posting it to the web. I am just sending it to Dan and the other --

DR. ANIGSTEIN: Very good. I'll get it to you as soon as we get off the phone.

MR. KATZ: Yes, that would be great.

DR. ANIGSTEIN: Very good.

MR. KATZ: Thank you Bob.

CHAIRMAN ZIEMER: Okay, Thank you everybody and we now stand adjourned.

MEMBER BEACH: Thank you.

MR. ALLEN: Thank you.

MR. KATZ: Thanks everybody.

DR. MCKEEL: Thanks everybody.

(Whereupon, the meeting in the above-entitled matter was concluded at 1:56 p.m.)