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 PIQUA  

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MONDAY  
APRIL 11, 2011  

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The Work Group convened via  
teleconference at 9:30 a.m. Eastern Daylight  
Time, John W. Poston, Chairman, presiding.  

PRESENT:  

JOHN W. POSTON, Sr., Chairman  
R. WILLIAM FIELD, Member  
PHILLIP SCHOFIELD, Member
ALSO PRESENT:

TED KATZ, Designated Federal Official  
ELIZABETH BRACKETT, ORAU Team  
ROGER HALSEY, ORAU Team  
KARIN JESSEN, ORAU Team  
JENNY LIN, HHS  
JOHN MAURO, SC&A  
CHARLES NELSON, DCAS  
JIM NETON, DCAS  
ARIS PAPADOPOULOS, SC&A  
GENE POTTER, ORAU Team  
LAVON RUTHERFORD, DCAS  
MUTTY SHARFI, ORAU Team  
DAN STEMPFLEY, ORAU Team
9:30 a.m.

MR. KATZ: Okay. Let's get started. It's time.

This is the Advisory Board on Radiation and Worker Health Piqua Work Group. We'll begin with roll call, beginning with Board Members, with the Chair.

CHAIRMAN POSTON: John Poston, no conflicts.

MR. KATZ: Thank you.

MEMBER FIELD: Bill Field.

MR. KATZ: Go ahead again, Bill Field, and speak the conflict too, please.

MEMBER FIELD: No conflict.

MEMBER SCHOFIELD: Phil Schofield, no conflict.

MR. KATZ: Very good. Do we have any other Board Members on the line?

Okay. NIOSH-ORAU Team?

DR. NETON: This is Jim Neton, NIOSH, no conflict.
MR. NELSON: Charles Nelson, NIOSH, no conflict.

MR. RUTHERFORD: LaVon Rutherford, NIOSH, no conflict.

MR. SHARFI: Mutty Sharfi, ORAU Team, no conflict.

MS. BRACKETT: Elizabeth Brackett, ORAU Team, no conflict.

MS. JESSEN: Karin Jessen, ORAU Team, no conflict.

MR. HALSEY: Roger Halsey, ORAU Team, no conflict.

MR. POTTER: Gene Potter, ORAU Team, no conflict.

MR. STEMPFLEY: Dan Stempfley, ORAU Team, no conflict.

MR. KATZ: I'm sorry. Can you say that again, the last one?

MR. STEMPFLEY: Dan Stempfley.

MR. KATZ: Dan Stempfley? Thank you.

That's quite a crew.
Is that it for NIOSH-ORAU?

Okay. SC&A Team?


MR. KATZ: Okay. Other federal officials, contractors for the Feds, HHS or other agencies?

MS. LIN: This is Jenny --

MR. KATZ: Whoever that was, I just caught the end of it.

MS. LIN: This is Jenny with HHS.

MR. KATZ: Jenny, hi. Any others?

How about members of the public? Any members of the public who want to identify themselves?

Okay. John, it's your agenda.

CHAIRMAN POSTON: Thank you, Ted. Basically, as I see the agenda, we have two things to consider.
First, the tritium and carbon-14 issue at the Piqua Organic Moderated Reactor.

The other is a recent document that was March 3, 2011 on the neutron exposure at the Piqua Reactor.

These were the two issues as far as I could tell that were outstanding that we needed to have more information on before we could side or make a vote on whether or not to accept NIOSH's recommendation that they could reconstruct dose.

Without any order to this, I would like to start with the tritium and carbon-14. I know that Mr. Papadopoulos is on the line and perhaps it would be good to have sort of a summary of that review of the NIOSH document.

MR. PAPADOPoulos: Okay. We did respond in a paper the SC&A's response on that.

Our final conclusion was that the White Paper -- our response was that we agreed with the NIOSH position on the volatility
issues of tritium and carbon-14. We agreed that it's technically defensible.

I heard about the teleconference about half an hour ago. I don't have in front of me the carbon-14 response or the issue.

But if I recall correctly, we questioned the volatility of the tritium and carbon-14 when at locations or when outside when the coolant was exposed.

The response was the point for which carbon-14 and H3 -- the point where the coolant is solid is in room temperature. Therefore, it does not release as gases the carbon-14 and H3 into the airstream.

There was a technical presentation in the paper in terms of those points. They appear to be technically correct.

CHAIRMAN POSTON: I have a question, perhaps for John Mauro.

John, the paper that I reviewed was labeled draft and it's dated December 20 of last year.
DR. MAURO: Okay.

CHAIRMAN POSTON: Has that been approved? The paper I have wasn't approved by Mr. Papadopoulos nor you, and I was just wondering if that's --

DR. MAURO: What you have in your hand, I can say that it has gone through SC&A's review and approval.

Whether or not it has been actually issued as a White Paper through Nancy Johnson and is officially part of the record, I'd have to check with Nancy. I've been operating on the premise that it has because it has gone through the SC&A's cycle. And the summary that Aris just described is as I recall it.

In fact, if I could add one more point, I believe there was also -- not only was it theoretically argued regarding the solidification issue on the organics. But also there is actually some empirical work, I believe it was in Idaho, a reactor of a very
similar nature which had data which confirmed
that the NIOSH strategy for estimating the
potential for airborne exposure was valid.

As far as this being officially
delivered, I could find out very quickly for
you by just checking with Nancy.

MR. KATZ: John, this is Ted. I
can speak to that. It was officially issued
through Nancy.

DR. MAURO: Very good.

MR. KATZ: Yes.

DR. MAURO: Excellent. So, yes.

That paper is in fact officially on the record
and it's SC&A's position that we find
favorably regarding NIOSH's position.

CHAIRMAN POSTON: I just wanted to
make sure that we checked all the boxes and so
forth here.

DR. MAURO: Sure.

CHAIRMAN POSTON: Any of the Board
Members, Bill or Phil, do you have questions
about the tritium and carbon-14 issue?
MEMBER SCHOFIELD: No. I think the White Paper covered it pretty good.

CHAIRMAN POSTON: Bill?

MEMBER FIELD: No. I didn't have any problems. I thought it was fine.

CHAIRMAN POSTON: Any of the NIOSH staff or no need to comment? Do you have comments you want to make? I don't want to leave you out.

DR. NETON: None here.

CHAIRMAN POSTON: Let's move on to the next issue, which is the neutron exposure. This was issued March 3 so it's only about a month old. I don't know exactly which would be the best way to approach this. I'm at a little bit of a loss. I can't tell whether this particular document -- I really don't remember if this document is an SC&A document. I think it is. Or is it a NIOSH document?

DR. NETON: John, this was a NIOSH document that was generated in response to one
of the comments raised by SC&A.

CHAIRMAN POSTON: Okay.

DR. NETON: In fact, it was in that paper that was just summarized. The only outstanding issue that they identified there was the neutron reconstruction.

CHAIRMAN POSTON: Would it be appropriate then to have NIOSH give us a quick summary of the paper?

DR. NETON: Yes. I think that's appropriate.

CHAIRMAN POSTON: I have read it. Whenever I read something I always put my initials on it and check it so I know I read it. But I'm sort of not functioning as well I perhaps should be today.

Let's go on and discuss this particular document.

MR. NELSON: Okay. This is Charles Nelson. I can summarize the document. Roger Halsey was also quite involved in writing this. He can jump in as
necessary.

Would you like me to give you a detailed review or a cursory review?

CHAIRMAN POSTON: I mean, I've certainly read it and I understood it. I'm an old neutron dosimetrist myself.

Why don't you give us a summary? And if Bill or Phil have questions, we'll go to those first.

MR. NELSON: Okay. That's not a problem.

Some of the areas SC&A was concerned was the number of personnel monitored, were they working in containment, and what types of surveys do you have for the neutron.

That's kind of what the approach of the White Paper was, let's gather all the neutron information we have, let's lay it out and show everybody what exists, and based on that do we have a good collection of evidence to say that neutrons were minimal or really
not an issue, which actually was our conclusion.

As far as monitoring workers, what we relied pretty heavily upon was interviews with an HP technician, health physicists, and workers. Without exception the result of those interviews was that everybody wore badges all the time.

The HP tech said that the folks in the Auxiliary Building wore them and they were exchanged monthly and quarterly. And he never recalled anyone ever forgetting to wear their badge. He said they used RWPs and a checklist prior to going into the area. So they were controlled, the workers going in there.

Also, we have the results of -- it was actually in one of the case files. It was an Atomics International employee. In looking at his records, there was a summary of 31 Atomics International workers that worked in there between the first two and a half years, and it had their results. It showed that
those folks were monitored.

Also the HP tech said not only were Piqua workers monitored; Atomics International people were monitored as well as the AEC representative. He also went on to say that they used NTA-type film.

As we've mentioned before in previous Working Groups, we don't have the actual results of the dosimetry. Those were at Landauer and we have not been successful in recovering those. But we do have AEC summary reports for every year.

We corroborated -- lifted that data and balanced it against one of the reports that we have. Everything matches as far as the doses that the workers received, less than one rem annually for all the years except for 1966.

Okay. That covers the monitoring of workers. That was the first part of that.

The next theme, access to containment. I looked at some of the
transcripts from the first meeting and there seemed to be maybe a little confusion about where the containment was and all that type of information. I'll kind of go over that.

Does everybody have in front of them the Technical Basis, the White Paper for the neutrons?

CHAIRMAN POSTON: I do.

MR. NELSON: It's kind of helpful in looking at some of the pictures.

If you look at page 4, Figure 1, that's a nice view of the reactor containment dome. That would be to the right.

Then you'll see to the left of that but in the center, that's the Auxiliary Building. You see the mounded up dirt all the way around.

Then to the left is the spec.

The reactor and the Auxiliary Building together formed a single structure.

The Auxiliary Building had administrative folks and below it had a filtration and
exhaust system.

There was access between the Auxiliary Building and the main containment. That's considered the 100-foot level. That was an airlock to get into that containment.

Then if you look at the next page, Figure 2, that kind of gives you a good cutaway drawing to show you the people in there at the 100-foot level. That's above the reactor floor.

The reactor is actually below all of that and entombed in concrete, contained within the lower section.

Then looking at one of the documents we've referenced called Piqua Nuclear Power Facility Operating Limits and Controls was a 1965 Atomics International document.

It stated no person shall enter the reactor containment shelf during periods when -- without first obtaining permission from the shift leader. And the work would be
controlled using a special work permit. It also said in that document that they found that radiation throughout the plant was sufficiently low to prevent normal operation and maintenance activities without imposing time limits.

So people were actually in that part of the containment periodically after they verified all the exposure rates in those areas. I think before there was some question of whether people were in containment.

Now to talk a little about the shielding, which becomes very important. If you look at page 6, Figure 3, it has a nice cross-section of the reactor as well as the shielding that's involved.

Looking at that you'll notice that there's a big what's called a bioshield on each side of the reactor. It's 8 feet and, I think, 4 inches -- 6. It's ordinary concrete. Then within the reactor vessel there's some other shielding, the thermal...
shield and that type.

    Above the reactor --

    MR. KATZ: I'm sorry, Chuck. I'm sorry to interrupt.

    Would everybody who is not speaking please mute your phone? We're having a lot of feedback or background noise. If you don't have a mute button, hit *6. That will mute your phone and *6 again will unmute your phone.

    Thank you.

    MR. NELSON: Okay. As far as the reactor goes, if you're going upward from the reactor there is a reactor vessel head at 8 and a half inches of steel. That's a grid lay-in, I guess, that would be below that at 8 inches. Above that there's 17 and a half feet of organic coolant.

    So if you look here and look at all the shielding that's involved, there's quite a bit of shielding to keep those neutrons within the reactor core.
So neutrons aren't an issue unless the reactor is running. Then we have to look at where the exposure points are.

Rather than me going through the entire write-up here, the bottom line is they did many surveys outside of the shielding of the reactor. They did them at various levels as they ramped up power, post-critical operational tests.

We have several statements in the Technical Basis White Paper that support that no neutrons were located except for one location. There are actually some coolant lines that come out the bioshield.

This was found in the interviews with the HP tech. We also found it in progress reports. Everybody talks about the one place where there were some neutrons. They were recorded at less than 0.5 millirem per hour. That was also stated by the HP tech.

In fact, he said that that's the
only location they ever found any neutron unless they were doing a source check. He said they have never had anybody assigned any neutron dose and it was never found on their film badge.

Those locations, like I've mentioned, were in these pump rooms where these coolant lines came out of this big bioshield. There was associated gamma dose rates with them.

If you look on page 8, which is Table 1-2, that was taken right out of one of the reports. What we're looking at is Item 11 and 12.

What it has is, for instance, Item 11 says 13.5. That's millirem per hour. That's the photon exposure rate -- gamma exposure rate with an associated less than 0.5 millirem per hour neutron. Right below that it's 11 millirem per hour gamma and less than 0.5 millirem neutron.

Basically, we looked at those. We
wanted to use those since that's really the only information we have other than all these other things that say, "No, we didn't find any neutrons." This is the only good survey that we have that shows anything about neutrons at any level.

You can look at Items 1 and 3, where it says no neutrons. This is the only, I guess I'd say quantified number. But it still shows less than 0.5 millirem per hour.

Looking at those numbers, that results in about 3.8 percent or 4.5 percent neutrons relative to gamma. We're assigning 10 percent or a one to ten ratio in the Evaluation Report.

The technician used what he called a Long John, which is a long counter. That's a pretty good instrument for measuring neutrons.

That's kind of a quick summary of it. I can go into more detail if you want. But hopefully that gives everybody an idea of
what the White Paper was about and where we're coming from.

CHAIRMAN POSTON: Any questions, Bill, Phil?

MEMBER FIELD: Jim, this is Bill. I just had a question about that 10 percent. Is that the customary ratio?

MR. NELSON: No. We went ahead and did it as claimant-favorable number because the highest -- we would have about -- 4.5 percent was the highest that we found. We believe it to be way less than that but that was just the claimant-favorable number that we found.

CHAIRMAN POSTON: Bill, I know that you're always being admonished for using surrogate data. But in my reactor experience, the answer to your question is that is typical. That's a reasonable assumption that your data shows less but -- moderated reactors -

Hello?
MEMBER SCHOFIELD: Hello?

MEMBER FIELD: Hello?

CHAIRMAN POSTON: Bill, are you there?

MEMBER FIELD: Yes, I'm here.

MEMBER SCHOFIELD: Yes, I'm here.

CHAIRMAN POSTON: Do you have any questions, Phil?

MEMBER SCHOFIELD: No, I don't.

The White Paper seemed to answer most of the questions I had.

CHAIRMAN POSTON: Okay. John, do you or anybody in SC&A have comments?

DR. MAURO: Yes. Aris did have a chance to look at it.

Aris, I think you actually put something out on this too.

MR. PAPADOPOULOS: Yes. We have prepared the response, the basic conclusion of which -- I don't know at what stage it is right now in terms of being official or not. But anyway, it was out of my hands going to
John and the rest of the processing.

Based on my cursory review of the paper, we have concluded that the position is technically defensible. And the paper's extensive close look at the data shows that there are no more concerns or uncertainty issues related with neutron exposures.

We believe that the methodology described in the Evaluation Report is bounding and is claimant-favorable.

CHAIRMAN POSTON: Thank you very much, Aris.

MR. PAPADOPOULOS: Sure.

CHAIRMAN POSTON: Again, just to get it on the record but also to refresh my memory, the recommendation of NIOSH was that you believed that you could reconstruct doses for these workers. That's correct?

MR. NELSON: That's correct. This is the operational period.

MR. PAPADOPOULOS: During the operational --
CHAIRMAN POSTON: During the operational period?

MR. NELSON: Yes. This is Charles Nelson. That's January 1963 through May 1, 1966.

DR. NETON: There is already -- this is Jim Neton - a Class in the D&D phase.

CHAIRMAN POSTON: It's January 1963 through what, again?

MR. NELSON: May 1, 1966.

CHAIRMAN POSTON: Okay.

MR. NELSON: The proposed Class goes from May 2, 1966 through February 28, 1969.

CHAIRMAN POSTON: Okay. So that's already been added?

MR. NELSON: That's already been added.

DR. NETON: That's correct. That's an added plus.

CHAIRMAN POSTON: But we don't have to consider that in this?
MR. NELSON: No.

CHAIRMAN POSTON: All right.

Bill, I'll try to enunciate. Bill, do you have any additional questions?

MEMBER FIELD: Yes. I just have a couple maybe Jim could answer.

During this operational period there were no reports of accidents or the reactor operating above full power?

MR. NELSON: This is Charles Nelson. No. I didn't see anything. I saw that they went up to 100 percent of power but no accidents or any exceedance of 100 percent. I didn't see anything relative to that.

I mean, we asked in the interviews about accidents and there were two issues brought up, and we found them in reports. We talked about them actually during the initial presentation to the Board.

MEMBER FIELD: Right.

MR. NELSON: But that was, they had a spill and this material went to near-
room temperature. As soon as it gets below 300 degrees it solidifies into a wax. They said they simply just scraped it up with a flat shovel and it was no big deal, no airborne, no contamination event whatsoever.

MEMBER FIELD: Right. But nothing new since then?

MR. NELSON: No.

MEMBER FIELD: Okay. Thanks. That's all I had.

CHAIRMAN POSTON: It seems that it's appropriate that we have some sort of motion. We've certainly discussed the issues. I think it's inappropriate for the Chair to make a motion so I'll turn it over to one of you guys.

MEMBER FIELD: Yes. This is Bill. I'm more than happy to make a motion to accept the recommendation.

CHAIRMAN POSTON: Is there a second?

MEMBER SCHOFIELD: I'll second
chaired that motion.

CHAIRMAN POSTON: Okay. Is there additional discussion before we vote on this motion? Certainly if there's any questions, lingering questions or concerns, I want to make sure that they're addressed while we have everybody here.

Hearing none, I would ask Ted to call for a swift vote.

MR. KATZ: Go ahead. There's three of you, so one at a time.

MEMBER FIELD: This is Bill Field.

Yes.

MEMBER SCHOFIELD: This is Phil Schofield. Yes.

CHAIRMAN POSTON: John Poston.

Yes.

MR. KATZ: And that would be unanimous in favor of awarding the NIOSH recommendation that dose reconstruction is feasible for this Class.

CHAIRMAN POSTON: For January 1963
through May 1966.

Ted, I have a procedural question for you.

MR. KATZ: Yes?

CHAIRMAN POSTON: We have a telephone meeting coming up. Should we report then or should we wait until the next Board meeting which is also coming up?

MR. KATZ: Let me settle that with Dr. Melius as to whether he wants that to happen during a teleconference. Generally we like to keep these to the face-to-face Board meetings. I don't know if this is an exception or not.

CHAIRMAN POSTON: I didn't think it was an exception but I was just wondering what the procedure is.

MR. KATZ: Right. I would plan on making a presentation to the full Board. At this time I would just plan on doing that for the May meeting unless you hear differently. I'll get back to you very shortly on your
question.

CHAIRMAN POSTON: Okay. That makes me happy because you know my situation.

MR. KATZ: Yes.

CHAIRMAN POSTON: I may not be available.

MR. KATZ: Then it's simple to just keep it to May. I don't even need to raise the question with Dr. Melius.

CHAIRMAN POSTON: All right. I want to thank everybody for their hard work on this, their professionalism, and so forth. I'm glad that we were able to resolve these issues and come to a unanimous agreement on the path forward.

I appreciate SC&A, NIOSH, everybody that's participated, and certainly the two Work Group Members.

If there's no other questions, comments, or statements, I think this meeting should be adjourned.

Any other --
MR. KATZ: No. Thank you, John.
And thank you everybody.
(Whereupon, at 9:59 a.m. the meeting was concluded.)