

Dragon, Karen E. (CDC/NIOSH/EID)

From: Daniel Mckeel
Sent: Thursday, June 13, 2013 6:00 PM
To: NIOSH Docket Office (CDC); Ziemer, Paul (CDC/NIOSH/OD); pl.ziemer@comcast.net; Katz, Ted (CDC/NIOSH/OD); Allen, David (CDC/NIOSH/DCAS); Neton, Jim (CDC/NIOSH/DCAS); Hinnefeld, Stuart L. (CDC/NIOSH/DCAS); Hinnefeld, Stuart L. (CDC/NIOSH/DCAS); jmauro@scainc.com; anigstein@cs.com
Cc: danmckeel Kinman, Josh (CDC/NIOSH/DCAS)
Subject: New white paper critique of Allen "Square Function Approximation" paper (June 2013)
Attachments: McKeel_REAllenJun13_Paper.pdf

NIOSH Docket 140 (GSI) Office
Dr. Ziemer and members of the TBD-6000 work group
NIOSH and SC&A work group members
Ted Katz, ABRWH DFO
Josh Kinman, SEC Counselor

Please consider the attached PDF white paper as a Discussion paper for the 6/20/13 TBD-6000 work group meeting. The paper is authored by Daniel W. McKeel, Jr., MD, and is titled: **A critique of the David Allen DCAS white paper dated June 2013 "Square Function Approximation to Estimating Inhalation Intakes"** – the 5/28/13 GSI technical call is also critiqued.

Ted Katz, please distribute this paper to all ABRWH members.

NIOSH Docket Office: Please consider posting this paper to Docket 140 on the DCAS website and listing it as a Discussion paper on the TBD-6000 work group meeting page.

Thank you for your consideration.

Sincerely,

-- Dan McKeel June 13, 2013 Thursday

Daniel W. McKeel, Jr., MD
GSI SEC-00105 co-petitioner

**Critique of David Allen DCAS June 2013 White Paper
“Square Function Approximation to Estimating Inhalation Intakes”**

Rebuttal White Paper by

Daniel W. McKeel, Jr., MD
GSI SEC-00105 Co-petitioner
(June 13, 2013)

Important Background Information

This is a critique of the PA-cleared version of an 11 page David Allen/DCAS white paper about General Steel Industries (“GSI”) sent to GSI SEC-00105 co-petitioner Dan McKeel by NIOSH SEC Counselor Josh Kinman on Friday 6/7/13. This paper is listed as a discussion paper for the TBD-6000 work group that is scheduled for 6/20/13. No agenda is yet posted for this meeting on the DCAS website.

Based on the content of a very brief (less than one page) summary of a 5/28/13 NIOSH and SC&A technical call telephone conference provided to me via e-mail by DFO Ted Katz two days later on 5/30/13 (**Attachment A**), **I believe the topic of this paper originated during that 5/28/13 secret-from-the-public technical conference call.** The active participants in the GSI 5/28/13 technical call included David Allen and James Neton of DCAS, John Mauro and Robert Anigstein of SC&A, and Ted Katz DFO. Mr. Katz’ intervention was the last bullet point of the *call summary that was anonymously authored*. Paul Ziemer, chair of the TBD-6000 work group, listened into the meeting without adding to the discussion, based on an e-mail Dr. Ziemer sent to Dan McKeel on 6/3/13.

Mr. Katz denied McKeel’s request prior to this 5/28/13 technical call, in McKeel’s role as GSI SEC co-petitioner, to listen to this meeting. The mere existence of the meeting was obfuscated from the beginning. McKeel had first to determine whether any NIOSH-SC&A technical calls had ever been held regarding the GSI site and was told “No, “ they had not. Dan McKeel was told initially on 2/28/13 by NIOSH SEC Counselor Josh Kinman that, “*as far as I am aware,*” NIOSH did not “*track*” technical calls from any AWE or DOE site. (**Attachment B**).

McKeel then produced evidence in the form of a Procedures Review subcommittee meeting transcript that involved Dr. Anigstein and Steve Marschke of SC&A and another technical call. (**Attachment C**). That transcript documented that Dr. Anigstein circulated an e-mail to work group colleagues who had *not participated* in the technical call, and then Steve Marschke had placed Dr. Anigstein’s e-mail notes about the technical call into the Board Review System (“BRS”) database. BRS is a NIOSH developed database that primarily serves the needs of the Procedures Review subcommittee of the ABRWH that is headed by member Wanda Munn. The public currently has no access to this ABRWH resource that has been in development for several years. It is unclear to McKeel whether results of other technical calls have been similarly documented.

Overview of Strengths and Weaknesses

A. **Strengths:** The paper is a purely mathematical and theoretical analysis of a “square wave approximation” method proposed by NIOSH at a date, time and place that are not specified or referenced. Unwittingly, I am certain, this paper strongly supports a key argument I have made in writing before, that has been ignored by NIOSH, with respect to OCAS-IG-003.

That is, that ALL (100% of) each and every radiation source term at an AWE site such as GSI MUST BE plausibly bounded, with sufficient accuracy, during the operational (AEC contract) period before an overall sufficiently accurate bounding external or internal dose can be determined. Figure 2 on page 3 of the Allen (DCAS) June 2013 white paper shows this relationship nicely.

If NIOSH properly bound all source terms, the collective dose would be additive, as in Figure 2, and the summed peak dose would exceed the highest of the single highest source doses. NIOSH previously has chosen to *ignore* this crucial relationship.

NIOSH has simply cherry-picked the alleged highest dose source and used it, alone, to bound other sources. For example, at GSI, NIOSH first stated in 2007 (GSI Appendix BB) and 2008 (GSI SEC-00105 evaluation report) that the ***New Betatron operator external doses*** were bounding for the GSI Old Betatron, the two GSI 250 KVP x-ray machines, and the GSI Ir-192 sources. Later, in 2012, NIOSH was working on the hypothesis that GSI “***layout workers,***” which is not an actual standalone job category at GSI, received the highest external dose.

Now, in 2013, NIOSH appears to be saying during 1953 through 1962 (the “radium era”), the GSI ***radium isotope radiographers*** received the highest doses, ignoring the Old Betatron external photon and neutron and beta doses, the two GSI 250 KVP x-ray sources doses and the GSI Ir-192 source doses. NIOSH continues to ignore the first three months of the GSI operational period from October 1, 1952 through 12/31/52, that was finalized by DOL and DOE in December 2012.

B. **Weaknesses:** For brevity, I will list my view of the weaknesses as bullet points:

1. The major weakness is the June 2013 Allen white paper does not mention the same topic was a main topic at the 5/28/13 NIOSH and SC&A first GSI technical call in history. Why was that fact not acknowledged? **Here is what the 5/28/13 GSI technical call summary states, in part:**

- *The DCAS modeling approach, as proposed, simplifies the exposure pattern at GSI to a square wave function in which the 95th percentile of the surrogate data for comparable operations aerosol levels is applied to operational periods and the modeled re-suspension exposure is applied to all other periods (non-uranium operations) during the AEC operational era at GSI.*
- *A concern of SC&A staff regarding this model is that the proposed square wave function simplification may not conservatively estimate the combined total exposure of workers (uranium operations + non-uranium operations). Specifically, SC&A staff members are concerned that if the decrease of the exposure level following the termination of an operational period is slower than the increase of the exposure level at*

the beginning of an operational period, then the square wave function may underestimate the net contribution to exposure associated with the uranium operations.

2. There is no attempt to relate the plausibility of the Allen “square wave approximation” mathematical formulae to the real world GSI uranium inhalation intake doses during the operational or residual periods for which there is no (zero) real measured data (general [ambient] air, breathing zone, process samples; or urine uranium bioassay samples).

3. The source derivation of the formulae used is not referenced as methods in scientific papers must be;

4. At the 4/26/13 TBD-6000 work group meeting, the discussion of inhalation intakes of uranium during the radium era centered around a “triangular distribution” model that SC&A’s John Mauro first introduced and that found some support. However, the WG (Board/SC&A, and NIOSH were unable to agree on exact values to assign to the doses at the triangle apices. That fact was a major impetus of the need to hold a technical call on 5/28/13. How does this paper augment or complement the “triangular distribution” discussion on 4/26//13?;

5. The **Background** section of the June 2013 Allen white paper being critiqued fails to clearly state where the mandate or rationale for offering this paper originated. That is, who called for a “square function approximation,” and why does Mr. Allen and NIOSH consider this paper to move the discussion of 4/26/13 by the TBD-6000 work group forward?;

6. This paper fails to mention either Adley *et al* 1952 [REF 1] and the Hanford Melt Building paper, nor does it mention OTIB-070, that are also candidate sources for a GSI uranium intake model.

Critical Analysis of the Paper

The remainder of the analysis utilizes section headings and page numbers from the 11 page Allen report.

“Background” section heading, page 1: The second paragraph states that:

“SC&A raised a concern that the airborne activity does not diminish instantly, and that therefore the NIOSH approach could underestimate the intakes received by workers.”

Adley *et al*, reviewed in REF 1, clearly indicates that, at Hanford, resuspended airborne uranium dust, in fact, stayed in the air a very long time even in quiescent production areas. At GSI during the operational and residual periods, there were repeated cycles of disturbance of the settled uranium dust as I have documented thoroughly in other white papers.

“Equations Describing Airborne Activity” section heading, page 1. The analysis is theoretical and very basic. What is left out is that the actual measured removal rate of uranium at GSI at GSI is completely unknown.

“Single Episode” subheading, page 2. The absolute shape and slope of the ascending curve, the shape of the descending curve, and precise mathematical equations needed to emulate both portions of the curve may not be as drawn. Thus, the curve is only one possible scenario for the “buildup” and “decline” phases of the graph.

“Intermittent Episodes” subheading, page 2. The lead paragraph needs emphasis as an argument that also applies to implementation of OCAS-IG-003 to dose reconstruction at AWE sites. **That is, the total bounding dose is both an “additive effect” of the various component sources, and the peak dose achieved will be “higher” than will the dose be from any one source.** I thank Mr. Allen and NIOSH for finally acknowledging this fact on the record.

My comments on the Figure 2 “saw tooth graph” are the same as for the buildup and decline portions of the single episode curve. Each “tooth” could have a different magnitude and shape to the ascending and descending limbs. Again, this graph represents a purely theoretical curve not backed up by any real data from GSI or any other identified AWE site. Thus, in the Board surrogate data criteria, this is one step removed from even the use of surrogate data when real measured data from a site is not available. It is true that the integrated dose under the saw tooth curve would be equal to the summed uranium intake, or for the summed doses from all source terms if OCAS-IG-003 were being applied correctly.

“Attachment A” (pages 10 and 11) subheading, page 3. The main scientific problem for Attachment A equations I see is they assume, without offering any proof, that both limbs of the saw tooth curve are exponential. That needs to be proven using real measured data, and that is not done in this purely theoretical paper.

Figures 3 and 4, page 4. In neither graph do the airborne and square function values match closely enough to be acceptable. The “airborne” curve data is not real measured data, or at least that is not stated.

Figures 5 and 6, page 5 purport to show, according to Allen, the airborne and square function curves will “eventually be equal but the square function reaches the final value faster.” That is a pure assumption given certain limiting parameters such as both limbs of the square curve are exponential. Perhaps as in the very low dose effective dose from the atomic bombs, The low end of the dose response curve is not strictly linear but has a quadratic shape. This has been argued since the bombs were dropped in 1945! Where is Mr. Allen’s real measured data? Has this model been applied at any other AWE site?

“Effect of Different Removal Rates” section heading, page 6. Graphs 7, 8 9 and 10 of different $\lambda = 0.001$ to 1 removal rate parameters cause increasingly large separation between the **theoretical** airborne and saw tooth square function curves over time.

“Approximation” section heading, page 8. The premise behind the approximation

"would be to assume a continuous intake with the production rate prorated to account for the fraction of time operations occurred."

The problem is, air disturbances based on copious worker testimony, were anything but continuous. Such disturbances were cyclical, intermittent, and multifactorial. In the New Betatron shooting room facility at GSI, for example:

a) **During the operational period** there was intermittent (irregular) industrial vacuum sweeping, irregular movement of men and castings, intermittent railroad transfer cars entering and leaving with opening and closing of the ribbon doors, together with 24/7 year around blowing caused by gas furnaces suspended high up on the Betatron room walls.

b) During the residual period there was documented power washing, building renovation for classrooms, and multiple owners conducting steel making operations such as pickling until the end of the period in 1992.


Page 9, paragraph 2. Allen states:

"This analysis implies that any airborne activity applied throughout a period of time must be prorated for the amount of time actual operations occurred."

The petitioners firmly assert this is not possible given the total lack of real measured uranium air inhalation intake data at GSI 1952 through 1992.

Conclusion by Petitioners. These patterns of air intake disturbances clearly do not fit a "continuous intake" model assumption for GSI intakes for any period. Thus "**Figure 3—Airborne Activity from Multiple Episodes with Approximation Superimposed**" is scientifically inaccurate and misleading based on the real world facts stated qualitatively only. The petitioners and site experts at GSI assert the absence of any real measured intake data at GSO precludes plausible sufficiently accurate upper bounding of airborne MCW-uranium or activated steel dust or ingestion intakes at General Steel Industries at 1417 State Street in Granite City, IL (SEC-00105 and Appendix BB to Battelle TBD-6000).

References

1. Submission from Daniel W. McKeel, Jr., M.D., Analysis of the Adley et. al. 1952 Hanford Melt Plant Technical Report
(June 7, 2013) DCAS website: www.cdc.gov/niosh/ocas/
 PDF 782 KB (23 pages)

Enclosures: Attachments **A** (5/28/13 technical call summary; **B** (Kinman email to DWM dated 2/28/13, technical calls not tracked; and **C** (Procedures Review subcommittee proof that some technical call notes are recorded and saved to the BRS BY SC&A).

ATTACHMENT A

GSI TECHNICAL CALL

SUMMARY 5/28/13

(one page)

GSI TBD (Appendix BB) Review Staff Technical Conference

May 28, 1:00 p.m.

Attendance: Paul Ziemer (ABRWH TBD 6000 Work Group Chair), Jim Neton (DCAS), Dave Allen (DCAS), John Mauro (SC&A), Bob Anigstein (SC&A), Ted Katz, ABRWH DFO

Summary:

The staff met by teleconference to clarify elements of the modeling approach being proposed by DCAS for estimating internal doses at GSI and concerns regarding the approach as understood by SC&A staff, and similarly to clarify an alternative approach proposed by SC&A in its April 24, 2013 memorandum and to clarify concerns regarding this approach as understood by DCAS staff. The discussion produced the following clarifications:

- The DCAS modeling approach, as proposed, simplifies the exposure pattern at GSI to a square wave function in which the 95th percentile of the surrogate data for comparable operations aerosol levels is applied to operational periods and the modeled re-suspension exposure is applied to all other periods (non-uranium operations) during the AEC operational era at GSI.
- A concern of SC&A staff regarding this model is that the proposed square wave function simplification may not conservatively estimate the combined total exposure of workers (uranium operations + non-uranium operations). Specifically, SC&A staff members are concerned that if the decrease of the exposure level following the termination of an operational period is slower than the increase of the exposure level at the beginning of an operational period, then the square wave function may underestimate the net contribution to exposure associated with the uranium operations.
- The SC&A approach, as proposed, does not attempt to model exposures during the AEC operational era at GSI "mechanistically", to directly reflect and account for differing exposure levels during periods of uranium operations and periods of non-uranium operations. Instead, it would apply an arithmetic mean (average) exposure level (based on the same surrogate data sets applied by DCAS) to all work time, avoiding the use of any assumptions about the timing and periodicity of the uranium operations.
- A concern of DCAS staff regarding this approach is that it may be more simplified than warranted given the information available for modeling and, as a consequence, it may produce overly conservative estimates of internal dose.
- SC&A staff noted that the number of days to be applied to deposition modeling might need discussion at the Work Group meeting, as might the determination of the initial exposure level during the residual period at GSI, as applied under OTIB 70.
- The DFO asked whether any adjustment was applied to the contractual labor hours information to account for concurrent work by multiple production employees and for administrative work, to estimate the operational time handling uranium. No adjustment was made.

ATTACHMENT B

NIOSH SEC Counselor

E-Mail to McKeel 2/28/13

(one page)

In a message dated 2/28/13 3:02:32 PM, eky1@cdc.gov writes:

Hi Dan:

At this time and after discussing this among DCAS staff members. I can inform you that we do not have records of such calls. Also, I am not aware that we track such calls or meetings. As explained to me, the only calls between NIOSH/SC&A would be worker interviews. I think you were on those calls, according to Mr. Allen.

If I am able to find any records later, I will let you know. At this time we have none because we do not record or track such meetings that do not involve worker interviews.

Josh

From: Daniel McKeel
Sent: Thursday, February 28, 2013 2:53 PM
To: Kinman, Josh (CDC/NIOSH/DCAS)
Cc:
Subject: GSI technical meetings

Josh,

You were checking for me about any NIOSH and SC&A technical meetings that have been held since 2007. Do you have any results to report on this query?
Thanks.

-- Dan 2/28/13

Daniel McKeel

ATTACHMENT C

Procedures Review Transcript

Excerpt RE: technical calls are

Documented by e-mail & BRS

From: Daniel Mckeel

To: tmk1 <tmk1@cdc.gov>; eky1 <eky1@cdc.gov>; pl.ziemer <pl.ziemer@comcast.net>; paz7 <paz7@cdc.gov>; wimunn <wimunn@aol.com>; j-poston <j-poston@tamu.edu>; josiebeach <josiebeach@charter.net>; Josie_J_Beach <Josie_J_Beach@rl.gov>; hls8 <hls8@cdc.gov>; stuart.hinnefeld <stuart.hinnefeld@cdc.hhs.gov>; dka6 <dka6@cdc.gov>; jmauro <jmauro@scainc.com>; low0 <low0@cdc.gov>; anigstein <anigstein@cs.com>; jfn2 <jfn2@cdc.gov>

Cc: danmckeel2

Subject: Re: GSI technical meetings, reply

Date: Fri, May 10, 2013 3:13 pm

Attachments: ProcRevSubcom_3.5.13_p27.pdf (28K)

Dear Ted and Josh, TBD-6000 work group members (Board, NIOSH, SC&A)

The attached PDF file excerpt from the March 5, 2013, Procedures Review Subcommittee meeting, page 27, refutes Josh Kinman's statement below that results of NIOSH and SC&A technical meetings are not tracked. Steve Marschke of SC&A recounts to chair Wanda Munn, regarding a technical call dealing with TIB-10 apparently, that Steve took Bob Anigstein's e-mail account to others not attending the technical call and inserted it into the Board Review System (BRS) database. Thus, some content of this particular technical call was tracked and kept on permanent record both as e-mails and in the BRS. Of note, that resource is not available to the public or to petitioners.

I was informed at the TBD-6000 work group meeting that no previous NIOSH/SC&A technical calls have been made concerning the GSI site. However, a **GSI technical call is planned between NIOSH and SC&A between the TBD-6000 WG 4/26/13 meeting and the next WG meeting on June 2, 2013.** I therefore request being informed about that technical meeting and its results, based on the new premise that technical calls are sometimes tracked by e-mail and by being entered into the BRS database.

Ted Katz, please distribute this memo to all Board members to correct the incorrect impression that NIOSH and SC&A technical call results are not tracked. Thank you.

-- Dan McKeel 5/10/13 Friday

Daniel Mckeel

-----Original Message-----

From: Katz, Ted (CDC/NIOSH/OD) (CDC/NIOSH/OD) <tmk1@cdc.gov>

To: DanMcKeel

Sent: Mon, Apr 1, 2013 11:28 am

Subject: RE: GSI technical meetings, reply

Distributed. --Ted

From: DanMcKeel

Sent: Friday, March 29, 2013 11:06 AM

To: Kinman, Josh (CDC/NIOSH/DCAS); Katz, Ted (CDC/NIOSH/OD)

Cc: ; pl.ziemer@comcast.net; Ziemer, Paul (CDC/NIOSH/OD); wimunn@aol.com; j-poston@tamu.edu; josiebeach@charter.net; Hinnefeld, Stuart L. (CDC/NIOSH/DCAS); Hinnefeld, Stuart L. (CDC/NIOSH/DCAS); Neton, Jim (CDC/NIOSH/DCAS); Allen, David (CDC/NIOSH/DCAS); jmauro@scainc.com; Wade,

Lewis (CDC/NIOSH/OD) (CTR);

Subject: Re: GSI technical meetings, reply

Dear Josh,

I request that Ted Katz please distribute this message thread to all Board members.

I am not sure I replied to this first paragraph last February. Thank you for resending the link. I am really surprised and amazed to learn that NIOSH/SC&A technical meetings are not tracked.

I know that technical meetings can be long meetings that address important points about SECs and site profiles and DR issues. I recall one technical conference for Bethlehem Steel called specifically to answer petitioner questions. This reminds me that early on we had a two hour phone call with Larry Elliott, who was then OCAS Director. I believe SC&A members may have been parties. As you mention, no transcript emerged. This was not billed as a formal "technical meeting" of the type I am inquiring about. I do understand there may be budgetary constraints as well.

Nevertheless, not tracking or having minutes or meeting summaries of technical meetings is a huge and shortsighted omission in my view that must be remedied. To make sure the TBD-6000 work group is aware of this matter, I will circulate this exchange to parties involved in the TBD-6000 work group. I will also send a copy to Dr. Lewis Wade, who has always strongly advocated having the most complete written record possible on EEOICPA part B matters.

Since technical meetings are not tracked, I will take your response as establishing only that one fact, and not that technical meetings between NIOSH (OCAS and DCAS) and SC&A about GSI matters have never occurred. I will follow your suggestion and submit a FOIA request to get to the bottom line on this important matter.

Thank you for your efforts. From your 3/29/13 e-mail further response about this matter, I gather no new information has emerged since February 2013. Thanks, too, for your fact finding efforts.

Sincerely -- Dan McKeel 3/29/13 Friday

In a message dated 2/28/13 3:02:32 PM, eky1@cdc.gov writes:

Hi Dan:

At this time and after discussing this among DCAS staff members, I can inform you that we do not have records of such calls. Also, I am not aware that we track such calls or meetings. As explained to me, the only calls between NIOSH/SC&A would be worker interviews. I think you were on those calls, according to Mr. Allen.

If I am able to find any records later, I will let you know. At this time we have none because we do not record or track such meetings that do not involve worker interviews.

Josh

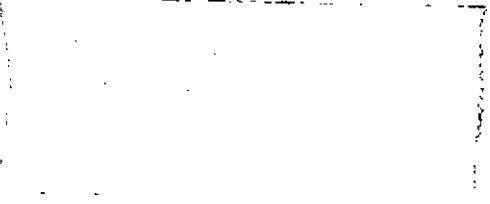
From: Daniel McKeel [mailto:danmckee@cdc.gov]
Sent: Thursday, February 28, 2013 2:53 PM
To: Kinman, Josh (CDC/NIOSH/DCAS)
Cc: danmckee@cdc.gov
Subject: GSI technical meetings

Josh,

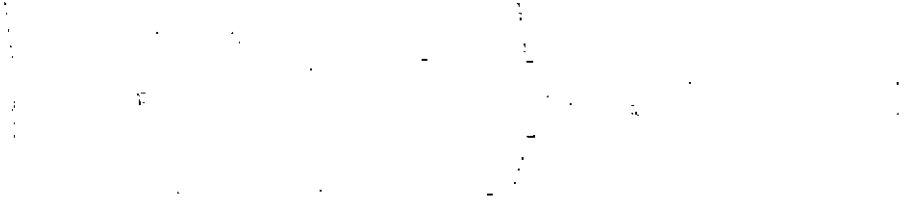
You were checking for me about any NIOSH and SC&A technical meetings that have been held since 2007. Do you have any results to report on this query? Thanks.

-- Dan 2/28/13

Daniel McKeel



Daniel W. McKeel, Jr., MD
GSI SEC co-petitioner



1 MR MARSCHKE: Correct.

CHAIR MUNN: That's good. Are you 2 okay then, Steve? 3

MR. MARSCHKE: Yeah. So what I 4 did, excuse me. After the technical call, Bob 5 Anigstein sent out an email to everyone who 6 was not on the technical call, and I took the 7 gist of that email and inserted that into the 8 BRS. 9

So you'll see, if you go to TIB-10 0013-04, you'll see the last entry is now from 11 Bob, and it's basically his email, where he I 12 think previously, we had used some angular 13 dependence out of ICRP-74.

PP 86-87

MR. KATZ: They've all been 18 closed. 19

CHAIR MUNN: Yes, we have closed 20 them all. The radon issues were actually 21 closed before. 22

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This transcript of the Advisory Board on Radiation and Worker Health, Procedures Subcommittee, has been reviewed for concerns under the Privacy Act (5 U.S.C. § 552a) and personally identifiable information has been redacted as necessary. The transcript, however, has not been reviewed and certified by the Chair of the Procedures Subcommittee for accuracy at this time. The reader should be cautioned that this transcript is for information only and is subject to change.

=====

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DR. H. BEHLING: Yes. Those 1 were, the radon issue, I believe, was Bob 2 Anigstein's issue.