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

From: DanMcKeel
Sent: Friday, April 05, 2013 1:32 PM
To: pl.ziemer@comcast.net; Ziemer, Paul (CDC/NIOSH/OD); wimunn@aol.com; j-poston@tamu.edu; josiebeach@charter.net; Katz, Ted (CDC/NIOSH/OD); NIOSH Docket Office (CDC); Hinnefeld, Stuart L. (CDC/NIOSH/DCAS); Hinnefeld, Stuart L. (CDC/NIOSH/DCAS)
Cc: danmckeel2@aol.com;
Subject: McKeel Discussion paper for 4/26/13 TBD-6000 work group meeting
Attachments: McKeel_ReAllenGSI_4.2.13.pdf

Dear Dr. Ziemer, DCAS Director Hinnefeld, Ted Katz, NIOSH Docket 140 officer, and members of the TBD-6000 work group and ABRWH,

Attachment: <McKeel_ReAllenGSI_4.2.13.pdf> 890 K

Enclosed is my commentary on David Allen's April 2, 2013, white paper "Issues Raised in February 21, 2013 Work Group Meeting." Attachment 1 deals with new information on the GSI stolen radium plumb bob overexposure incident (as defined in 42 CFR §83.9) that occurred in October 1953. According to §83.9, such radiation overexposure incidents require NIOSH to do further research and investigation, beyond worker affidavits, into matters of this type. The stolen plumb bob matter was first brought to the attention of NIOSH and the Board in 2006 in GSI worker outreach meeting transcripts.

I believe it is important that the TBD-6000 work group not merely acknowledge receipt of this important paper, but also to evaluate its content. The paper is highly relevant to assigning external doses during the radium era and residual periods at GSI. It also includes very important information about definitions of GSI radiographers, employees who did layout, and non-radiographers. The paper also documents that DOL cannot make this particular job distinction at GSI. I request this new GSI Discussion paper be specifically added as an agenda item on the 4/26/13 TBD-6000 WG agenda. I also request that SC&A be tasked to review this paper, and that NIOSH comment on it as well at the 4/26/13 WG meeting.

Ted Katz, please distribute this paper to the entire ABRWH and to appropriate TBD-6000 staff members.

NIOSH Docket officer, please add this paper as a Discussion paper for the 4/26/13 TBD-6000 work group and for GSI Docket 140.

Thank you for your consideration.

Sincerely – Dan McKeel April 5, 2013

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

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

Response to David Allen and DCAS White Paper Dated April 2013:
"Issues Raised in February 21,2013 Work Group Meeting"
PA Cleared Version Released April 1, 2013

(April 5, 2013)

This paper is in response to David Allen's April 2013 paper requested by Paul Ziemer, chair of the TBD-6000 work group at its 2/21/13 meeting. I have already submitted my annotated notes to the same WG about the 2/21/13 meeting and the many dosimetry assignment issues raised. This paper is now posted on the DCAS website under Docket 140:

URL: http://www.cdc.gov/niosh/ocas/gsi.html

- Annotated transcript of notes submitted by Daniel W. McKeel, Jr., M.D. from the February 21, 2013, meeting of the Advisory Board's Work Group on TBD 6000 (March 12, 2013)
  PDF 2 MB (139 pages)

There was tremendous confusion as to exactly what doses had been assigned, and about which job categories should be used.

McKeel comments on page 1, Background.

• **Point 1**: Dan McKeel perceived that external dose to both radiographers, which the work group, SC&A and NIOSH could not agree on a definition of on 2/2/13, and to non-radiographers was to be clarified in the next Allen/DCAS white paper.

• **Point 2**: On 2/21/13, there was marked disagreement among the work group ABRWH members, SC&A and NIOSH as to the overlap between the term **"layout man"** as used by SC&A and by DCAS and Mr. Allen. The petitioner's further research since the February meeting suggests that "layout" (man, person) is not one of the 163 official job categories at GSI. Additional worker interviews by GSI site expert[illegible] the interim period strongly suggest that, in fact, all layout was done by radiographers, while conversely, all radiographers were not layout men. Mr. Allen chose not to delve into the thorny issue of layout man terminology in this paper.

▪ **Point 3**. The dose assignment and intake model to be used during the operational and residual period were left to be defined by NIOSH in this paper. Co-petitioner Dan McKeel expressed his strong opinion that TIB-070 was not applicable to the GSI residual because of the many companies that did work power washed and renovated New Betatron Building repeatedly

McKeel comments on Non-Radiographer Dose Estimate pre-1963 (Radium Era)

(a) Petitioners challenge Allen's assertion that "*both (SC&A and NIOSH) agreed that the majority of of radiography with the small isotopic sources occurred inside the radiography room.*" Interviewee and other GSI radiographers stated that the Ra-226 small sources were used throughout the plant, including other parts of 6 building. NIOSH and Allen continue to ignore this valid testimony [REF 1].

(b) Petitioners assert that NIOSH must bound Ra-226 NDT source doses inside the 6 building; that is their assigned task under part B of EEOICPA. SC&A is supposed to evaluate NIOSH's scientific methods. NIOSH cannot delegate their work to SC&A and still maintain that NIOSH bounded the dose when SC&A did the work.

(c) Also, Dave Allen states that the SC&A model was based on NCC Cobalt-60 dosimetry that does not apply to Ra-226. The SEC-00105 co-petitioner has just received the final response from NRC FOIA/PA 2013-00191 stating that agency has no records that matched the Nuclear Consulting Corp. (NCC) or the St. Louis Testing Laboratories license numbers given in NRC FOIA/PA 2010-0012 that Mr. Allen quotes liberally as a definitive source in this paper. NRC formerly provided 1,016 pages of GSI AEC by-product license material to co-petitioner Dan McKeel in 37 component documents that comprise NRC FOIA 2010-0012, Links to the complete FOIA set of documents may be found on the DCAS website. Thus, in effect, NIOSH invalidates the SC&A Bldg. 6 radiography room Ra-226 model by referring only to Co-60 source data. It appears that NIOSH is unable to validly model Ra-226 in the GSI Bldg. 6 radiography facility using their own methods. In fact, NIOSH and SC&A both lack any measured Ra-226 source data to validate the SC&A model. The petitioners therefore contend the Ra-226 building 6 doses that Allen proposes in this paper are invalid and the doses have not thus far been able to be bounded with sufficient accuracy.

This finding underscores why the petitioners contend (a) the Board was misled on 12/11/13 as to NIOSH's ability to bound with sufficient accuracy all external doses for all workers in the potential SEC-00105 class with sufficient accuracy, and (b) the full Board vote on GSI SEC-00105 at its December meeting was premature and based on a false belief that NIOSH could plausibly bound all internal and external doses at GSI. This Allen DCAAS April 2013 white paper, together with the McKeel annotated and court reporter version of the February 21, 2013, TBD-6000 work group meeting transcript prove that NIOSH cannot meeting the statutory requirements of dose determination with sufficient accuracy.

(d) Petitioners challenge the plausibility of using the NCC/Konneker Co-60 1962 survey because the sources differ from Ra-226 in strength and isotope photon energy spectrum and decay rates (t1/2 Co-60 = 5.2 yrs vs 1646 yrs T1/2 for Ra-226.

(e) Ra-226 decays to produce radon-226 gas. WG chair Ziemer has noted that Ra-226 sealed sources such as those used at GSI were notorious for leaking, and we know that both NCC and St. Louis testing Labs performed leak tests for GSI sealed sources. **NIOSH must therefore bound radon-222 inhalation doses at GSI during the entire radium era, which we now know is 10/1/1952 through 12/31/1962**. Allen did not account for RADON dose or for the extended GSI operational period to the last quarter of 1952. The petitioners have recently again documented these facts and placed them again on the written record.

(f) David Allen also omitted addressing in this paper new information Dan McKeel circulated to NIOSH, SC&A, the TBD-6000 and the full Board on March 12, 2012, about a documented overexposure incident (42 CFR §83.9) that must be investigated in more detail by NIOSH. See the following:

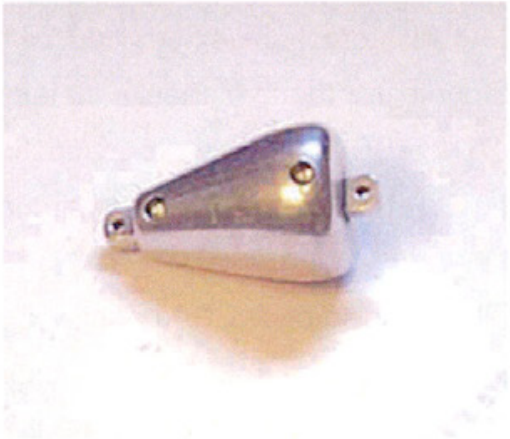
Attachment 1 (7 page source ref): Filename: GSI_RadiumPlumbBob1953.pdf
Research by GSI site expert found stories from two Illinois newspapers, the Edwardsville Intelligencer, and the Granite City Press-Record, disclosed that a radium containing plumb bob source became missing at GSI that was recovered about a week later between approximately October 20 and 27, 1953. The petitioners contend that "plumb bob" is a term used almost exclusively to identify a radium-226 NDT source with that basic shape:

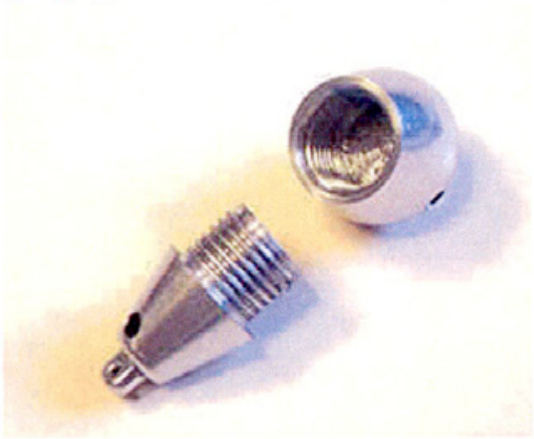
Radium Industrial Radiography Source (ca. 1940s)

http://www.orau.org/ptp/collection/Sources/radiumradiog.htm

eries Knape & Vogt HTML 4.01 Quick List New Dx Criteria AD 2011 PwrMacG5 2...eryMac.com Kate Wolf Re...elf To

Radium Industrial Radiography Source (ca. 1940s)





This is an example of an industrial radiography source of the type used in the 1930s and 1940s. Sometimes referred to as a plumbbob, it would have contained approximately 0.1 Ci of Ra-226. Although expensive, radium was used because no other radionuclides were then available of sufficient strength. After World War II, Ir-192 and Co-60 quickly became the radionuclides of choice and the use of radium was abandoned.

The same story appeared in a Washington State newspaper as well. The basic incident, minus the date information and the fact the plumb bob contained $5,500 worth of radium according to United Press (Now UPI), was placed into the record at GSI worker outreach/affidavit meetings in 2006 and 2007. Drs. Ziemer (ABRWH, TBD-6000 work group chair) and Anigstein (SC&A) had previously stated on the record this story was "urban legend," "hearsay," or the incident occurred at another site (Attachment 1), none of which were true as this new evidence proves. SC&A has even shown this ORAU photo in one of its prior white papers.

(g) Last paragraph on page 1 that extends over to page 2: GSI workers have testified they are not aware of any new concrete blocks being added to the Bldg. 6 walls at any time. They further dispute the walls were 24 inches. There are no to scale GSI construction blueprints for the Bldg. 6 radiography room. Only sketches exist that differ in their features.

(h) Paragraph 2, page 2, through the end of page 3: I am puzzled and concerned that Mr. Allen, while admitting that Co-60 sources are not adequate surrogates for ra-226, nevertheless relies on cablt-60 sources from the NCC 1962 analysis. Allen uses

many assumptions that are not reliably substantiated and that we challenge. Among them are the following:

1. Allen states on page 1, last line, the walls were "solid concrete." Workers variously decibed the walls as concrete blocks, whether the blocks were solid or not was not stated. How would the workers actually know that information? Kleber 1962 does not provide engineering plans to validate Bldg. 6 inner radiography room side wall construction materials.

2. On page 2, paragraph 1, there is no corroborating worker or engineering drawing information that added shielding was actually added in June/July 1962. Allen's "***it is assumed...,***" is a statement the petitioners claim is not merited by the facts.

3. In paragraph 3, The "***Williams and Wilkins 1998***" reference is not a valid and complete literature reference. Williams and Wilkins is a well known scientific textbook publisher. Who were the authors, and what page(s) are being referred to? One would have to peruse the entire book in order to identify this too generic and simplified citation. Also, there are many different types of concrete, with different elemental compositions, physical characteristics and therefore HVL's. How does Mr. Allen know the type of concrete used in the Bldg. 6 radiography room in the radium and cobalt eras at GSI? The petitioners suggest this crucial information cannot be determined.

4. The analysis in page 2, paragraphs 4 nd 5 of page 2 again deals with a cobalt-60 survey, whereas the subject of this heading is dose estimates before 12/31/1962 when radium-226 and Iridium-192 sources were the only NDT isotopes used at GSI. Thus, this whole 1962 NCC cobalt-60 survey analysis cannot be plausibly extended to the radium era. There is the added fact that GSI workers state the Bldg. 6 radiography room lacked any door during the radium era. An overexposure incident of undefined date allegedly caused a door with a lock to be installed in the facility.

5. Even though Allen and Neton stated at the 2/21/13 TBD-6000 work group meeting that the newly extended operational period at GSI of 10/1/52 through 12/31/13 would be used in a revised Appendix BB, this fact seems to have been ignored in the current Allen DCAS April 2013 report.

6. Page 3, paragraph 1. There is no document number or page reference to substantiate the fact that sources are normally placed inside the castings and normally

4 to 6 feet from the wall of the room. What is that exact reference? Even though a shield was placed between two sources, the radiographer would still be exposed to radiation scatter from the ceiling and walls (there was no source collimation).

7. Page 3, paragraph 3. The petitioners challenge the "further assumed" propositions that "***both radium sources were not routinely used side by side...***" How could Allen know that, and why is that assumption at all plausible? The exposure outside the wall should also include skyshine, and for that reason as well the dose outside the wall should not be reduced by a factor of two.

8. Page 3, paragraph 3. There is no justification for the statement "***This exposure rate for 975 hr/yr (30% of 3250 hr).***" How was the 30% factor derived and what is the justification for making this assumption that is not claimant favorable?

Assignment of Individual Cases to Radiographer vs. non-Radiographer Dose Estimate pre-1963 (Radium Era) - [pages 4, 5 and 6]

1. Page 4, paragraph 1. The first sentence phrase, "... ***a dose estimate for radiographers in the radium was agreed upon...***" needs to be referenced to discrete page and line numbers of the 2/21/13 TBD-6000 work group meeting transcript, which is now available. As described in the McKeel annotated notes of the 2/21/13 meeting, the co-petitioner could not identify such a passage or meeting point of agreement. In fact, there appeared to be significant agreement among the work group, particularly about the minimum dose using the triangular distribution method proposed by Jim Neton. Allen in this section mentions 6.279 rem, however, 3 rem was also suggested. SC&A insisted to the end that 12 and 15 REM doses should be used. No one made a definitive statement of agreement in the 2/21/13 transcript. Therefore, it is incumbent on Mr. Allen to cite exact page and line reference in this paper to substantiate his assertion of agreement among the WG, SC&A and NIOSH members at the February 21st meeting.

2. (ibid.) Not only that, there was significant disagreement of how to define the term "radiographer" at the GSI AWE site during the 2/21/13 WG meeting.

3. (ibid.) Allen, in the last sentence of paragraph 1, makes clear there will be two levels of assigned dose: radiographer and non-radiographer. At the 2/21/13 meeting a heated discussion revolved around "layout man" as being synonymous with non-

radiographers. Since worker testimony indicates that all layout men were radiographers, this logical dilemma needs to be resolved. (see McKeel notes in Attachment 1).

4. Page 4, paragraph two. Allen again avoids use of the term layout man by referring to "***those who did not place sources***." Such people were characterized as "***someone is working next to the radiography room 100% of the time***." That conforms to workers SC&A has referred to as "layout man" since 2008. The problem with assigning doses, is that all layout men were radiographers, who were not all radiographers. NIOSH and DOL cannot reliably discriminate which workers did what radiographer tasks (there was sub-specialization among GSI NDT radiographers).

5. Page 4, last paragraph jobs list. It is not clear where this list of radiographers came from. This is not an official GSI jobs list of 163 jobs that provided to the TBD-6000 work group many years ago [**REF 2**]. The list omits the major category of GSI radiographers with special training (in Groton, CT), who performed ultrasonic NDT examination, a major task for layout men. Ultrasonics radiographers at GSI defined how deep cracks and voids were in thick steel castings. This is well described in 2006 GSI worker outreach meeting testimony [**REF 3**]. Isotope radiographers were AEC licensed, and these key personnel are also omitted from the Allen list. This Allen/DCAS list has not been validated against DOL job categories.

6. Page 5 analysis, all four paragraphs. The methods used for defining GSI radiographers are not clearly or precisely described. The final result reached is not accurate enough, nor is it fair to non-radiographer claimants because a subset of them (18 of 31) are assigned to the radiographer class that received higher external doses under Appendix BB Rev 0, the primary resource technical document that has been used by ORAU health physicist dose reconstructors for all but 4 GSI completed DRs.

This page needs to be viewed in the context that deceased GSI Betatron operator transmitted to NIOSH and the Board a list of 11 GSI badged radiographers that he believed had submitted part B claims. His e-mail was dated 4/4/2011 [**REF 4**]. At the 2/21/13 TBD-6000 WG meeting, Bob Barton's SC&A list contained 115 GSI claims from the radium era, only one of which was a radiographer. Ted Katz sent this jobs list to Dan McKeel with names redacted, and McKeel confirmed that only one radiographer was listed. No one was listed as a layout man on the list.

Here are a few additional comments on this section of the paper:

6a) Page 5, paragraph 2. the statement ***"11 were confirmed to be radiographers by telephone or dose records."*** Is the telephone interview the CATI interview, or were these new living claimant interviews? If so, they should be documented with interview summaries that are approved by workers. And does "***by dose records***" mean by Landauer program #2084 film badge records?

6b) Page 5, paragraph 3. The conclusion in the last sentence does not make sense: "...***the fact that two QC inspectors can be confirmed to be radiographers illustrates the need to include any type of inspector in the radiographer category***." A better interpretation of this observation is recognition that the same individual workers often held non-radiographer and radiographer jobs in succession at GSI. Edward Holshouser (deceased) was both a clerk and a radiographer. "Betatron foreman, film interpreter" were the terms he used to describe himself in the 7/7/06 GSI worker outreach meeting/affidavit transcript [REF 5].

6c) What is important is to realize that 95% of GSI claims sent to NIOSH for dose reconstruction (DR) already have completed DRs. Previously, NIOSH reported to the co-petitioner and Mr. that only four GSI badged radiographers had filed claims. Mr. was surprised at this low number. All completed GSI DRs but four that are covered by PER-24 have been carried out using Appendix BB Rev 0 (June 2007).

Page 6 analysis

6d) Last paragraph page 5 carried over to page 6. This job analysis of 23 "telephone interviews" marked "unknown" raises two immediate questions. Were these CATI interviews? Why was NIOSH just getting around to assigning job categories in April 2013?

McKeel comment on 6c) and 6d): There are two assigned dose levels stipulated in Appendix BB Rev 0 for Betatron/isotope radiographers and non-radiographers/layout men. In light of the complete job overlap now recognized between GSI layout men and radiographers, and the fact that at least 23 (CATI?) telephone interviews remain marked "unknown," it seems important to assess what dose

level—Betatron/isotope radiographer *versus* layout/non-radiographer—were actually assigned what dose level in already completed DRs based on Rev 0 Appendix BB?

The last paragraph mentions among 23 claims with job marked "unknown" a "***third had no information about job titles or duties or location. This one was considered a radiographer due to lack of information***." Why would this person ever be classified as a radiographer?

6e) Page 6, paragraph 3. Allen mentions the alarming fact that 31 claims matched last names from the Landauer records. He concluded ***"This resulted in the realization that using these dose records to confirm a person was a radiographer is not foolproof and must be considered with other evidence."*** In this regard, McKeel queried [redacted] about the number of GSI radiographers that DOL could identify. She replied that "our system is not sophisticated enough" to reliably identify radiographers, so that DOL ***"has to depend on NIOSH to identify GSI radiographers for us."*** ([REF 6] also see Attachment 1).

6f) Mr. Allen concludes that a two step (new and not yet validated) process yielded 26 GSI radiographer claims, with only 12 being confirmed by either telephone interviews or dose records or both. While this may appear to be claimant favorable it is not fair, because the 14 possible misclassified "false positive" radiographers would be assigned the higher Betatron/isotope operator external photon doses under Appendix BB Rev 0. There are less than 5% of new DRs to be carried out under a revised Appendix BB. Correctly classified non-radiographers thus would be treated unfairly compared to their peers with respect to assigned dose.

Internal Dose Estimate (pages 7 and 8)

1. Page 7, paragraph 1. This paragraph is too brief and inexact. Airborne concentration of what source, uranium? An exact page and line number citation to the 12/11/12 full Board meeting transcript should be stated in order to validate the statements in this paragraph. That is, what is the pedigree of assigning an airborne concentration of 68.7 dpm/m^3? Was this dose to be assigned only to the operational period? Does it apply to the extended revised AEC period of 10/1/52 to 12/31/52?

2. Page 7, paragraph 2. The phrase "***uranium shot scenario provided by workers***" requires a validating citation for the reference source as to what meeting, which worker(s), year(s), and page(s) of the specific meeting summary or transcript or affidavit from which this statement derives. GSI Betatron operator 2006-2007 testimony I am familiar with respect to MCW uranium states a four corner shot required two to 4 hours. This is not consistent with Mr. Allen's 60 minutes total time with 15 minutes between shots. Mr. Allen's figures are not correct in the petitioners view. All of the GSI worker affidavits and outreach meeting minutes have been available to NIOSH and the Board and to SC&A since 2006 and 2007. Verbatim transcripts and video records were provided by a *pro bono* court reporter firm (Pohlman) recruited specifically by the SimmonsCooper law firm (also *pro bono*) to help SINEW thoroughly document the July and August 2006 GSI worker outreach meetings. These recordings and records also helped to formulate affidavits and both HIPAA and dosimetry releases that aided in the retrieval, by co-petitioner McKeel, for the first time in January 2007, of Landauer GSI film badge records.

Some other workers stated the shots on MCW uranium were on slabs "straight down," while others testified the Betatron would not penetrate through a uranium ingot, and thus the four corner method was required. One Betatron foreman and fil interpreter (his terms) stated the quality of the uranium shots was poor and the images were "blown." This foreman also revealed he did not understand the purpose of MCW ingot shots because the quality of the films was so poor. There was testimony of a MCW uranium shot session in which no film at all was employed [**REF 7**]. **Thus, an exact citation by Mr. Allen is needed to assure correct attribution of his statement.**

3. Page 7, paragraph 3. The petitioners challenge the use of now discredited TBD-6000 surrogate data for settling of airborne uranium, because none of the surrogate sites has been stringently justified as being similar to GSI operational processes (Betatron NDT inspection with resulting fission and photon activation of MCW uranium dingots, ingots, Betatron slices and billets but not slugs). The dust load at GSI during the operational period was not known but was stated by workers to be very large. NIOSH and SC&A failed to model airborne uranium loads along the entire uranium transport pathway as the petitioners have pointed out many times to the WG.

4. Page 7, paragraph 4. The wording of several parts of this important path are inexact: for example "OTIB-0070 (which version?) does support a factor of 10 higher..." does this mean 10-fold higher? On what page(s) and in what version (Rev 0 or Rev 1 or both) does this statement apply. Another example, "***the TBD will use a resuspension factor of 1x10^{-5} m^{-1}...***", which TBD is being referred to? Is it Appendix BB revision 1 to be constructed sometime in the indefinite future? And when might that Rev 1 version of the TBD be released.

Most importantly, as the petitioners have pointed out to this work group and to the full Board last September and December, TIB-0070 Rev 0 and Rev 1 surrogate data has an underlying assumption of an initial level of airborne uranium that gradually declines in a smooth function that can be accurately modeled. However, that was not at all the situation at GSI during the residual period. Both Betatron facilities were power washed several times, the New Betatron facility was renovated for offices, and multiple firms we have identified conducted active steel manufacturing businesses (such as pickling in acid) along the uranium pathway at GSI. Thus, uranium bearing dust resuspension at GSI from mid-1966 to the end of 1992 was irregularly cyclical. Since no air concentrations of uranium were taken at GSI prior to the DOE cleanup in 1993, NIOSH has no way to know what the measured airborne uranium dust levels actually were at GSI. They need a new model, other than TIB-0070, in order to accurately model uranium resuspension and settling rates at GSI during the residual contamination period. NIOSH has not yet been able to do so five years and nine months after Appendix BB Rev 0 was released and started being used for DR purposes at GSI. By now approximately 95% of GSI DRs have been completed[1] using that flawed and badly out of date scientific technical guidance that NIOSH has steadfastly refused to revise.

5. Page 7, last paragraph. It is scientifically indefensible and claimant adverse to apply a 10-fold lower airborne Ur contamination for the residual period as outlined above in the preceding section: GSI residual period activity was cyclical.

[1] Online DOL EEOICPA statistics by state on 4/3/13 show 289 GSI claims have been submitted to NIOSH for DR purposes, and 256 or 88.6% have been completed. Why 30 cases have not had DR is unclear. Three cases are at NIOSH, one of which is an initial referral, seventy two GSI cases have been paid to date, or 21.6%. This is a low paid rate at GSI compared to the AWE site average of 30% paid. The SEC-00105 co-petitioner has highlighted this fact previously.

6. Page 8, first three paragraphs. There are many errors of fact and faulty reasoning in this section of the Dave Allen April 2013 white paper, as follows:

(a) NIOSH glibly assigns OCAS-TIB-009 ingestion data to GSI without making any attempt to defend this position scientifically based on Board surrogate data (SD) criteria. This is no rigidly justifiable SD data for the GSI situation because no AWE other site performed 24-25 Mev Betatron NDT analysis of MCW uranium-238 dingots, ingots, Betatron slices, and billets that is known to produce both enhanced fission of natrual U-238 and photon activation of the metal. Petitioners claim the SD criteria must be addressed.

(b) How does TIB-9 establish that "***daily ingestion can be estimated as 20% of the airborne concentration in one cubic meter of air***"? Does TIB-9 take into account that GSI workers often ate bagged meals sitting on, or leaning on, or near large steel castings that had been activated by 24-25 Mev Betatrons? Has TIB-9 surrogate ingestion data been stringently justified as faithfully representing that real world situation? The answers to both of these questions is undoubtedly "No." Petitioners thus contend that OTIB-9 SD has not been justified by NIOSH and thus is not scientifically defensible as being applicable to the GSI AWE site.

(c) Petitioners further challenge Allen' statement, which s completely unsubstantiated by any specific applicable references statement, that "***due to the fact that the highest airborne activity would be located in the betatron buildings where the uranium was positioned for x-ray.***" Since no measurements of airborne uranium at any location exist at GSI, then this assertion by Allen falls into the realm of conjecture or intuition or "common sense," none of which have earned a place in the world of good and acceptable scientific practice. Mr. Allen needs to prove his points, not reason *a priori* absent any measured data at all. As the petitioners have pointed out many times previously, neither NIOSH nor SC&A have attempted to model uranium dust levels or airborne uranium levels anywhere along the GSI uranium transport pathway from loading and unloading docks for rail cars and trucks, Building 5 uranium/welding rods and radium-226 storage area, rail tracks through many buildings (5 through 10 and alongside the foundry and buildings 1 and 2), tunnel of the New and Old Betatron buildings, as well as the Betatron shooting rooms. All of these places were described as

"very"dusty but nothing was quantified. Industrial vaccum were used in the Betatron facilities, but 2006 affidavit testimony states that rail transfer cars for uranium and castings were only cleaned twice each year.

(d) There were no uranium urine bioassays performed on any GSI worker during the operational or residual periods to quantify ingestion of inhalation intakes of suspended uranium.

(e) Page 8, paragraph 8 states the inhalation and ingestion values will be increased by 1% "*to account for fission products.*" There is no mention of photon activation products that also added dose. Petitioners contend that the full range of fission and activation radionuclides was underestimated, based on scientific literature references and data from physicist ' that we provided, and Dr. himself provided to the Board as a lengthy Public Comment [**REF 8**].

7. Page 8, table after paragraph 3. The derivation of the yearly data in this table is not clear. Where did it come from (what was the pedigree)? Uranium Handling in column 4 and Total Inhalation in column 6 change so dramatically over time and include data from 1953. There were no MCW AEC purchase orders for uranium for 1953-1958, so how eere the1953 data values determined? The note at the bottom of the table is not clear as to what is to be done: "***Note: the values after 6/30/1966 are to be reduced using depletion factors in ORAU-TIB-0070.***" This is formulaic jargon. The reduced values dictated by ORAUT-OTIB-0070 need to be spelled out. Mr. Allen takes far too much information for granted. Relevant data values need to be recorded in this paper.

8. Page 8, table, column 1 (annual dates). **Accommodation of the extended GSI operational period to include the last quarter of 1952**. As the petitioners again pointed out during the February 21st WG meeting, DOE and DOL had officially changed the start date of the GSI operational period from Jan. 1, 1953 to October 1, 1952. Mr. Allen assured the TBD-6000 WG on 2/21/13 that the new extended operational period for GSI would be included in a revised Appendix BB [**REF 9**]. WG Board members and NIOSH and SC&A ignored these new operational period extension to the last quarter of 1952 at the 11/18/12 WG meeting. Both NIOSH and McKeel's DOE FOIA information from 1994 contributed to the extension of the GSI

operational period to 1952. SEC-00105 co-petitioner McKeel had submitted a white paper to the WG prior to the 11/28/12 meeting that showed that in 1952 the AEC and MCW were actively collaborating with GSI to establish optimal Betatron NDT imaging parameters for uranium metal [**REF 10**]. This basic information was in FUSRAP IL.28-5 and in the DOE 1994 sanitized RHPG database. The two 1952 reports that McKeel was sent under his FOIA request had been captured 11 months previously by ORAU and NIOSH had this same information for months. NIOSH submitted their documentation to DOL about the 1952 GSI-AEC-MCW collaboration two days after McKeel submitted his information. This fact is made clear in a letter that DOL DEEOIC sent to Dan McKeel, NIOSH and DOE about the change in the GSI operational period [**REF 11**]. Thus it is difficult to understand why this April 2013 Allen/DCAS white paper totally ignores the new 1952 covered period at GSI.

In a revised Appendix BB, NIOSH must model or extrapolate all assigned external and internal radiation doses from all sources, with dose established with sufficient accuracy, for the new and extended GSI AEC operational period from 10/1/52 through 12/31/1952. An unresolved issue is whether NIOSH, which had the captured October 1952 GSI report many months before, should have applied the extended operational period dates to SEC-00105 before the Board members cast their final votes on 12/11/12.

References Cited:

[REF 1] interview, personal communication with forwarded 10/26/11 to Dr. Paul Ziemer, TBD-6000 work group chair

[REF 2] A PDF 1967 booklet of 163 job descriptions at GSI provided to NIOSH and SC&A by GSI site expert (October 29, 2007); The file was: CANON7095-COPYFRONTR_EXCHANGE_09042007-10575.pdf.

[REF 3] Role of ultrasonics in GSI NDT radiography layout work.

- page 34, 7/7/06 outreach meeting/affidavit transcript: "***Only people that had radiation badges were employees of the nondestructive testing department; i.e., the Betatron department, Mag, layout and Sonics.***"
- , e-mail to , cc: Dan McKeel

(3/24/13)" *"Ultrasonics did not take place on the initial layout. The castings were shot after initial layout... The film was then taken to the castings by the layout men and the defect marked on the casting surface using the yellow paint tube. Then ultrasound came into the picture to indicate how deep the defect was."*

[REF 4] GSI Betatron (deceased) operator, affidavit list of 11 GSI radiographers who had submitted EEOICPA Pt. B claims (4/4/2011).

[REF 5] affidavit as to his jobs of clerk and radiographer. GSI worker outreach meeting (7/7/06 transcript, page 38): *"Prior to becoming a foreman and film reader, I was a clerk in the Betatron. Part of my duties was to pick up the film badges on a Monday and reissue the new film badges."*

[REF 6] DOL DEEOIC letter dated (4/8/2011) to Dan McKeel, that NIOSH had to identify radiographers for DOL: *"Our system is not sophisticated enough for us to identify radiographers vs. non-radiographers easily, and in fact most of the job titles we receive would fall into the radiographer category are for Chemists or Chemical Operators. It is rare that the employee actually self-identifies as a "radiographer." I believe it is through the NIOSH CATI process or other research they conduct wherein the classification goes to whether someone is a radiographer..."*

[REF 7] GSI worker outreach testimony that MCW uranium was shot without film: radiography and ultrasonics 1962-73, outreach transcript 7/7/06, pages 18-19, GSI Affidavit #2: *"On several Sundays between 1964 to about 1972, another operator and myself would be scheduled to work on the uranium billets. Having ten years knowledge as a lab technician, I suspected it was something out of the ordinary because they did not look anywhere near the appearance of steel and other metals we were accustomed to dealing with. It was darker, more dense, and took a whole lot more radiation. One Sunday we shot "special" ingots for several hours without any film. We laughed about it because people said we were "charging" them."*

[REF 8] ABRWH phoned in formal testimony to the full Board on February 7, 2007. [ABRWH 44 transcript, pp]

[REF 9] The 2/21/13 TBD-6000 work group transcript, pages 76, 195 (McKeel) and 178 (Mauro SC&A) corroborated the new October 1952 start date for the GSI operational period.

[REF 10] Dan McKeel white paper dated October 18/19, 2012: a revised and extended GSI operational period to include the last quarter of 1952. Restated to Ted Katz and (DOL) in a 12/10/12 e-mail.

[REF 11] Rachel Leiton DOL DEEOIC formal letter dated 12/18/12 to Dan McKeel, NIOSH (Hinnefeld) and DOE ( ) announcing the GSI operational period start date had been extended to October 1, 1952.

Respectfully submitted,

Daniel W. McKeel, Jr., M.D. 4/05/2013

Current contact information:

ATTACHMENT 1

See following page 17:

Primary source reference filename: **GSI_RadiumPlumbBob1953.pdf**

Citation: McKeel, DW. **The GSI Stolen Radium-226 Plumb Bob Radiation Incident:** Seven pages, March 12, 2013. Published on DCAS website: 4/5/2013 as a Discussion paper for the 4/26/13 TBD-6000 work group meeting and under Docket 140 (GSI). (Research information for this paper provided by GSI site expert .

Subj: **Fwd Docket 140: GSI radium plumb bob 1953 newspaper story implications**
Date: Tuesday, March 12, 2013 10:52:32 AM
From:
To: NIOSHDOCKET@cdc.gov
cc: danmckeel

Dear Docket 140 officer,

Attachment: <TheGSIStolenRadium-F.pdf> 2.9 MB

I would appreciate your consideration of placing this important cover letter and attached e-mail as an entry under Docket 140 on the DCAS website. The subject matter is administrative review of the GSI SEC-00105. Thank you very much.

-- Dan McKeel 3/12/13

In a message dated 3/12/13 10:47:59 AM, DanMcKeel writes:

> Stuart Hinnefeld (DCAS Director)
> David Allen (DCAS)
> Jim Neton (DCAS)
> Ted Katz (DFO for the ABRWH)
> Paul Ziemer (chair, TBD-6000 work group)
> John Mauro (SC&A)
>
> March 12, 2013
>
> Attachment: **<The GSI Stolen Radium-F.pdf> 2.9 MB** -- Ted Katz; please circulate this file to all ABRWH members. Thank you.
>
> Gentlemen,
>
> The attached 5 page PDF file directly affects the future work of NIOSH in formulating with the TBD-6000 work group and SC&A a revised GSI Appendix

BB to replace Rev o (June 2007). There are several important implications. The plumb bob refers to radium-226 sources, not cobalt-60. The UPI reports states the GSI radium source was missing for a week. DR. Ziemer noted in October 2010 that radium sources leak and that radon, which has not been bo unded at GSI, escapes. The newspaper story from the Edwardsville (IL) Intelligencer newspaper dated Oct. 27, 1953, indicates the plumb bob incident at GSI was not an urban legend and did not occur at some site other than GSI. Note also that Dr. Ziemer says in the Oct. 12, 2010 TBD-6000 WG transcript that (AEC) legal dose limits do not apply to radium sources, so the and statements that AEC dose limits were never exceeded at GSI cannot be accurate. The incident did occur at GSI in October 1953, and NIOSH has to be plausibly bound the dose with sufficient accuracy, since more than a single person was undoubtedly exposed. This will be difficult to do, since there are still many unknown variables associated with the stolen/missing radium source incident at GSI in October 1953.

-- Dan McKeel 3/13/13 Tuesday 10:30 AM CDT

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

Daniel W. McKeel, Jr., MD

The GSI Stolen Radium-226 Plumb Bob Radiation Incident


Edwardsville Intelligencer

Tuesday October 27, 1953 91st Year Madison County's Home Daily No. 293 8 Pages 5-Cent

Talks Against Reds | Reds Accused | New York Honors Gen. Dean | Union Agrees to Build Room on Triplets' House

- General Steel Industries (GSI) site expert John W. Ramspott has discovered more conclusive evidence about the date and circumstances of the "GSI stolen plumb bob incident."
- He and GSI SEC co-petitioner Daniel W. McKeel, Jr., M.D., wish to make several additional points about this discrete and better defined overexposure to one of two GSI 500 mCi Ra--226 sources that were first described in NRC FOIA 2010-0012 obtained by Dan McKeel. The new information was provided, through McKeel's efforts, to the Board, SC&A and NIOSH soon after the 1,016 pages of NRC FOIA unredacted material was released.
- The stolen plumb bob incident was known about through former GSI worker testimony during four GSI worker outreach meetings in 2006-2007. Transcripts and minutes of those meetings are posted on the DCAS website (www.cdc.gov/niosh/ocas).
- Radium-226 "Plumb Bobs" and the fishpole technique for nondestructive radiographic inspection (NDT) of metal castings and welds were well described and known to the Board and SC&A (see Anigstein 2009 SC&A review of portable GSI sources). These applications are described on the ORAU Museum website. It was also known that the AEC banned the use of Ra-226 in the early 1960s throughout the U.S.A because the practice was too dangerous.
- However, radium-226 source bounding dose estimates were not made by NIOSH until the after emergence of the NRC FOIA 2010-0012 materials. This delay of *years* is difficult to understand because "plumb bob" *fishpole NDT radiography had become synonymous specifically with radium-226 source radiography decades ago.*
- The banner above and the accompanying article on page 1 of the Edwardsville (IL) Intelligencer newspaper, 91st year, No. 293, 8 pages, dated October 27, 1953, establishes that a radium source was "lost" at the GSI plant in Granite City, IL. GSI management believed the source was in the plant, while others believed the radium was off-site and possibly was stolen. United Press indicates the GSI plumb bob radium source had been *missing for about a week.*
- Ramspott and McKeel believe the doses received by GSI plant workers cannot be plausibly bounded with sufficient accuracy because of the "fuzzy" details that are not known. Those factors include where in the plant the Radium source was first used and where it was taken, who took it and what was their job, and the way the radium source was handled, or mishandled, after it was removed from its normal location. That location is also not known.

Radium-Filled Tool Missing at Granite City

An extensive search for a missing "plumb bob" filled with radium and valued at $5,500 continued Tuesday at the Granite City General Steel Castings corporation plant. The bob has been missing for a week.

Plant officials believe the plumb bob was misplaced in the plant and not stolen. They warned, however, that the radium could prove dangerous to an individual if he carried the bob in his pocket for a time.

The object in the search is about one-half inch long and closely resembles that of a carpenter's plumb bob. It is attached to a black fishing line, is used in X-raying steel castings and is of no commercial value, a plant spokesman said.

Newsettes

By United Press

Footnotes:

1. As of March 12, 2013, it is still not known with certainty whether or how or when the missing GSI radium plumb bob source was found and returned to GSI. One part time GSI radiographer and laboratory worker indicated he became aware of the plumb bob incident after returning to GSI from military service in about 1956 or 1957. This corroborates the date of the incident as being consistent with 1953.

2. The Oct. 27, 1953 UPI newspaper article also refutes Drs. Ziemer and Anigstein's Oct. 12, 2010, TBD-6000 WG testimony that the stolen plumb bob was an "urban legend" (PLZ) or happened at a different site than GSI (RA). The meeting transcript states:

> **TBD-6000 work group transcript, pages 146-147**
> **TUESDAY**
> **OCTOBER 12, 2010 (quote begins)**
>
> **DR. ANIGSTEIN: So, this was 13**
> **hearsay. Everyone who talked about it heard it 14**
> **from someone else. 15**
> **CHAIRMAN ZIEMER: Well, it may or 16**
> **may not have been urban legend**
> **DR. ANIGSTEIN: And this apparently 19**
> **happened -- either it happened more than once. 20**
> **As you say, an urban legend, it happened 21**
> **someplace else, at another time, and simply got 22**
> **CHAIRMAN ZIEMER: Well, in any 2**
> **event, its pretty clear that radium wasn't 3**
> **regulated.**
> **But you're quite right: it wouldn't have been 14**
> **regulated by AEC in those days, nor was there a 15**
> **state agency to regulate it. 16**
> **This is true not only of 17**
> **radiographers in those days, but medical 18**
> **applications as well. I was not aware that 19**
> **people tried to bleed off the helium. The point 20**
> **I was making on the helium build up was that 21**
> **often led to leaking sources. So, radium 22**
> **sources became a source of external 1**
> **contamination very common in those kind of 2**
> **facilities for there to be leaking sources that 3**
> **contaminated the surfaces with radon daughter 4**
> **products as the radon gas leaked out of the 5**
> **source. 6**
> **So, yes, they weren't subject to any 7**
> **legal dose limits.**

(transcript quote ends)

There are multiple take away key points in this verbatim testimony:

(a) The 10/27/1953 newspaper article proves this episode was not merely "hearsay" or an "urban legend." The work group erred in dismissing and not taking action on this information.

(b) The presence of twin radium-226 sources at GSI for at least the covered period from October 1, 1952 through December 31, 1962 means that NIOSH is required to bound with sufficient accuracy the radon gas inhalation dose for all those years. This has not been done even though the TBD-6000 work group was aware of the plumb bob (i.e., radium-226) incident/s since 2006-2007, and of the probable presence of radon gas since October 2010 based on Dr. Ziemer's remarks quoted above.

Board precedent is strong that radon is a separate source term (see Blockson Chemical and Texas City Chemicals SECs) that must be bounded with sufficient accuracy nder OCAS-tG-003. This has not been done at GSI. We know from NRC 201-0012 that both Nuclear Consultants Corp. and St. Louis Testing Laboratories both alleged they carried out leak tests on GSI sources. However, to my knowledge no corroborating records have been found that this was actually done.

Plausibly bounding radon gas from possibly leaking Ra-226 sources at GSI from 10/1/52-12/31/62 at GSI still must be done in order for NIOSH and the TBD-6000 work group to properly and responsibly revise GSI site-specific Appendix Rev 0 (June 2007).

(c) The oft quoted GSI AEC license assertion about the pre-1963 last two decades by and that AEC dose limits had not been exceeded and averaged 25% of the AEC limits conflicts sharply with Dr. Ziemer's assertion in the last two lines quoted above that, ***"So, yes, and they weren't subject to any legal dose limits."*** Nine Board members who voted to deny SEC-00105 on 12/11/12 erred in accepting the GSI McMillin-Ripley statement as established facts, when Dr. Ziemer had asserted 2 years and 3 months earlier that no AEC legal limits existed during the Radium-226 era (1952-1962) at GSI.

In previous papers, Dan McKeel has repeatedly inquired of NIOSH and SC&A the source document for the AEC limits they allude to in reference to the McMillin-Ripley AEC license statement about never exceeding and averaging 25% of then current (pre-1963) "AEC" radiation safety limits at GSI. Surely, an uncovered Ra-226 source, a plumb bob, that was missing for at least a week, was sufficient to cause a serious overdose breach of even today's stricter radiation limits allowed for the public by the NRC and other US Governmental agencies. Mr. , and Mr. must have been aware of the Ra-226 plumb bob stolen/misplaced source incidences, and thus knew their license statement was not true. Noteworthy is an allegation by a GSI clerk who remembers the stolen plumb bob incident described in the October 27, 1953, issue of the Edwardsville Intelligencer newspaper. That clerk, who is still alive, remembers the exposed person who removed the plumb bob got sick, was hospitalized

and died as a result of radiation injury. [redacted] and McKeel are attempting to confirm that story in local Illinois newspapers.

Respectfully submitted to NIOSH, Docket 140, the ABRWH, and SC&A on March 12, 2013.

 with [redacted]

McKeel Contact Information:
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SEC co-petitioner at GSI, Dow Madison
and Texas City Chemicals
[redacted]