

NIOSH Docket Office (CDC)

From: Daniel McKeel
Sent: Thursday, January 26, 2017 7:54 AM
To: NIOSH Docket Office (CDC)
Cc: Ziemer, Paul (CDC/NIOSH/DCAS); Katz, Ted (CDC/NIOSH/OD)
Subject: Fwd: Distribution of McKeel critique of Appendix BB Rev 2 (ADDENDUM)
Attachments: Critique of NIOSH Appendix BBr2.docx

NIOSH Docket Office,

Please consider the attached Daniel W. McKeel, Jr., MD submission for posting on the DCAS website, under the following sections: (a) GSI Docket 140, (b) AWE Sitewide documents, and (c) as a Discussion Paper for the Dec. 14, 2016 ABRWH TBD-6000 work group meeting. As you can see from the message below, my paper was forwarded to DFO, Ted Katz and to the chair of the TBD-6000 WG, Dr. Paul Ziemer, prior to the 12/14/16 meeting. Thank you.

Sincerely - **Dan McKeel** 1.26.17 Thursday at 6:50AM CST

Daniel W. McKeel, Jr., MD
GSI, Dow IL and Texas City Chemicals
SEC co-petitioner
SINEW cofounder

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

From: Daniel McKeel
To: tmk1 <tmk1@cdc.gov>
Cc: paz7 <paz7@cdc.gov>; pl.ziemer <pl.ziemer@comcast.net>; josiebeach <josiebeach@charter.net>; wimunn <wimunn@aol.com>; j-poston <j-poston@tamu.edu>; danmckeel2 <danmckeel2@cdc.gov>; patriciajeske27 <patriciajeske27@cdc.gov>; hls8 <hls8@cdc.gov>; dka6 <dka6@cdc.gov>; jwramspott <jwramspott@cdc.gov>; eky1 <eky1@cdc.gov>
Sent: Wed, Dec 14, 2016 11:18 am
Subject: Distribution of McKeel critique of Appendix BB Rev 2

Hello Ted,

Would you please distribute my attached critique of GSI Appendix BB Rev 2 to the full TBD-6000 work group. I understand no one will have time to read it prior to the meeting at 3 PM today. I'd like to make a very brief comment to the Work group regarding at the allotted agenda time for public comments about how the GSI year 1952 data is being handled in the AppBB site profile versions. Thank you.

-- **Dan McKeel** 12.14.16 Wednesday 11:15 am

p.s. For some reason conversion of this Word document to PDF eliminated the Bolding emphasis, so I forwarded the Word version instead.

Daniel W. McKeel, Jr., MD
GSI, Dow IL and Texas City Chemicals
SEC co-petitioner
SINEW cofounder

**“Critique of NIOSH Appendix BB Revision 2 (5/26/2016) for
The General Steel Industries, Inc. (GSI) AWE Site, Including
Comments on the Subsequent SC&A Review Ten Findings
and the Follow-up DCAS Response”**

By

Daniel Walter McKeel, Jr., M.D.

GSI NIOSH Authorized SEC-00105 Co-Petitioner
Cofounder of SINEW(Southern IL Nuclear Energy Workers)

December 14, 2016

Introduction

This document is a targeted scientific critique of General Steel Industries, Inc. Revision 2 of its site profile, Appendix BB Rev 2 to Battelle TBD-6000. AppBBR2 was issued by DCAS/NIOSH on May 26, 2016. My comments include identifying both editorial and technical errors made by DCAS in Rev 2 of the GSI site profile.

The ABRWH technical contractor, Sanford Cohen & Associates, reviewed GSI Appendix BB Rev 2 on September 26, 2016. DCAS responded to SC&A’s residual concerns about Findings 1 and 10 on November 7, 2016. This document includes my comments on these two 2016 review reports.

The original Appendix BB Rev 0 was issued on June 27, 2007 and NIOSH issued the first revision (Rev 1) seven years later on June 6, 2014.

The TBD-6000 work group of the ABRWH, which is chaired by former Board chair Dr. Paul L. Ziemer, is scheduled to meet and discuss GSI Appendix BB Rev 2 on December 14, 2016. The full Board will hold its next face meeting (#116) in July of 2017. During 2017, NIOSH should issue a new PER to cover GSI Appendix BB Rev2. SC&A will then be tasked to review the new PER.

NIOSH PER-024 and PER-057 based on GSI site profile documents

PER-024. NIOSH issued PER-024 Rev 0 on September 27, 2007, based on four GSI dose reconstructions (DR) performed by NIOSH using ORAUT-TKBS-004 (now obsolete) in 2004. Three of those earliest DR presumptive “GSI” cases were never employed at the 1417 State Street location in Granite City, IL, and therefore were ineligible to participate in the EEOICPA NIOSH Part B dose reconstruction program.

The U.S. Department of Labor (DOL) DEEOIC Director Turcic issued Final Circular 08-02 dated 11/01/2007 to explain to DOL claims examiners the different physical locations for GSI (also referred to as “the South Plant”) and Granite City Steel (GCS), which purchased the GSI property after castings operations ceased. The

General Services Corporation (GSA) sold the U.S. Government owned GSI equipment at auction in 1974. GCS and National Steel owned the former GSI land and buildings during the residual contamination period up until 1993. At that time U.S. Department of Energy (DOE) remediated residual uranium contamination from the Old Betatron Building.

PER-057. NIOSH issued this program evaluation report, which was based on Appendix BB Rev 1 (6/6/14), on March 11, 2015. The complete list of 196 cases was forwarded to DOL the same day. The report identified a startling number of 100 potentially compensable claims (PER POCs =/>>50%), which were culled from among 196 previously denied GSI Part B EEOICPA claims. This fact alone strongly indicated the original thirteen page long Appendix BB Rev 0 that was issued in June 2007 had used badly flawed scientific DR methodology. Ninety (90) new GSI cases have been paid under part B by DOL since 3/11/15. The Procedures Review subcommittee of the ABRWH has selected 5 GSI cases from PER-057 for SC&A to review, possibly at its next meeting which is scheduled for January 10, 2017.

Detailed Review of NIOSH Appendix BB Rev 2 (42 pages)

For clarity and to facilitate reference to them, GSI SEC-00105 co-petitioner Dan McKeel's findings will be numbered and referred to as ERRORS throughout this critique.

[Error 01] **Page 3. Record of Revisions Table.** The description of Revisions 1 (6/4/14) and 2 (5/26/16) Effective Dates is too vague, as follows: "Revised to incorporate resolution of issues raised by the ABRWH..." This language is insufficient. The method modifications made in the revision need to be spelled out in greater detail.

[Error 02] **Page 4. BB.2 Site Description.** The phrase "... Utilizing two 25 MeV betatron machines" should be modified to read "Utilizing one 24 MeV and one 25 MeV Allis-Chalmers (mfr.) betatron particle accelerators..."

[Error 03] **Page 4. BB.2 Site Description.** The phrase "...performed x-rays on uranium metal of various forms including uranium ingots and betatron slices..." should be altered to read: "...performed x-rays on uranium-238 metal of various forms including uranium ingots, **dingots** and betatron slices..."

[Error 04a] **Page 4. BB.2.1. Site Activities.** The following clarifying sentences need to be added after the opening sentence in this paragraph. "The 1952 work was considered to be 'R&D work' (research and development) work by the AEC (FUSRAP

Reference IL-28.5, October-December Operational Report). GSI used MCW uranium billets and a custom uranium shield fabricated at Mallinckrodt to attempt to improve x-ray film image quality of the MCW uranium metal. Thus, this R&D work differed substantially from the production x-ray nondestructive testing of MCW U-238 that occurred after January 1, 1953 at GSI."

[Error 04b] The documents that revealed the GSI R&D work for MCW should be referenced on page 4 and listed in the **BB.7 References** section starting on **page 35**. The three reports include the October and November 1952 AEC Operational Reports contributed by NIOSH and the December 1952 Operational Report McKeel obtained from the Dept. of Energy ORO FOIA Office in Tennessee.

[Error 05] **Page 6. BB.3 Occupational Medical Dose.** The information in this section on GSI occupational Medical Dose is not completely accurate. The 1,016 pages of AEC By-Products Materials licensing information for GSI Dan McKeel obtained from NRC via the FOIA process, and GSI equipment auction data from 1974 obtained by a GSI site expert (), revealed that General Steel Industries owned three 250 KvP low voltage x-ray machines. Two of them were used for NDT radiographic inspection work. The third unit was a clinical diagnostic x-ray unit. Records we obtained and worker testimony also indicated there was an onsite infirmary staffed by medical personnel at the 1417 State Street "South Plant." Other worker testimony indicated the GSI infirmary records were carried to company headquarters in Clayton, MO in 1974 when the Granite City Plant was closed down. It is therefore likely that ORAUT-OTIB-0006 does not fully cover all diagnostic medical x-ray exposures at GSI.

[Error 06] **Page 6. BB.4 Occupational External Dose.** The initial sentence in this section that enumerates radiologic sources at GSI should be expanded to read as follows (only the changes are underlined): Sources of external radiation exposure licensed and used at GSI included the following: (a) one 24 MeV and one 25 MeV Allis-Chalmers betatron particle accelerators which produced very high energy x-rays from an internal platinum target; (b) two (2) radium-226 "plumb bob" sealed sources (purchase date not known); (c) two (2) cobalt-60 sealed sources purchased in 1962 to replace the Ra-226 sources under AEC GSI license No. 12-8271-1; (d) an 80 Ci Co-60 sealed source licensed at GSI Granite City in 1962 (worker affidavits indicate this source was in use at GSI during the 1964-1966 GSI operational period); (e) GSI was licensed for a Ir-192 NDT sealed source (see page 14); (f) St. Louis Testing Co. used its Ir-192 sealed source for subcontract NDT work at GSI during the operational period; (g); Badged GSI workers also used an Ir-192 sealed source and a 1 MeV x-ray unit at American Steel Foundry in Granite City, IL for spillover NDT radiography; (h) three

250 KvP conventional x-ray units; two for industrial NDT and one for medical diagnostic x-rays for GSI personnel.

NIOSH should incorporate all of these GSI radiation sources into a table that provides all of the important source specifications that would contribute external and internal radiation exposures from these various source terms.

[Error 7] **Page 7. BB4. First paragraph:** The rationale for this major difference in approach between Rev 1 of Appendix BB in June 2014 and Rev 2 of June 2016—namely, reducing the categories of GSI personnel to two, eliminating the layout man as a separate category and merging it with the betatron radiographer operators—needs to be made crystal clear. The documentary or work group actions that endorsed this change need to be specifically cited and referenced. In fact, all computer models (Atila™, MCNPx™) have shown major differences, on the order of 10-fold, between the external x-ray and gamma doses received by Ra-226/Co-60 and Betatron radiographers and layout men. Later in Appendix BB Rev 2, different doses to radiographers and layout men are alluded to, thus this merger of the two job categories is doubly confusing.

[Error 8] **Page 7. BB.4.1 Betatrons.** The phrase “*Betatron x-rays are of sufficient energy to produce nuclear interactions in material being x-rayed causing some atoms to become radioactive*” is, again, too vague and scientifically inexact. The process being described is scientifically correctly known as **activation** (there are TIBs related to fission and activation products of nuclear reactors, for example) and should be so identified by NIOSH using standard scientific terminology.

[Error 9] **Page 7, BB.4.1 Betatrons.** The next to last sentence of the third paragraph should be modified to change the phrase “*equipment tunnel*” to “railroad track tunnel.” This is the manner that large castings were brought into the New Betatron Building from 10 Building to have Betatron x-ray NDT radiography performed. Other AEC license drawings clearly show the New Betatron rail tracks.

[Error 10] **Page 7. BB.4.1 Betatrons.** The Old and New Betatron buildings, and the particle accelerators themselves, differed in numerous important ways. This information has been transmitted in detail to the TBD-6000 work group and full Board and NIOSH by GSI workers, site experts and the petitioners, but has been essentially ignored by Mr. Allen in Rev 2 of Appendix BB to TBD-6000. Most importantly, the New Betatron Building was built more than ten years after the Old Betatron Building. The New Betatron unit was moved from GSI in Eddystone PA in 1963.

[Error 11] **Page 7. BB.4.1 Betatrons.** Much of the third paragraph is spent describing various exposure scenarios that differ between operators and layout personnel. This seems to conflict with the decision to merge radiographers with layout men as one of only two GSI job categories for dose reconstruction purposes.

[Error 12] **Page 7. BB.4.1 Betatrons.** The specific documents and portions thereof that justify these factual statements about exposure scenarios involving different categories of workers need to be cited in this scientific guide for performing dose reconstructions with sufficient accuracy under EEOICPA part B.

[Error 13] **Page 7. BB.4.1 Betatrons.** The citation “(DCAS GSI web page)” used in the fourth paragraph is so vague it is useless as a scientific reference. The specific GSI web page has a link and is NIOSH Docket 140, both of which need to be cited by Mr. Allen in this key guidance for dose reconstructors. There are numerous technical white papers and related documents within Docket 140 that need to be cited specifically by title, author and date to support facts in section BB.4.1 Betatrons.

[Error 14] **Page 8. BB.4.1 Betatrons.** Note: The actual total distance from the camera port of the Betatron to the external target should include the thickness of the specific metal undergoing Betatron x-ray inspection. The thickness of the steel comprising some huge GSI castings ranged up to 20 inches (1 foot and 8 inches).

[Error 15] **Page 8. BB.4.1 Betatrons.** Figure 1 is an oversimplified and therefore inaccurate sketch of the Old Betatron Building, as follows: (a) the railroad tracks are omitted; (b) The control room is not shown accurately as a separate room with a lead shielded porthole; (c) there was no double door. The door from the shooting room into the control room was a standard thin steel door; (d) The building contained a second floor with the capacitor banks and other electronics; and (e) the precise source document(s) for the drawing is not referenced.

[Error 16] **Page 9. Page 8. BB.4.1 Betatrons.** (a) The source documents for Figure 2 are not given. (b) The railroad tracks run through the Break area but are not shown doing so. The Figure is incomplete, and like Figure 1 of the Old Betatron Building, is not an engineering drawing. Both figures are building sketches, that is cartoons. The Old and New Betatron structure “as built” draftsman drawings and blueprints and specifications are apparently no longer in existence. The Old Betatron building was built by the Chicago District office of the US Army Corps of Engineers and was owned by the U.S. Government. Our team provided the GSI Board minutes in 1951 that show the US Government ownership of Old Betatron and other

buildings in addition to the Allis-Chalmers 24 MeV Betatron itself. The GSI Board minutes from 1952¹ showed they rejected taking ownership from the government.

[Error 17] Pages 9 last paragraph and 10 top paragraph. BB.4.1. Betatrons.

There are many unsubstantiated “facts” presented in this section. The assumptions are not defensible or credible where the layout man worked at the Old Betatron building year around, for example. Besides that, if the same doses are assigned to betatron and radium-226 radiographers and to layout men, who clearly had different external radiation exposures, this discussion seems to be irrelevant and confusing for dose reconstructors. Subjective phrases such as “much more likely” (second line from end of page) have no place in a scientific document created to serve as *quantitative* radiation dose reconstruction guidance.

[Error 18] Page 10. BB.4.1 Betatrons. The last two sentences do not make sense and seem irrelevant in any case. They read as follows: *“This would result in a considerably lower dose to the layout man before 1963. However, Ra-226 radiography resulted in an exposure estimate higher than the new betatron layout man estimate so the lower exposure scenario was not explored further.”*

[Error 19] Page 10. BB.4.2 Betatron Building Model. The GSI SEC-00105 petitioners and site experts have always maintained the modeling with MCNPx of an 80 Ci Co-60 source in 1971, outside of the operational GSI AEC/MCW contract period that ended June 30, 1966, is not a realistic model for 25 MeV Betatron x-ray exposures in the same physical environment. The gamma ray output of the 80 Ci GSI Co-60 source was not shown to be collimated, whereas the Betatron beam was strictly confined. The agreement between the modeled and measured Co-60 gamma is not germane to the exposures betatron radiographers got using both Betatrons and Ra-226 sources between 1953 and 1962. Most of the Co-60 NDT inspections during the GSI operational period took place in Building 6, and inside that building in a Radiography Room structure between 1955 and 1962. We therefore believe this entire section is flawed scientifically and has no value for calculating betatron and Radium-226 and smaller 0.5 Curie Co-60 external exposures for Betatron operators during the GSI AEC operational period 1953-June 1966. The Betatron work done for three months at GSI in 1952 was for experimental R&D work to improve NDT x-ray image quality before production NDT inspections started January 1, 1963.

¹ The GSI Board minutes from 1951 and 1952 are located at the St. Louis History Museum on Lindell Blvd. near Washington University main campus.

[Error 20] **Page 11, BB.4.2 Figure 3.** (a) New Betatron Building Drawing with Dimensions. Reference on page 10 to this Figure is incomplete: "*Documents from the AEC License application...*" The specific documents and pages within the 1,016 pages of GSI license information obtained by Dan McKeel in an NRC FOIA 2010-0012 need to be referenced. (b) The arrow and bracket pointing to a "DOUBLE LEAD SHIELD" should have been removed and the legend modified. The TBD-6000 WG agreed this lead shield had been removed.

[Error 21] **Page 12, BB.4.2 Figure 4.** Reference on page 10 to this Figure is incomplete: "*Documents from the AEC License application...*" The specific documents and pages within the 1,016 pages of GSI license information obtained by Dan McKeel in an NRC FOIA 2010-0012 need to be referenced. The abbreviation "C&F Building" should be spelled out at first use.

[Error 22] **Page 12, BB.4.2 Figure 5.** Reference on page 10 to this Figure is incomplete: "*Documents from the AEC License application...*" The specific documents and pages within the 1,016 pages of GSI license information obtained by Dan McKeel in an NRC FOIA needs to be referenced. The abbreviation "C&F Building" should be spelled out at first use.

[Error 23] **Page 13, BB.4.2 Betatron Building Model.** The generalization of results statements beneath Table 3 -- Comparison of Modeled Radiation Levels to 1971 Survey is challengeable as to its accuracy. The first sentence of the table legends states: "*The modeled values were found to be in reasonable agreement with the measured values.*" Most computer model validations for radiation dosimetry in refereed scientific journals require an agreement of the experimental data to the measured values of $\pm 10\%$ to 20% at most. Dan McKeel furnished the TBD-6000 WG several literature references that supported this contention. David Allen did not acknowledge those references in the current document. Values comparing a modeled 80 Curie Co-60 source should not be used to validate radiation external doses designed primarily as a 25 Mev Betatron platinum target x-ray particle accelerator facility. In short, this critique disagrees the modeled and measured values are in reasonable agreement. The first New Betatron computer models by NIOSH and SC&A appeared in 2008, so the degree of inaccuracy in this Co-60 validation resurrected eight years later for Rev 2 AppBB is especially concerning.

[Error 24] **Page 14, BB.4.2 Betatron Building Model.** Error 23 is compounded by the first sentence on Page 14: "*...the building model provides a realistic representation of the shielding presented by the new betatron building.*" This statement is rendered scientifically invalid and implausible because the energy spectrum and dispersion

patterns of an 80 CurieCo-60 gamma source and the tightly focused x-ray/electron/neutron (15%) beam emitted by the Allis-Chalmers 25 MeV particle accelerator are completely different. The ability of the respective beams to penetrate steel and uranium are different. The direct and beam leakage from source doses each type of source would deliver to the workers is also different.

[Error 25] Page 14, BB.4.3. Betatron Operations External Dose Estimate.

Neutron and Gamma Dose from Scattered Radiation. This section should mention the sole directly applicable Betatron neutron delivered dose data publication that the GSI petitioners are aware of. That is, two AEC/HASL Accelerator Survey technical papers that DCAS was made aware of and asked to use by our team in Appendix BB. Those two papers are NYO 4699 from 1956² and 1957³, which Dr. James Neton and DCAS argued did not provide useful data for GSI dose reconstructions. Petitioner McKeel disagreed strongly then and now, citing the papers gave measured x-ray and neutron data from three 22 MeV betatron installations matched to film badge readings from the same facility betatron operators. These data were measured by the highly regarded, well respected AEC HASL (Health and Safety Lab, Merrill Eisenbud). Dr. Neton noted the NYO-4699 building schematics were “*too simplistic.*” Inspection reveals many of the AEC report drawings were far more detailed. Yet Dr. Neton approved use of even more simplistic and incomplete drawings in this DCAS report by David Allen (see Errors 15 and 16). The fact this major scientific error of omission was repeated by DCAS in Appendix BB Rev 2 is extremely disturbing.

[Error 26] Page 14, BB.4.3. Betatron Operations External Dose Estimate.

Neutron and Gamma Dose from Scattered Radiation. The same error in 25 is repeated for neutron measurements. That is, doses were merely modeled using MCNPx code minus any measured Betatron neutron data. No measured neutron data was cited by DCAS from the betatron literature. Again, NYO-4699 (1956) and Suppl. 1 (1957) reports brought to everyone’s attention by Dan McKeel, reports that contained such neutron and film badge data from three 22 Mev Betatron facilities, which were similar to the GSI twin 24-25 Mev Betatrons, were not discussed or referenced. This is another *egregious scientific error* carried over by DCAS from Appendix BB previous versions.

² Solon, McLaughlin, and Blatz. Stray-radiation measurements at particle-accelerator sites. New York Operations Office, Health and Safety Lab. , AEC NYO-4699, 67 p. (1956), NSA 10, 7019 (66)

³ J. E. McLaughlin, Jr., Keran O'Brien, Leonard R. Solon, Albert V. ZUa, Wayne M. Lowder, and Hanson Blatz. Stray Radiation Measurements At Particle Accelerator Sites (Suppl. 1), NYO-4699 (Suppl.1), April 1, 1957

[Error 27] **Page 14, BB.4.3. Betatron Operations External Dose Estimate.** *Neutron and Gamma Dose from Scattered Radiation.* DCAS again, as in previous versions of Appendix BB, failed to mention neutron scatter from concrete in this report.

[Error 28] During the many discussions McKeel had with the TBD-6000 WG about the lack of validation of Atila and MCNPx computer code models of GSI twin Betatrons, the TBD-6000 WG, especially members Allen and Ziemer, steadfastly defended the use of computer dosimetry models with no validating measured (real) data. McKeel agrees the MCNPx *code* has been extensively validated, yet A-C Betatron computer modeled x-ray and neutron data has not yet been cited by DCAS, the WG or by SC&A. McKeel queried the TBD-6000 WG about this in person 3/15/12.

[Error 29] **Page 14, BB.4.3. Betatron Operations External Dose Estimate.** *Neutron and Gamma Dose from Scattered Radiation.* The Allen DCAS argument why layout man exposure during uranium radiography was not determined is rejected as being scientifically not compelling.

[Error 30] **Page 14, BB.4.3. Betatron Operations External Dose Estimate.** *Gamma Dose to Betatron Operator.* Dose reconstructors should be informed about the interview(s) the DCAS Director had with a veteran RS Landauer Executive and friend of his concerning how Landauer handled GSI film badge background. This important information, that Dr. Neton relayed to the TBD-6000 WG in an early December 2013 memo, should be referenced in this GSI site profile document.

[Error 31] **Pages 14 and 15, BB.4.3. Betatron Operations External Dose Estimate.** *Gamma Dose to Betatron Operator.* There are several components to this error:

(a) Allen does not properly credit GSI petitioner McKeel with phoning RS Landauer in 2006 and obtaining yearly badge data 13 months (Jan 2008) before NIOSH negotiated a complete weekly FBD set for GSI and informing the TBD-6000 WG and NIOSH that Landauer Corp. in Chicago held film badge data (FBD) on at least 30 GSI workers;

(b) Landauer FBD only covered 89 GSI radiographers during 1964 through June 1966 (the AEC operational period) and another 19 during the July 1, 1966 through 1974 residual for a total of 108 badged workers. The GSI work force during 1952-1974 varied between 1,200 and 5,000 workers at various times, thus the FBD data was relevant to only a tiny group of betatron operators (108 of 1200 = 9%; 108

of 5,000 = 0.2%) of the total GSI work force, with 91-99% of GSI workers having never been badged;

(c) McKeel disputes the highest GSI film badge readings (2450, to 10,000 mrem) that SC&A claimed were retracted by GSI workers. One such worker denies he ever retracted his high FB reading, nor was he adequately informed about it.

(d) DCAS never adequately investigated why no FBD was available for GSI for the 10 year period (1953-1963) cited by a GSI executive who claimed that GSI FB readings never exceeded AEC limits, and in fact never rose above 25% of the limits. The FB vendor or how many workers were badged was never discovered by NIOSH for 1952-63 except for one part time chemical lab and NDT radiographer who worked weekends only with both radium-226 and betatron sources.

[Error 32] Page 15, BB.4.3. Betatron Operations External Dose Estimate.

Neutron and Gamma Dose from freshly Exposed Material. Allen fails to deal with the huge discrepancy between 2008 and 2012 NIOSH and SC&A computer modeled Betatron external doses to the operators and layout men compared to the Landauer 1964-1974 radiographer film badge doses (~an order of magnitude higher). These FB data indicate either that they are low inaccurate gamma readings, or the computer models with MCNPx and Atilla code, which NIOSH and SC&A staunchly defended in 2008 and 2012 were grossly inaccurate on the high side. Ten-fold is a truly huge difference. The resolution of this dose discrepancy between models and film badges needs to be explained to dose reconstructors who might be tempted to assign the much higher 2008 Betatron modeled gamma doses to betatron radiographers.

[Error 33] Page 15, BB.4.3. Betatron Operations External Dose Estimate.

Neutron and Gamma Dose from freshly Exposed Material. Again, the MCNPx calculated Betatron operator neutron dose could, and should be in my opinion, be compared with measured surrogate 22 MeV Betatron values in the NYO-4699 references (footnotes 1 and 2).

[Error 34] Page 16, BB.4.3. Betatron Operations External Dose Estimate. *Beta Dose.* I challenge the statement regarding dose due to the Putzier effect “..., ***the top of the castings were normally cut off***” as this is hearsay evidence from an SC&A consultant as was not confirmed to have been done to MCW uranium sent to GSI for Betatron NDT radiography. The cropping practice might have been different for U-238 from the MCW Destrehan Street St Louis and the Weldon Spring DOE site 40 miles away in St. Charles County.

[Error 35] **Page 17, BB.4.3. Betatron Operations External Dose Estimate.** *Beta Dose.* Hy-80 steel was one of more than 30 different types of steel used at GSI. This assumption is a scientific oversimplification, especially if calculating dose with sufficient accuracy is taken seriously and is desired to be scientifically accurate rather than a guesstimate.

[Error 36] **Page 17, BB.4.3. Betatron Operations External Dose Estimate.** *Beta Dose.* McKeel steel activation data shows byproduct radionuclides with half-lives much longer than 2 hours. We challenge the shorter times (99% decay in 15 minutes) and the identification of only 6 significant activation products of steel. To my knowledge, neither DCAS nor SC&A produced supporting documents that supported this assumption that is not claimant favorable. It is important to remember that 25 Mev Betatron x-rays are powerful enough to cause fission of uranium-238 (footnote⁴).

[Error 37] **Page 20, BB.4.3. Betatron Operations External Dose Estimate.** *Beta Dose.* **Table 5** - Dose Estimate to Betatron Operator Year 1952 (data row 1) is a simple 25% back calculation of the 1953 full year data values. However, as pointed out earlier, the GSI conducted R&D x-ray image improvement work on AEC/MCW Uranium-238 billets with a uranium shield that differed significantly from NDT routine inspection work beginning Jan. 1, 1953. NIOSH's simplifying assumption of equivalence between 1952 and 1953 Betatron work at GSI in this, and in all subsequent Tables where 1952 Betatron values are a line item, is thus scientifically indefensible. NIOSH never calculated a dose specific to the 1952 R&D uranium work.

[Error 38] **Page 21. BB.4.4 External Dose Estimate for Isotope source Operations.** *Radium-226 radiography.* Allen does not mention the license documents referred to do not mention the year the two GSI Ra-226 sources were acquired. Thus, the exact strength in Curies in 1952-1962 is not known with certainty.

[Error 39] **Page 23. BB.4.4 External Dose Estimate for Isotope source Operations.** *Radium-226 radiography.* Two recent interviews with knowledgeable GSI workers who were eyewitnesses to the inner Bldg. 6 radiography roofless room construction testified the walls were never extended to be 24 inches thick. They remained 8 inches thick after 1955 when the inner block bldg. was constructed. McKeel contends external doses for the 300 workers a short distance outside the

⁴ Schmitt RA, Sugarman N. Uranium photofission yields. Phys Rev (5) 95: 1260-67, 1954

GSI Bldg. 6. radiography facility based on a 24 inch wall thickness are inaccurate and are not claimant favorable.

[Error 40] Page 23. BB.4.4 External Dose Estimate for Isotope source

Operations. *Radium-226 radiography.* McKeel has pointed out several times that of St. Louis Testing stated to him that the NRC had two, not one standard safe zones, that must be adhered to with sealed sources such as Ra-226 and Ir-192. There was a 100 mR boundary closer to the source that was never to be breached and had to be guarded at all times. NIOSH has ignored this boundary closer to the source in all its calculations. The implication of the 2nd barrier is that workers might approach but not cross it.

[Error 41] Page 23-24. BB.4.4 External Dose Estimate for Isotope source

Operations. *Radium-226 radiography.* McKeel provided proof the GSI AEC license stated that leak tests on GSI sealed sources were performed by St. Louis Testing and NCC. However, definitive proof these leak tests were done and what the results were are not known.

[Error 42] Page 24. BB.4.4 External Dose Estimate for Isotope source

Operations. *Radium-226 radiography.* All Ra-226 radiography was done outside in Bldg. 6 prior to 1955 when the inner roofless structure was built. GSI Ra-226 radiographer L.D. testified that Ra-226 radiography was done frequently outside the inner room after 1955, and the source was marked with safety tape but was not guarded full time during exposures.

[Error 43] Page 25. BB.4.4 External Dose Estimate for Isotope source

Operations. *Radium-226 radiography.* McKeel and the GSI site experts and workers challenged the GSI executive's statement that AEC limits were never exceeded as explained previously for Betatron operators 1952-1963. NIOSH has had years to locate a second set of GSI film badge data for years 1952 through 1963 but has been unable to do so. No GSI worker could identify another Film badge vendor than RS Landauer. The accuracy of the GSI administrator's statement that AEC limits were never exceeded is thus challenged here for Ra-226 operators as well.

[Error 44] Page 26. BB.4.4 External Dose Estimate for Isotope source

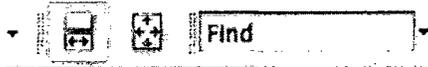
Operations. *Ir-192 Radiography.* The second sentence: No Ir-192 source was ever added to GSI's AEC license or requested to be added. We provided the evidence below that GSI's AEC license definitely 100% did indicate that GSI was licensed for Ir-192. The proof follows (see **Page 27 - item No. 12**).

[Error 45] **Page 26. BB.4.4 External Dose Estimate for Isotope source Operations.** *Ir-192 Radiography.* The GSI workers contradicted St. Louis Testing and confirmed they did guard the 2 mR/hr boundary at times. Mr. Allen reported this testimony inaccurately. McKeel believes NIOSH is obligated to calculate doses for ALL sources (OCAS-IG-003) before declaring a source dose not to be limiting. It is insufficient to assume this relationship is true without first showing the dose calculations and having the WG and SC&A agree with the results.

[Error 46] **Page 26. BB.4.4 External Dose Estimate for Isotope source Operations.** *Ir-192 Radiography.* A total of six (6) GSI workers testified in worker outreach meetings in 2006 that GSI that owned and used its own Ir-192 source for NDT of welds on small castings. See proof on page 14 from NRC license renewal.

- Note: Badged GSI radiographers also occasionally used an Ir-192 source at American Steel Foundry in Granite City IL for spillover work.

[Error 47] **Page 26. BB 4.5 External Dose Estimate for portable x-ray machines.** Allen's first sentence referring to "*a 250 kvp x-ray machine was reported at GSI*" is inaccurate; three portable GSI 250 KvP x-ray units were proven by JWR, the GSI site expert, to have been sold by GSA at the GSI equipment auction in 1974. The manufacturers and model numbers were supplied to NIOSH, the TBD-6000 WG and to SC&A. NIOSH has repeatedly ignored this fact. Two 250 kvp x-ray units were used for industrial NDT work and one was used in the GSI infirmary for diagnostic radiography of workers. OCAS-IG-003 dictates that doses must be calculated with sufficient accuracy for ALL site source terms. DCAS has repeatedly ignored and bypassed this particular guidance authored by Dr. James Neton. We believe the 250 kvp NDT doses to radiographers and bystander workers cannot be calculated because details of this work, including specific affidavit testimony, is almost completely lacking. The workers did not recall sufficient information. McKeel included this item in SINEW moderated GSI affidavit worker outreach meetings. These doses cannot be ignored. Allen/DCAS erred in doing so.



EC-374A
CFR 30

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

Page 2 of 2 Pages

License Number 12-08271-01

Amendment No. 08

CONDITIONS

(continued)

12. The licensee is authorized to receive, possess, and use sealed sources of Iridium 192 or Cobalt 60 where the radioactivity exceeds the maximum amount of radioactivity specified in Item 8 of this license provided:
 - A. Such possession does not exceed the quantity per source specified in Item 8 by more than 20% for Iridium 192 or 10% for Cobalt 60;
 - B. Records of the licensee show that no more than the maximum amount of radioactivity per source specified in Item 8 of the license was ordered from the supplier or transferor of the byproduct material; and
 - C. The levels of radiation for radiographic exposure devices and storage containers do not exceed those specified in Section 34.21, 10 CFR 34.
13. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated March 15, 1972, as amended May 19, 1972, and July 17, 1972.

[Error 48] Page 26. BB 4.6 External Dose Estimate for Administrative Personnel. This section is confusing in two respects:

(a) only two categories of GSI workers, among 163 jobs recognized by the Steelworkers Union, are recognized for external dose assignment in Appendix BB Rev 2: *Operators* and *Administrative*, as alluded to earlier in this critique.

(b) The administrative workers referred to in (a) are defined as GSI employees who rarely or never entered the production areas of buildings 5 through 10 or either of the Betatron buildings.

(c) This section refers to administrative personnel who did enter Bldg. 6. GSI floor plan maps including detailed engineering drawings of the interior of Bldg. 6 dated 1957 clearly show at least two main paths traveled by persons in transit through Bldg. 6 on the way to other buildings. Once again, prior to 1955, from 1952 through 1954, all Ra-226 radiography was in the greater open spaces of Bldg. 6 before the inner "Radiography Room" structure was built.

(d) The final sentence of the next to last paragraph on page 26 is thus very confusing: “As a favorable assumption, it is assumed that every administrative person walked through the area twice (one round trip) every shift.” The very definition of an administrative person as being apart from operators is thus clouded and very poorly defined.

(e) Another not credible assumption is made on Page 27 in the first sentence of Paragraph 2: “It is also possible an administrative person stood at the boundary during the radiography.” This is an imagined by DCAS scenario that has zero supportive worker testimony.

(f) The further DCAS assumption that admin personnel spent 25% of their time in an area with an exposed radiography sealed source appears to make impossible a clear job category corresponding to admin personnel that is clearly distinct from all other GSI personnel who are lumped together as “operators.” The site expert acquired a union listing of 163 discrete jobs at GSI. “Layout Man” was not among them.

[Error 49] **Page 27, BB 4.7 External Dose Estimate Summary.** This section summarizes the doses assigned to the two categories of GSI workers: *Administrative* (on page 27 and Table 7 on page 28) and *Operators* (on page 28 and Table 8 pages 28-29 and Table 9 Page 29). This is a change from Rev 1 AppBB. I have two specific comments:

(a) McKeel asserts the partial or complete year 1952 cannot be simply back extrapolated from later year data because, as stated previously, this was experimental R&D work on Mallinckrodt Uranium billets using a unique uranium shield. No source parameters for this source (A-C Betatron with MCW proprietary uranium shield R&D; configuration size, shape, of the uranium billet) are known for the fourth quarter of 1952 AEC Operational reports on GSI AEC/MCW contract work.

(b) The McKeel view is that “Bounding dose” as used in this section is an artificial NIOSH construct that cannot be equated with “sufficient accuracy” as a dosing criteria for determining a portion of total dose in formal dose reconstruction.

(c) The concept also conflicts as a practical matter with OCAS-IG-003 dose reconstruction guidance that dictates all radiation source terms must be determined with sufficient accuracy.

(d) The “layout man” is another artificial job construct, originated by SC&A, I believe. There was no Layout Man formal job title at GSI. Some but not all layout work was done by Betatron operators or their assistants. There is worker testimony that no GSI worker performed layout work as their exclusive job function. Besides that, the vast majority of exposed to radiation GSI workers were never badged and had no relationship with being a Betatron or Isotope operator, nor did they ever

perform layout work. Lumping everyone but a few administrative personnel that never entered the production buildings into a single "Operator" category is actually a gross and implausible, scientifically indefensible maneuver of convenience to avoid the conclusion that external dose reconstruction for all up to 5,000 GSI workers with sufficient accuracy is infeasible for NIOSH.

[Error 50] **Page 29. BB.5 Occupational Internal Dose.** There are two added sources of uranium intake not noted, but should be noted, in section BB.5: (a) MCW-AEC owned uranium metals had to be transported on railroad transfer cars along interior and exterior railroad tracks (I have called this the Transport Pathway). The transfer cars were very dusty and undoubtedly were contaminated with uranium metal dust (flaked off oxides and slag) such as the alpha radiation found by DOE in 1993 during the cleanup of the Old Betatron building. (b) the uranium ingots and dingots from MCW had to be handled by chain operators (chain men) and crane operators, who were potentially exposed to radioactive particles flaking off the uranium metal surfaces during the loading, transport and unloading activities on the loading dock and within the Betatron shooting room(s). Both the Old and New Betatron Buildings were serviced by railroad tracks and transfer cars.

[Error 51] **Page 29. BB.5 Occupational Internal Dose.** The final sentence on page 29 should be revised to read: "*...betatron photons are of sufficient energy (24 to 25 MeV, threshold around 6-10 MeV) to interact with uranium atoms to cause both discrete activation and fission daughter product radionuclides to be formed.*" (see errors 52 and 53) that follow.

[Error 52] **Page 30. BB. 5.1 Intakes from handling uranium metals.** The petitioner team strongly objected to the validity of the surrogate sites used to define doses for handling uranium metal as not meeting Board or OCAS surrogate data criteria (the facilities were not sufficiently justified to be similar to GSI). None of them carried uranium ingots and dingots (direct process ingots) that weighed 3000 to 3300 lbs. each along an internal Transport Pathway that spanned six huge buildings (5 through 10) and two different betatron facilities.

[Error 53] **Page 30. BB. 5.2 Intakes from Fission Products.** An allusion to Rev 0 of Appendix BB from June 2007 is not sufficient for either practical or scientific purposes. The scientific rationale for establishing a 1% incremental intake dose from uranium fission products needs to be recorded in Rev 2 of AppBB. Older versions of the guidance may not be available. The key references that justify this 1% dose due to unspecified "airborne" fission products need to be referenced in Rev 2. There are numerous papers in the scientific literature that explore the parameters

of Betatron-induced fission of natural uranium that have been provided to the work group, full Board, DCAS and to SC&A.

[Error 54] Pages 30 and 31. BB. 5.3 Intakes from Activation products in Steel.

GSI workers testified that some fractures in large steel castings required 500 lbs. of welding rod material during repair of some structural flaws created during casting. DCAS has no way to reliably estimate the steel activation product size (weight or composition of the welding rods -- if they contained thorium as was common, this would be another significant external and intake exposure source). We believe DCAS should have included a non-zero dose due to inhaled activation products of steel. Dust from grinding operations containing steel activation products could also be ingested and these not zero ingestion intake doses need to be assigned as well. OCAS-TIB-009, the generic ingestion guidance DCAS uses, is a poor fit for the GSI site. TIB-009 is over utilized by DCAS, for convenience, in lieu of absence of measured or calculated ingestion data.

- Dan McKeel's team provided a table of steel activation products with half-lives that approached days, weeks and even years. Included were 9 literature references showing that Betatrons and linear accelerators induced long-lasting steel activation daughter products.

- We cited the following reference by the chairman of the TBD-6000 work group: Guo S, Ziener PL. Health physics aspects of neutron activated components in a linear accelerator. Health Phys. 2004 May;86(5 Suppl.):S94-S102. **ABSTRACT:** *The purpose of this study was to investigate the residual radioactivity in the therapy accessories of a medical x ray linear accelerator. The residual radioactivity mainly originated from nuclear activation reactions by neutrons, which are present as a contamination radiation in the x-ray beam. The radiation used in this study was the 25 MV x-ray beam produced by a CGR Saturne III linear accelerator. The five treatment aids include four wedges of various angles and one cerrobend block. The decrease in dose rates with time was followed for 60 min for each of the five treatment aids immediately after 999 monitor units of irradiation. The integral doses from the surface of each of four activated therapy accessories following three different radiation doses were measured by using thermoluminescent dosimeters (CaF₂). In the TLD measurement, polyethylene filters were used to differentiate beta or beta particles from the mixed decay radiation. A high-purity germanium detection system was utilized to collect and to analyze the gamma spectra from the activated therapy accessories. The residual radioisotopes found in the 15 degree wedge and 30 degree wedge included V, Cr, Cr, Mn, Fe, Co, and Ni. In the 45 degree and 60 degree wedges, the radionuclides identified were Co, Ni, Cu, and W. The principal nuclides identified in the irradiated cerrobend block were In, Sn, Cd, Pb. The corresponding nuclear reactions from which the residual radionuclides produced were confirmed by consulting the current literature.*

Publication Types: Evaluation Studies

PMID: 15069298 [PubMed - indexed for MEDLINE]

The assignment of zero extra intake dose is not claimant favorable.

[Error 55] Pages 31 and 32. BB.5 Summary of Intakes of Radioactive Materials.

We challenge the assumptions in paragraph 1 related to times assigned to moving uranium inside and outside the Betatron shooting rooms. These are pure guesses. The uranium ingots were so heavy they had to be moved by crane inside and

outside. The path mentioned in paragraph three on Page 31 did exist, however, there were repeated trips along this path by different uranium loads as the MCW AEC uranium NDT occupied 13 years at GSI from Oct. 1, 1952 through June 30, 1966. The McKeel team believes this entire path was contaminated with uranium dust that could be mobilized by transfer rail car, crane chains, forklifts and truck transport (known to occur at the Old Betatron building by GSI radiographer testimony { }).

- Table 10 on page 32 improperly back extrapolates 1953-1966 production NDT values for intakes to 10/1/1952. As mentioned several times, GSI performed “experimental R&D work during Oct.-Dec 1952 using a uranium shield fabricated at MCW to improve x-ray image quality.” GSI used uranium billets not used during the AEC contract production Betatron NDT years (1953-June 1966). DCAS needs to calculate 1952 R&D work at GSI for MCW separately; back extrapolation is not scientifically acceptable due to the different nature of the R&D work compared to all other years.

[Error 56] **Pages 32-34. BB.6 Residual Contamination.** The sentence in paragraph two of this section is completely misleading and inaccurate: it reads as follows: **“With no indication of a decontamination effort or a cleanup...”** McKeel team provided the TBD-6000 WG, full ABRWH, NIOSH and SC&A with ample worker testimony that numerous power washing cleanups and buildings 5-10 and both Betatron buildings repurposing had occurred during the residual period. Each incident would be expected to stir up new airborne radioactive contamination along the entire uranium transport path (as Allen speculates might happen) and in the buildings themselves including both Betatron facilities. Allen/DCAS simply ignored all of this information which went unchallenged at the time the TBD-6000 met about the residual contamination period at GSI. This significant error of omission is very distressing and is very concerning.

- The multi-component concerns about this section includes Table 11 - Residual Period Dose Estimate. Section BB.6 errs significantly in ignoring information about multiple GSI cleanups and building power washing and repurposing for steel pickling operations by a succession of operators during the residual contamination period from 1966 through 1993 when DOE cleaned up residual uranium alpha dust from the Old Betatron building. The New Betatron building had been converted for classroom use during this period.

- Summary: McKeel team vigorously challenged as scientifically inaccurate and claimant unfavorable the exponential decay of intakes and ingestion during the residual period. The OTIB-70 exponential decay model is inappropriate for the GSI facility. Its use in Appendix BB Rev 2 is claimant adverse.

[Error 57] **Page 35, BB.7 References.** This vitally important GSI site profile Appendix BB Rev 2 guidance is not fully referenced. Many of the references are incomplete.

(a) One example is reference 7 (the references are not numbered and should be), "DCAS GSI web page...providing various white papers pertaining to GSI gives only the full page reference www.cdc.gov/niosh/ocas/gsi.html, the most basic link. Left out is the fact that this page is NIOSH Public Docket 140. McKeel contributed more than 50 white papers to this Docket and SC&A and NIOSH contributed dozens of other papers.

(b) No McKeel team voluminous information from the petitioners, site experts, workers, expert Betatron operators, or worker outreach meetings in 2006 are referenced here. The references are grossly sparse rather than being exhaustively scientifically pertinent as they should be.

(c) Last reference beginning "Transcript 2009,..." should contain the page numbers being referred to. The citation should be unequivocal and more specific. Transcripts are often several hundred pages long. Which pages are being referred to should be crystal clear from the reference.

(d) The crucial 1016 pages of unredacted Dan McKeel NRC FOIA 2010-0012 GSI AEC license information should be attributed. McKeel provided an index to this material to Docket 140 before NRC decided to post the information on its ADAMS website. This reference disclosed multiple new GSI radiation sources the TBD-6000 WG, ABRWH, NIOSH and SC&A never knew existed.

[Error 58] Page 40-42, Attachment B - Surrogate Air Data for Handling Uranium Metal. Dan McKeel strongly protested use of these surrogate data sites at TBD-6000 WG meetings as soon as NIOSH proposed using them. Multiple reasons led to his opposition: (a) uranium slugs were never used at GSI; (b) uranium billets were used only during Oct. 1-Dec. 31, 1952 at GSI; (c) the bars in Figure B.1 are not equal height; ergo all uranium metal weights do NOT give the same dpm/m³ values. (d) LeBlond, Tocco have very low numbers of claims and are not equivalent to GSI as facilities with justified similar scale and scope or radiation source terms. (e) Weldon Spring site is a major DOE site uranium and thorium feed materials plant with very different overall source terms and operational activities profiles; (f) slugs represent 12 of 25 surrogate air samples, and LeBlond billets another 6 of 25 total air samples. Weldon Spring dingots akin to those used at GSI represent only 7 of 25 or 28% of surrogate air samples.

- Clearly this surrogate sample does NOT meeting Board or OCAS SD criteria (OCAS-IG-004). The acceptance of this DCAS defined surrogate data by the TBD-6000 WG, and full ABRWH was a claimant adverse error of deliberate commission.

Dan McKeel final comments:

- I find it lamentable and discouraging that DCAS has ignored large volumes of valid technical information provided by the GSI petitioners, site experts and workers (“the Petitioner’s team”) data provided continuously and freely since 2005. On the other hand, DCAS has used major portions of the team’s dose reconstruction information without, in my opinion, properly attributing it in the text or references of any versions (0, 1 or 2) of this GSI appendix BB to Battelle TBD-6000 site profile guidance for dose reconstructors.
- It has taken almost nine and a half years since June 2007 for the TBD-6000 work group and Board to finalize Appendix BB. The job is not yet completed. SC&A in their September 2016 AppBB Rev 2 review agreed with NIOSH on all but 2 Findings 1 and 10. DCAS replied to SC&A in November 2016 and now appears to agree with SC&A’s position. Thus it is likely the TBD-6000 work group will recommend to the full Board at the January 2016 teleconference (meeting 115) or the March face meeting (#116) they approve Appendix BB Rev 2 as being completed.
- I can predict that none of the “editorial” or technical changes I detail in this paper will ever be added to Appendix BB.
- The outlook for GSI workers based on Appendix B Rev 2 is bleak given the recent pace of progress.

(a) The Procedures Review subcommittee is still selecting cases for SC&A to review for GSI PER-057 issued by NIOSH March 11, 2015.

(b) NIOSH will issue a new PER to cover Rev 2 of Appendix BB at some indefinite future time. The PRSC might be tasked to review the new Rev 2 PER, again months or years in the future.

(c) As of 12/11/16 ninety new GSI cases have been paid since PER-057 was issue in March of 2015. DOL has flagged a significant number of PER-057 potentially compensable cases on the short list of 100 previously denied cases as either deceased with no known survivors (n=12 names provided to McKeel under FOIA). DOL has indicated another 15 cases on the NIOSH PER-057 list of 100 had wrong employment at another ineligible not covered by EEOICPA Illinois steel facility.

- The GSI workers and GSI Petitioners Team still await the recommendation of the HHS review panel for the GSI SEC-105 185 page administrative review citing 44 specific errors that was submitted to HHS on April 17, 2013 and approved by Asst. Secretary of HHS Howard Koh 30 days later (5/17/16). The HHS Secretary still has to make a final decision on GSI SEC-105. HHS Secretary Sylvia Burwell will leave office January 20, 2017. Former HHS Secretary Kathleen Sebelius rendered the initial decision to deny GSI SEC-105 in March of 2013.
- The utter secrecy inherent in the SEC AR appeal rule (42 CFR §83.18) is appalling. Petitioners and GSI workers cannot know any information; no time limit is imposed on the three independent (of NIOSH) HHS senior scientist reviewers to complete

their recommendation work to the HHS Secretary. The SEC beneficiaries thus have no path to further appeals as they learn the reviewers recommendations and names only after the HHS Secretary has made the final decision.

Respectfully submitted,

Daniel McKeel December 14, 2016

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