

Daniel W. McKeel, Jr., M.D.
Critique of the NIOSH January 2012 White Paper
“Dose Estimates For Betatron Operations,” David Allen DCAS Author

1. **General comments on GSI dose reconstruction:**

a) The October 2011 and January 2012 Allen white papers about GSI portable and Betatron sources need to be acknowledged as being the basis for a revised Appendix BB to the parent Battelle TBD-6000 document. This may be inferred but is not stated explicitly.

b) It should also be acknowledged by NIOSH that the Director of DCAS has stated unequivocally that these two white papers are not the basis for a revised SEC-00105 evaluation report. DCAS Director Stuart Hinnefeld has written to the GSI petitioners and has stated unequivocally that “NIOSH has no plans to revise its evaluation report of SEC-00105.”

c) There is zero urine uranium bioassay monitoring data for any GSI worker for the covered period of 1953-1966. GSI has repeatedly minimized, we believe incorrectly, the intake dose potential inside the two GSI Betatron facilities.

d) *The new Betatron modeling dosimetry results using the MCNP code in the January 2012 Allen white paper are misleading in that there is no direct comparison with earlier dose modeling by SC&A using MCNPx code and by NIOSH using Attila code.* The early results disclosed a highly significant, scientifically troubling *order of magnitude or greater* discrepancy between the computer models and the limited GSI film badge results. In addition, the NIOSH and SC&A models disclosed significant differences between them. These early results need to be reconciled with the new results. How do the NIOSH MCNP results compare to the earlier Attila code results by NIOSH? Why were the analyses switched from Attila to MCNP?

e) *Mr. Allen and NIOSH have been repeatedly non-transparent about how certain of their key dosimetry data came into their possession.*

e.1) In particular, *co-petitioner McKeel first discovered the presence of Landauer GSI film badge data to NIOSH 13 months before NIOSH obtained the complete data set.* McKeel made the initial contact that led to this important revelation. This was acknowledged in part by Mr. Allen in an open meeting in Collinsville, IL in 2006. However, the fact has not been acknowledged in NIOSH technical reports, including the January 2012 paper being critiqued here.

e.2) Also, *co-petitioner Dan McKeel, not NIOSH, filed the FOIA request* that led to the release of NRC FOIA 2010-0012 documents on the NRC website. When McKeel provided these data to NIOSH a few weeks after obtaining 1,016 pages of GSI by-product materials licensing information, he explicitly provided the following language as to how these documents should be attributed. This reasonable request has been totally ignored by NIOSH. Co-petitioner McKeel believes NRC decided to release these documents because McKeel provided them with a compelling set of answers to eight questions that must be answered to have NRC waiver fee waivers. As a result, McKeel believes, NRC released the 1,016 pages—unredacted—without charging him a fee. In addition, NRC voluntarily provided McKeel an unredacted Index of all these FOIA documents, listing 37 different sets of documents that comprised the whole. McKeel provided this Index to NIOSH, where it was and is posted in a heavily redacted form. NIOSH has never provided a valid explanation why they heavily redacted the unredacted NRC Index given to McKeel and posted later on the NRC website, including names of many deceased persons that are not subject to protection by the Privacy Act of 1974.

e.3) *Co-petitioner Dan McKeel and site expert John Ramspott together interviewed Jack Scheutz, an NIOSH contractee, more extensively person-to-person and before NIOSH interviewed Mr. Scheutz.* NIOSH has been informed by co-petitioner McKeel that Mr. Scheutz said that Allis-Chalmers, for whom he worked and which was the company that installed the GSI Old Betatron, “always” conducted a complete and comprehensive radiation dosimetry of all Betatrons facilities they installed. Mr. Scheutz also told McKeel and Ramspott that he “destroyed those building surveys when he took over the assets of Allis-Chalmers Betatron operations and began his service business.” However, to our knowledge, NIOSH and DCAS have made no effort to secure possible copies of these radiation surveys that would, of course, be immensely relevant to Betatron operations at GSI and other EEOICPA sites such as Allis-Chalmers itself and Los Alamos that also operated A-C manufactured Betatrons during the covered period. McKeel challenges the credentials of Mr. Scheutz to be the most definitive source of data on GSI operations. He was not a physicist, nor was he credentialed as a health physicist. He was a well trained Allis-Chalmers Betatron technical repair person to our knowledge. Also, *it was clear to McKeel during the direct interview that Mr. Scheutz had a vested interest in promoting Betatron technology as a safe NDT modality.* Therefore his viewpoint is biased in this way, and this fact needs to be acknowledged in assigning a weight to Mr. Scheutz’ testimony.

2. **Specific dose reconstruction and SEC issues:**

A. **Issue #1: Exposure data from an 80 Curie cobalt-60 source from the 1968-71 during the residual contamination period cannot be used to model Betatron exposures during the 1953-1966 covered period.** This entire section and analysis should therefore be completely disregarded and not allowed to be part of a revised Appendix BB, the announced intention of producing this new technical paper. There is no surviving GSI Betatron x-ray dosimetry data. All of the logbooks, “shot records,” x-ray check off and analytic reports known to be generated for the MCW Uranium Division by GSI, uranium ingot shipping manifests and inventory sheets, have been lost, destroyed or misplaced (and therefore not found) by DOE/NARA. The petitioners have repeatedly suggested that NIOSH seek these records among MCW reports, yet this data capture effort has never been made by ORAU as part of the EEOICPA funded Data Capture program to our knowledge.

B. **Issue #2: External and internal photon doses, beta skin doses, and neutron data derived from *calculated* 1963-66 photon-to-neutron ratios cannot reliably be back extrapolated from the 1953-66 early years of the GSI covered period.** These p-to-n ratios were based on modeled photon doses rather than real doses. There is no actual (measured) neutron data from the two GSI Betatrons. Other SECs such as the first Rocky Flats SEC were approved because p-to-n partial dosimetry data was not thought to be sufficiently accurate to define dose. There is no convincing NIOSH neutron data at GSI, even though it has been shown by the petitioners that the ~15% of the output beam of 24-25 Mev Allis-Chalmers Betatrons of the same type as used at GSI was neutrons.

C. **Issue #3: NIOSH and David Allen have mischaracterized the uranium source term at GSI in at least 4 important ways:** [Note: *The term “Mallinckrodt” refers to the Uranium Division of Mallinckrodt Chemical Works-Destrehan Street and the Uranium Division feed*

materials DOE plant operations at the Weldon Spring Feed Materials Plant in St. Charles County].

[1] The GSI petitioners and site experts have produced unchallengeable data from Mallinckrodt documents that David Allen's analysis of GSI nondestructive testing of Mallinckrodt uranium during 1953-66 is incorrect in at least three aspects:

[1a] MCW and Weldon Spring sent 2-step uranium ingots and 1-step uranium dingots to GSI for nondestructive radiographic testing ("X-ray NDT") using the two plant Betatrons. These uranium forms were *in addition to* the uranium slices that David Allen referred to in the January 2012 white paper.

[1b] The *purpose* of X-ray NDT at GSI on Mallinckrodt uranium was not only, or even primarily, to uncover structural defects as David Allen claims in the January 2012 white paper. Rather, *the major purpose was to define the interface between the outer magnesium "slag" or "crust" that coated each ingot or dingot after it emerged from the "bomb"* (metal vessel) in which the ingot or dingot was formed. MCW needed this precise slag/pure uranium interface location information in order to guide the lathes that shaved away the mg-fluoride crust to expose the pure uranium surface of the ingot or dingot. The petitioners and Mr. Ramspott have described and documented this process by documents and photographs. It is really unfathomable why this basic fact is ignored repeatedly by NIOSH and Mr. Allen. Obviously, an entire intact ingot or dingot would have to be examined by x-ray NDT at GSI. The goal could be, and we contend was, reached by doing glancing shots around the ingot/dingot. The crust was only a few inches thick, and the underlying interface with the pure uranium was readily imaged by the powerful Betatron x-ray beam. GSI Betatron operator Ed Brawley clearly described this process on the record.

[1c] The heavy uranium ingots, dingots (and possibly the "Betatron slices") were transported from Mallinckrodt-Destrehan Street or Weldon Spring Feed Materials Plant to GSI across the Mississippi by truck. Those trucks had to be unloaded when they reached GSI. Heavy steel castings and the uranium, according to worker testimony, were transported within the GSI campus and building complex by rail. Railroad engines were used to bring the castings and uranium into the Old Betatron Building. Petitioners and Mr. Ramspott have provided maps of the route of these GSI railroad tracks. Railroad tracks entered both Betatron facilities. There were no docks for trucks in either Betatron building. Castings and the uranium ingots and dingots, each weighing perhaps 3,000 pounds, were transported through several GSI buildings and through building 10 by electric rail engine on the way to the tunnel entry to the New Betatron facility that adjoined and was connected to Building 10. NIOSH has failed to calculate exposures to the many unbadged workers who handled the uranium during the transport loading and unloading and transport operations described above. These real doses have to be calculated and be made part of the assigned external and internal dose for uranium by unbadged and badged workers. This has not yet been done despite repeated urging by the petitioners, site experts and workers to do so.

[1d] David Allen in the January 2012 white paper incorrectly states several facts to support his rationale for using the New Betatron doses, based on film badge readings of the operators, as bounding for the Old Betatron x-ray unit for the *entire covered period of 1953-1966*. This is not just a dose reconstruction issue; it is also a fundamental SEC issue. Mr. Allen is incorrect in stating that the peak uranium volume for Betatron NDT examinations was during the last three years (1964-1966) of the GSI covered period when film badge data were available. In fact, as has been documented on the record previously by analyzing MCW-AEC purchase orders issued to GSI, the peak year was 1962. Thereafter, uranium shipments took a sharp decline in

numbers. The preponderance of worker testimony evidence is that most of the AEC MCW uranium NDT work was performed during the entire covered period was done in the New Betatron building, not the Old Betatron building as Mr. Allen indicates. It is true that *overall* Betatron activity likely increased with the addition of the second unit from Eddystone in 1963. However, I would point out again, that NIOSH has zero shot records or log books or shipping manifest, or steel materials inventory records, that would prove this is the case. The written records of GSI operations during the covered period are practically nonexistent. So, Mr. Allen's "facts" are mostly educated suppositions (guesses) and are definitely not established facts.

D. Issue #4: David Allen has mischaracterized the Betatron NDT work on MCW uranium products in other significant ways in the January 2012 white paper.

a) Workers testify that a large majority of the GSI NDT examinations of MCW uranium took place in the Old Betatron building. That must be the case, because the New Betatron machine and building were not in place at GSI until 1963. Nevertheless, Mr. Allen implies that the model to be used for uranium doses at GSI should be based on exposures in the New Betatron building. This analysis is therefore by definition false and misleading, and the underlying assumption that both Betatrons and their facilities are equivalent is incorrect. Based on OCAS-IG-003 dose from *all* radiation source terms at a facility during the covered period *must be determined*. Such is not the case for GSI in any NIOSH technical report, including David Allen's January 2012 white paper under discussion here.

b) Mr. Allen fails to note that no MCW-AEC purchase orders to GSI for NDT examinations are available for the years 1953-1968 of the covered period.

c) During the DOE cleanup of the GSI Betatron facilities in 1992, ORNL found residual uranium contamination *only* in the Old Betatron Building. Mr. Allen's January 2012 white paper ignores this well documented fact.

E. Issue #5: Very limited, non-representative film badge data from 89 men doing a single job (Betatron operator/radiographer) of a workforce of 3000 to 4000 men and women for 3/13ths of the covered period in years is in no way representative of the entire work force. As such it cannot be used to bound doses for anyone except the 89 persons with data. With respect to the rest of the GSI workforce, there is absolutely no film badge or urine bioassay for uranium data, or ambient air or "dust study" data for any portion of the covered period.

Petitioners contend there is no compelling scientific rationale for being able to back extrapolate the film badge data to other workers and to the first ten years of the covered period. Petitioners further challenge the validity of NIOSH accepting SC&A evidence from Landauer that the highest film badge readings at GSI were retracted. Such retractions of GSI film badge data were not brought up by Landauer representatives Chris Passmore and Emily Quirke first discussed the GSI film badge data with McKeel in 2006 thirteen months before either NIOSH or SC&A were even aware of the existence of this information. In fact, Ms. Quirke went out of her way to highlight the highest reading of 30 REM, and to point out that this was received in one quarter. That quarter coincided with a high exposure accidental exposure known to have occurred with this individual (Peterson) as supported by detailed affidavits from coworkers who were eye witnesses to these events. There is evidence that the GSI film badge "retraction" letter signatures by individuals with the highest FB readings were forged by GSI supervisors. NIOSH has refused to supply petitioners with copies of the unredacted letters citing the Privacy Act of

1974. However, the affected workers are and were both deceased and therefore were not protected by the PA of 1974 at the time these requests for unredacted copies were made by the petitioners. There is no polite term for this action by NIOSH: the best case scenario is that it is censorship; the worst case scenario is that the denial of unredacted letters constitutes obstruction of legal due process.

F. Issue #6: The petitioners challenge David Allen's use and job characterization of a theoretical Layout man as the prototype for all workers at GSI apart from the Betatron radiographers. In Allen's construct in the January 2012 white paper, all workers other than Betatron operators and assistant operators will be assigned one dose, and everyone else will be assigned another dose calculated for the prototypical Layout worker. As a comment, confining the Betatron operator dose only to people who worked most of the time in the Betatron buildings is unfair. Why? Because many persons such as guards, electricians (prominently as workers have testified), inspectors and certain other workers *routinely* entered and left the Betatron buildings and could have accordingly received extra dose compared to a Layout worker who never entered the Betatron facilities.

First, there is zero (no) film badge or urine uranium bioassay intake data or Radium-226 or cobalt-60 or industrial x-ray machine dosimetry monitoring data for any GSI workers except the Betatron and isotope radiographers.

Second, there is no way to construct a valid co-worker model for GSI "general" workers such as Layout workers because, as admitted first by OCAS Director Larry Elliott, "GSI is a unique site."

Third, there is no breakdown of Layout workers versus the general workforce at GSI with respect to gender. There is recent epidemiologic information from the general radiation literature that for certain types of cancers women respond differently than men to radiation exposure [REF]. So, Layout worker may not be representative of the entire GSI workforce for gender.

Fourth, David Allen cites no evidence that GSI Layout workers actually received more dose than GSI welders, burners and grinders, for example.

Fifth, Mr. Allen misrepresents what a Layout worker actually does. He ignores the fact, established by petitioner and site expert photographs, that some steel castings required up to 400 (four hundred) separate shots. Allen's analysis indicates that almost all shots were either 15 minutes or 60 minutes.

Sixth, workers in building 10 near the break area and railroad tunnel entry to the New Betatron building, and the 300 workers there is testimony worked near the inner roofless building 6 radiography facility, probably received higher external doses compared to Layout personnel in other parts of the factory. NIOSH cannot identify which *particular* workers were the included in the "building 10" and the "building 6" GSI worker cohorts. This is an SEC issue as well as a dose reconstruction issue.

Seventh and most importantly, *the Allen analysis does not compare how the external photon, neutron and beta doses calculated in the January 2012 white paper compare to dose assigned to workers other than the Betatron operators in Appendix BB, Rev 0.* This is a major and crucial omission, since this white paper will form the basis for a revised Appendix BB Rev 1 according to DCAS Director Stuart Hinnefeld. Such an analysis will be further important guidance for health physicists who will be charged with performing second (repeat) dose reconstructions for GSI claims whose claims have been denied. It is certain that many such situations will arise.

3. **Issues that bear on validity and veracity of GSI dosimetry information:**

Co-petitioner McKeel offered the following comments on both of the following issues to the full ABRWH on February 28, 2012 at its regular meeting in Oakland, California.

G. **Issue 8. The red steel roll up ribbon doors in the Old and New Betatron facilities during the covered period.** McKeel's comments on 2/28/12 to the full Board were as follows:

FINDING #1. The Betatron exit tunnel doors were NOT double leaf and lead shielded during the covered period of 1953-1966 as is stated in the January 2012 Betatron paper.

We have photographic and affidavit proof that the double leaf doors were installed in 1971 or 1972 after the covered period had ended. Betatron workers to a man had always stated that the tunnel exit doors on both the Old and New Betatron buildings were a "steel red ribbon type roll up door."

NIOSH evidence: On pages 2, 3 and 4 of the 30 page January 2012 white paper Mr. Allen showed drawings of the Betatron buildings from the 1992 FUSRAP cleanup and the GSI cobalt AEC license renewal application. The drawing had originated in the GSI 80 Curie AEC license application in 1968, two years after the covered period had ended. The text noted the doors were "double leaf with lead shielding." Similar "double leaf doors" minus the reference to being lead shielded were described and shown in drawings in the ORNL DOE cleanup report for the GSI Betatron buildings in 1992. The page 4 drawing indicates the nearest building is 1000 feet away.

McKeel-Ramspott evidence: There is both old and recent direct worker confirmation that in the 1963-66 time period the Old and New Betatron tunnel exits were "red, steel, roll up ribbon doors" that could not be retrofitted with lead shielding. Ramspott and McKeel have their own Old and New Betatron photographs, and ones from the Department of Energy cleanup in 1992 that they obtained, that indeed show the exit doors have double leaf doors with vertical strips on the lower panel. These doors bear no resemblance to the red ribbon roll up door described by the workers at the end of the covered period. However, in September 2006 Dan McKeel had a photograph of the exact type of red, steel, roll up ribbon door that enclosed the building 10 entry to the break area that was an extension of the New Betatron Building tunnel. AEC documents said the break area tunnel at the entry to Building 10 was bounded by a chain mesh. Workers testified that in 1963-66 the break area entry to building 10 was wide open, not enclosed at all.

These observations lead to several important conclusions:

Conclusion 1) It is incorrect to reconstruct doses for the covered period based on the assumption there was a double leaf lead shielded door to stop limit the dose to workers in building 10 and in the New Betatron break area. This section of the second Allen white paper should be retracted and doses redone based on a roll up unshielded steel door at the end of the two Betatron tunnels.

Conclusion 2) The January 2012 Allen white paper also contains the incorrect statement that the nearest building from the Old Betatron building during the covered period was 1000 feet away. In fact, to the contrary, the Old and New Betatron buildings were only 300 feet apart. The outside of the Old Betatron Building contained a sign, that McKeel photographed in 2006, which said "Do Not Approach This Building Within 100 Feet." We hold this sign meant that radiologic surveys must have established a significant radiation danger field around the Old Betatron building. We can assume a similar danger zone also surrounded the New Betatron facility. Those 100 foot radius zones would clearly involve persons in building 10 and in the space between the two Betatron buildings. This was a very busy area that many unbadged workers also used to by-pass walking through the foundry. Casting "flasks" filled the area that had to be placed there. Many persons parked within 100 feet of the New Betatron facility as proven by photographs from the GSI magazine. These between Betatron doses have not been modeled or measured accurately by NIOSH, nor have they been recognized or modeled by SC&A.

Conclusion 3. Once again NIOSH and SC&A have given insufficient weight to worker testimony about the true nature of the Betatron doors and shielding in the covered period. Instead, the paper uses information about the Betatron facilities from the residual period that has no relevance to the covered period situation.

On the next page are photographs of the double leaf doors placed, the petitioners and site experts believe, in 1968, *after the covered period which ended in 1966*. Lead shielding was not observed by any living Betatron workers on the double leaf doors at the Betatron exit tunnels. The doors that should have been modeled in the Allen January 2012 white paper are also shown on the next page as "red, steel, roll up type ribbon doors" that all GSI workers agree closed off the rail track tunnels to the two Betatron facilities during the covered period. The building 10 door shown blocked the entry to the New Betatron tunnel in 2006, a place the workers say was open during the covered period, and DOE 1992 cleanup documents say had a wire mesh closure.



Legend. The double leaf ribbed door at the end of the Old Betatron Building railroad track exit on a site visit photographed by Dan McKeel on 9-26-2006. It is believed this type of door replaced the red roll up steel doors in 1968 when GSI obtained its AEC license for the 80 Curie Cobalt-60 source as an AEC licensing requirement.



Legend. A red ribbon door in GSI building 10 blocks the entry to the New Betatron break area and tunnel in 2006. This type of door is identical to the "red, steel roll up ribbon doors" that numerous GSI workers testify was present at the ends of the GSI Betatron building railroad track tunnels during the 1963-66 covered period. Photo by Dan McKeel, GSI SEC-00105 co-petitioner on site visit 9-26-2006.

H. **Issue 9. Alteration of the original NRC FOIA 2010-0012 drawing of the 1962 status of the inner Radiography structure in GSI building 6.** McKeel's comments on 2/28/12 to the full Board were as follows:

Finding #2. The building 6 radiography facility has been incorrectly modeled for the period 1953-1962 when Radium-226 was being used for nondestructive testing.

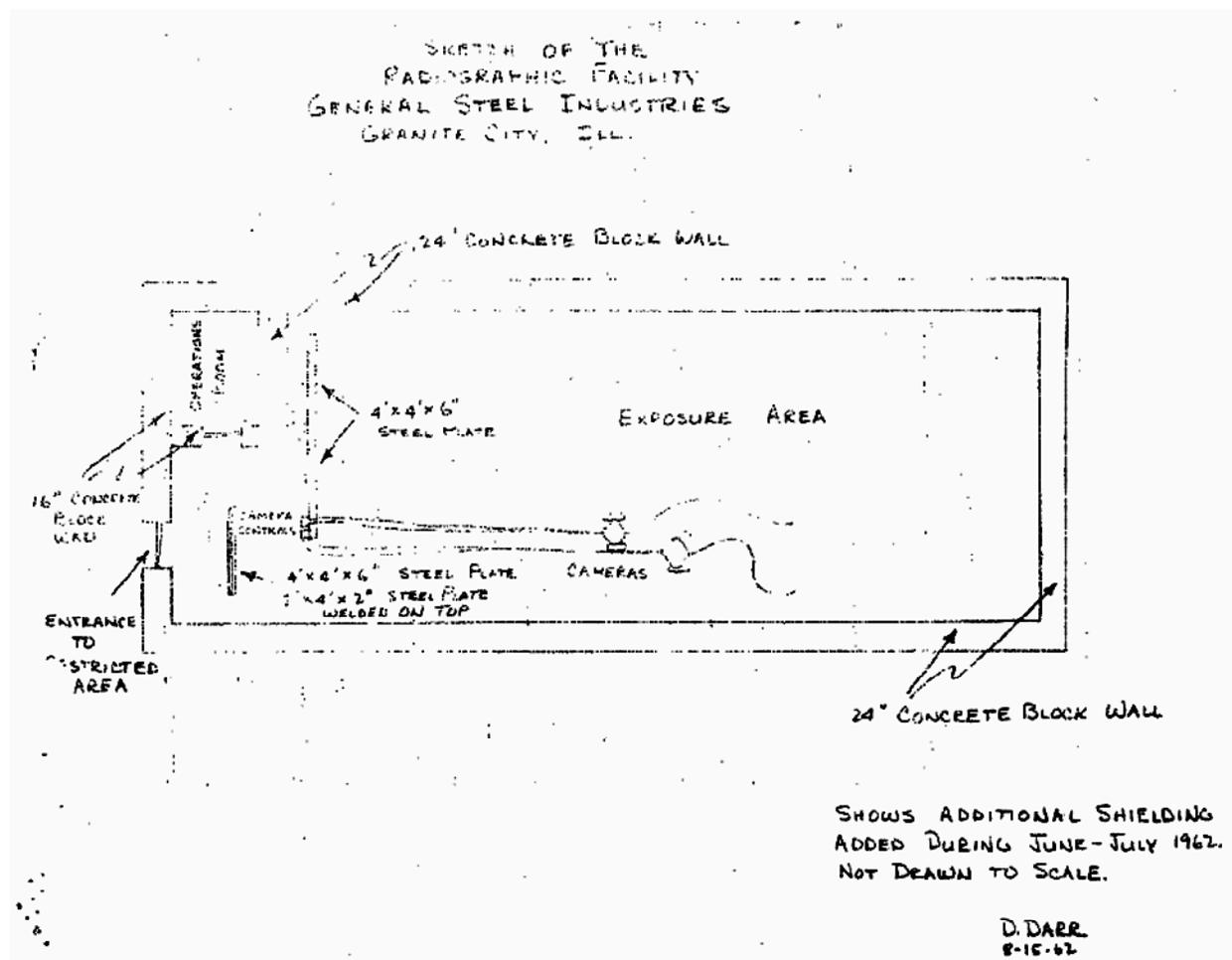
This is an SEC issue. In the October 2011 first Allen GSI white paper on portable sources, on page X is shown an August 1962 drawing of the building six roofless radiography facility. SC&A uses the same drawing in their review. Packet 3 of 37 of the NRC FOIA 2010-0012 material that Dan McKeel obtained, on page X, shows the same drawing in which "D. Darr" has signed the drawings and annotated that the steel plates and second layer of concrete blocks were "added in June/July 1962." **Mr. Darr's name and the date annotation were omitted both in the SC&A review drawing and in the GSI 1962 AEC license application for the 0.5 Curie Co-60 sources.**

Scientifically, this is a very troubling omission of key data, because it confirms worker testimony (Leroy Dell, Jim Powers) that no such steel plate shielding was in use prior to 1962 when the same inner structure was used with radium-226 sources and the "fishpole technique" the AEC banned from use in the early 1960s throughout the USA. Workers state that 300 unbadged workers were near the building 6 radiography facility. This differs from the Allen-SC&A analysis.

Finding #2 indicates that neither NIOSH nor SC&A thoroughly reviewed the McKeel NRC FOIA 2010-0012 materials. Lack of a door in the inner radiography structure before 1962, and walls that were a single concrete block thick, had been testified to NIOSH and SC&A by GSI workers previously but was ignored in the recent Allen white papers. Radium-226 doses in and surrounding the building 6 radiography facility from 1953 to 1963 of the covered period should be recalculated or modeled by NIOSH and SC&A. The SEC issue is that no actual (that is real) radiologic surveys had been made of this facility prior to 1962 when there was less steel and concrete shielding. Again, the Darr June/July 1962 annotations proof the changes were applied to an existing facility and further confirm worker testimony to that effect.

Another overall conclusion that applies to both Findings is that GSI license applications to the AEC cannot be trusted without confirmation by readily obtainable worker testimony. This company was clearly self serving to the detriment of workers. It is clear to us that GSI. The D. Darr June/July 1962 annotations should have been incorporated into the 1962 GSI cobalt-60 license application to the AEC, but apparently someone removed them. This removal of key data casts doubt on the validity of the entire Wilfred Konneker and Nuclear Consultants Corporation radiologic survey and input to the GSI license application. Correct scientific data appears to have been deliberately manipulated according to the written record.

GSI petitioners, site experts and former workers and claimants that the TBD-6000 work group carefully consider these new findings when making a final recommendation on GSI SEC-00150 to the full Board.



Legend added: D. Darr signature clear with annotation
"Shows Additional Shielding Added During June-July 1962."

The NRC FOIA 2010-0012 material from which the above drawing was taken was available to both NIOSH (David Allen) and to SC&A (Robert Anigstein) when their respective reports were written in 2010 and 2012. They should have been aware of this drawing.

This new understanding of the different physical characteristics and shielding in the building 6 Radiography structure pre- and post June and July 1962 and the AEC license application radiologic survey of August 1, 1962 by Nuclear Consultants Corporation has another important implication. SC&A reported MCNP modeling of radium-226 when part of this work was done inside the building 6 Radiography facility and part was done in the rest of the GSI building complex (see Leroy Dell and James Powers interviews) as follows:

Effective Date:

10/20/2011 Revision No. 0 – Draft Document Description: White Paper:
Update on the Use of Sealed Radioactive Sources at GSI Page No. Page
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Appendix B MCNP SIMULATIONS OF EXPOSURES FROM 226RA
IN NO. 6 BUILDING

Prepared by Robert Anigstein and Richard Olsher S. Cohen & Associates

- We simulated the exposures and dose rates from 226Ra in the radiographic facility in No. 6 Building at GSI using the MCNP5 radiation transport code. The model of the radiographic room was based on a sketch in the GSI application for an AEC byproduct material license (NRC 2009e, p. 31), which is replicated in Figure 4.

However, all or essentially all of the radium-226 NDT work at GSI was done pre-1962 when, we now know through D. Darr's annotation, all of the shielding, the steel plates and added concrete block wall thickness, *allegedly* was added to the building 6 radiography structure in June and July 1962. So SC&A incorrectly modeled the better shielded post July 1962 situation rather than the correct situation that prevailed after mid-1962. **The petitioners therefore assert that all radium-226 modeling reported by SC&A is thus substantially incorrect**, and to preserve claimant favorability the SC&A analysis should be retracted and redone to reflect the higher doses the radium-226 fishpole technique operators would have undoubtedly been subjected to before July 1962 of the covered period when the radium-226 NDT work was actually performed. NIOSH needs to address the lack of observational evidence that the steel plate shields were actually in place at a specific date.

I must reiterate the fact that an extra thickness of concrete blocks was added in June and July 1962 has been challenged by a GSI worker (JTD), who told the petitioner he climbed up to

the top of the building 6 radiography wall in 1963 and observed the wall was “only one block thick.” NIOSH needs to produce observational data to confirm that extra concrete was actually added to make the walls 24 inches thick in the building 6 Radiographic facility.

I. **Issue #10. The peak period for uranium NDT work at GSI was not 1964-66** (detailed information in Appendix A). Related to D Issue #4 on page 4, the January 2012 GSI white paper perpetuates another error first promulgated by the former OCAS Director Larry J. Elliott. That is, that the peak uranium radiographic NDT operations on MCW-AEC uranium took place during 1964-66 when film badge data is available on 89 Betatron and isotope radiographers. In fact, as shown from Rev 0 of Appendix BB, section 2.2, there was a *dramatic decline* in MCW uranium purchase orders to GSI for uranium NDT work from 1961 to 1966 amounting to 97 percent!

J. **Issue #11. The nearest distance to another building from the Betatrons was not 1000 feet** (support information in Appendix B) **as was claimed in the 1962 GSI AEC license application to obtain cobalt-60 sources.** Mr. Ramspott and several GSI Betatron operators refute the erroneous statement on the GSI 1962 cobalt license examination that the nearest building was 1000 feet away from the Betatrons. That is decidedly not true. Measurements by John Ramspott shown in Appendix B, estimates by GSI workers, and SC&A data all indicate the two Betatron facilities were within 300 to 312 feet of one another. The inter-building area bore heavy human traffic as has been mentioned.

As I have noted, the Old Betatron Building contained a sign that read “Do not approach within 100 feet of this building.” Dan McKeel photographed this faded sign in 2006 and it was shown to be present in 1992 photographs of the same facility that John Ramspott obtained from DOE made during the cleanup campaign.

GSI should not have made this false statement to the AEC, and Mr. Allen should have disavowed the factual basis for the assertion in his January 2012 white paper.

K. **Issue #12. David Allen incorrectly describes “head flipping” of the Betatron.** The following entry occurs on page 7 of 30 of the January 2012 David Allen GSI white paper:

to as the “railroad” position. In this position, the equipment is assumed to be on a railroad type cart located in the shooting room. For this configuration, the betatron is assumed to be pointed directly at the equipment, perpendicular to the railroad tracks. Additional scenarios could involve aiming the betatron head 45 degrees to the right and to the left of that position.

It should be noted that aiming 45 degrees to the right would be a “flipped head” position.

Ramspott Comment:

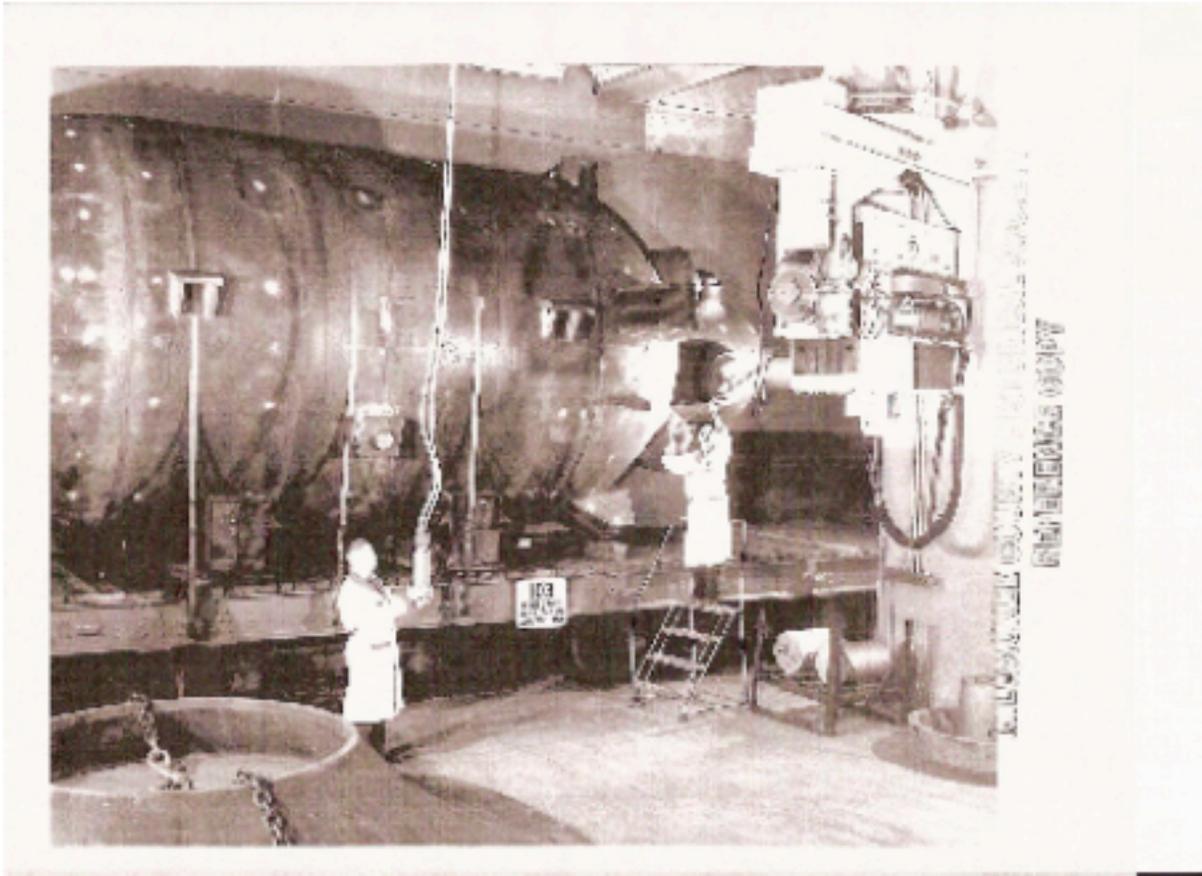
“It should be noted that aiming 45 degrees to the right would be a “flipped head” position ”.

This is “totally incorrect”! NO FLIPPING IS NEEDED.

Please note this very clear Allis-Chalmers Betatron PROMOTIONAL PHOTO:

Allis-Chalmers promotional literature states that 45 degree rotation of the camera head in either direction is a normal feature of their Betatron. See the large casting on a flatbed RR car image on page 14, for example. The Betatron head would have to be rotated 45 degrees in either direction to image the entire casting using x-ray NDT. The downside is that a shot using this scenario to the right would send the beam down the long “L” tunnel that contains the railroad tracks. The thin unshielded roll up ribbon door that closed the Old and New Betatron building tunnels in the covered period would not have stopped the Betatron beam in this position.

Head-flipping is quite different—cited as being dangerous—and is *forbidden* as a safe operational technique to x-ray inspect objects in the opposite direction from the limited normal movements of the Betatron head. Head flipping has been well described by GSI Betatron workers. It is troubling that normal and banned operations are being confused at this late stage of the dose reconstruction program when 94% of GSI dose reconstructions have been completed.



Simply turning the Betatron 45 degrees to the right, to radiograph the end of the casting, does not require any “flipping”.

It would also send the Betatron beam "right down the tracks" towards the doors.

This was a common “timesaving” procedure per numerous workers, including T.Dutko/ GSI operator.

SUMMARY AND CONCLUSIONS:

I decided not to submit a line-by-line rebuttal to the David Allen and NIOSH January 2012 white paper because the “big picture” extensive factual and scientific distortions, intentional selective citation, lack of proper professional attribution, and inaccuracies assumed overarching importance when I reviewed this second white paper in an Appendix BB process that has now dragged on since October 2010 (16 months). This report does a disservice to the

EEOICPA process and is the opposite to the intent of Congress to be claimant favorable in every way when our elected federal officials established EEOICPA in 2000 to compensate deserving nuclear weapons workers. This report even being allowed to take a further 15 months to research and be published is an affront to every GSI claimant and to the petitioners, and to GSI advocates and experts, and supporters and families of GSI workers and claimants. It is a further affront that Appendix BB has not been revised since June 2007 when Rev 0 was released.

This summary and conclusions includes information from the October 2010 Allen white paper that dealt with portable radiation sources at GSI. The two Allen white papers encompass all ten new dose reconstruction “models” that were originally outlined by Mr. Hinnefeld in his initial announcement that NIOSH would undertake these new studies.

My concluding points can be summarized in brief statements as follows:

1. NIOSH has failed to fully comply with its own guidance OCAS-IG-003 that for dose reconstruction purposes all radiation sources at a facility during the covered period must be calculated with sufficient accuracy.

2. NIOSH in the January 2012 Allen white paper improperly cites cobalt-60 dosimetry obtained outside of the covered period to characterize Betatron worker doses during the covered period. In the October 2010 Allen white paper on portable GSI sources, NIOSH challenged and denied that an 80 Curie cobalt-60 source was in use at GSI before 1968. The covered period ended in 1966. NIOSH cannot have it both ways.

3. Further, with respect to point #2, the radiation characteristics (energy spectrum, directional vectors, neutron content, and extent of the radiation fields) differ completely from that of the Betatrons.

4. The radiation patterns cannot be assumed to be comparable or lower for the Old compared to the New Betatron buildings as David Allen does in the January 2012 white paper.

5. The two most recent Allen white papers fail to cross correlate the new doses calculated for Betatron workers and layout (rest of the GSI work force) workers with the two dose levels assigned to Betatron and other workers in Appendix BB. The methods and computer codes were quite different. This will be key for calculating doses in reopened denied cases (so called “reworks”).

6. In the January 2012 second Allen white paper there is no cross comparison between the new NIOSH dosimetry calculations for the Betatron using MCNP and the doses modeled

previous by SC&A using MCNP and NIOSH using Attila. Why NIOSH switched computer modeling code is not justified in Allen January 2101. Dr. Anigstein from SC&A has commented that different software versions of MCNP give different results. Mr. Allen again overlooks these important scientific points. It appears that Mr. Allen is assigning Betatron workers an overall dose that is approximately 75% of the dose SC&A assigned to them previously based on SC&A MCNP modeling results. These lower doses assigned to Betatron workers in part may reflect the incorrect assumptions that lead shielded doors covered the Betatron shooting area exits. We have shown these assumptions were false.

7. Both NIOSH/DCAS in Allen January 2012 and SC&A (in their review of Allen October 2010) used drawings from the GSI 1962 cobalt-60 license application to AEC that were altered in significant ways compared to the original drawings from two months earlier where “D. Darr” annotated the steel plate shields and the double concrete walls were added only 1 to 2 months earlier in June and July 1962. There is meager evidence that the steel radiation shields were added. One former worker says yes and another says no. There is no support for the proposition, that is no worker affidavit confirmation, that a second layer of concrete blocks was ever added to the walls on the inner Radiography structure to Building 6.

8. Related to point #6, NIOSH needs to calculate separate doses for radiographers using the radium-226 sources with the fishpole technique before 1962 (when no shielding was in place, a single block wall existed and possibly there was no door) and after 1962 to 1966. Workers testified that both Ra-226 and 0.5 Curie cobalt-60 sources were used for a short while during 1962 and then the ra-226 sources were abandoned as mandated by the AEC for safety reasons. Mr. Allen fails to acknowledge these nuanced points, nor have the necessary dose calculations been carried out.

9. A former GSI Betatron operator who was very familiar with the two Betatron facility control rooms disputes there was a separate “control room badge” as Allen reports the Landauer film badge data indicates. This person (JTD) is well known to the Board and is willing to sign an affidavit to that effect. The petitioners believe and assert the control room badge data cannot therefore be validated or trusted, and that the 114 readings do not necessarily represent the true dosimetry readings in the two control rooms. SC&A modeling, in fact, showed the *highest levels of radiation* occurred in the control room that was supposed to be protecting the workers. The Betatron control rooms both had thin metal doors that would not impede the high Mev photons

and x-rays that were prevalent during Betatron shots. Photos of these thin metal doors have been provided previously to NIOSH, the Board and SC&A by Mr. Ramspott and the petitioners.

10. Although the reasoning is obtuse and poorly described, using tortured scientific logic in my opinion, Mr. Allen improperly attempts to “explain away” Jack Scheutz’ direct measurement of residual Betatron activity for 15 minutes after the camera is turned off. The petitioners have produced several papers (many more being available) that clearly show that many internal components of all high energy particle accelerators become activated with prolonged duty cycles, and that some of these activation products have half lives longer than 15 minutes. To the petitioners, therefore, the Scheutz observation is both expected and readily explainable. The appearance is that NIOSH wishes to explain away the residual radioactivity because it is “inconvenient” and results in a higher overall dose to Betatron operators. Good science and the intent of Congress was that workers should be compensated and that such adversarial tactics have no valid place in implementing the dose reconstruction program under EEOICPA 2000.

11. After spending 16 months developing new dose reconstruction models and methods for ascertaining external and internal doses to all GSI workers, the two main work products that NIOSH has produced, the October 2010 and January 2012 David Allen white papers, are full of bad assumptions, use data from the residual period that cannot apply to the covered period, and incorrectly model Betatron doses and x-ray particle accelerators that produce a very tight, narrow, and highly directional beam that has to be widened through a beam flattener (read spreader), by using as a source a Cobalt-60 gamma source beam that is not collimated and radiates as a *sphere* in all directions. NIOSH has claimed an 80 Ci C-60 source was not at GSI during the covered period 1953-66; GSI workers have claimed otherwise.

The overall result of these new studies and new dose modeling results is a predictable lowering of the overall dose attributed to Betatron operators and assistant operators. By incorrectly assuming the presence of lead (Betatron tunnel exit doors) and steel and concrete shielding (inside steel plates, outside extra concrete added to walls of the 6 building Radiography facility) that *was not there* during the covered period when radium-226 was being employed, NIOSH has lowered the dose that will be assigned to workers. Further, dose lowering has been achieved by more rather than less reliance on film badge data that, in the petitioner’s view, have been manipulated and mishandled by both NIOSH and SC&A. Vital information about the

highest film badge doses have been deliberately and improperly withheld from the petitioners and knowledgeable workers and site experts. The worker with the second highest film badge dosimetry reading at GSI denies he was even informed about having received such a dose. If this is a true statement, then how could that person have signed a letter addressed to Landauer retracting his high film badge reading? We assert this did not happen. It is clear the true facts from this episode have not been fully disclosed by NIOSH or by SC&A to the Board.

Such considerations engender a very disturbing reaction to the last two David Allen white papers. This reviewer and long time GSI co-SEC-00150 co-petitioner has no choice but to conclude that NIOSH is attempting to limit the dose to all GSI workers. I will leave assigning motive to others. However, I must observe the overall effect is strongly adversarial to the true intent of EEOICPA, and is definitely harmful to the financial well being of affected workers by diminishing their chances to be fairly compensated based on scientifically sound, well researched, and well described dose reconstruction methodology and practices.

Reference: Letter from Senator Barack Obama and Representative Henry A. Waxman to Stephen L. Johnson Administrator, U.S. Environmental Protection Agency May 30, 2008. (URL: <http://www.ieer.org/sdfiles/16-1/referenceman-letters.pdf>). The cited EPA letter states the following: “At issue now is whether separate male and female risk coefficients should be published for the general population, given the approximate two-fold difference in risk per unit dose estimated in BEIR VII.”

A handwritten signature in black ink on a white background. The signature reads "Daniel W. McKeel, Jr." in a cursive script. The signature is written over a background of a repeating pattern of small, stylized letters.

Appendix A and B attached

Daniel W. McKeel, Jr.

2/27/2012

Respectfully submitted by:
Daniel W. McKeel, Jr., M.D.
GSI SEC-00105 co-petitioner
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**Uranium NDT Hours at GSI: Cost Allocations by Year According to
Purchase Orders Listed in TBD-6000 Appendix BB Rev 0 dated 6/25/07**
- Data from John Ramspott to Dan McKeel (e-mail dated 1-18-09)

E-mail subject line: Fwd: "Right from NIOSH's Report" URANIUM AT GSI

Body of e-mail message:
Begin forwarded message:

From: John Ramspott <jwramspott@sbcglobal.net>
Date: January 18, 2009 10:11:08 AM CST
To: Dan McKeel <danmckeel2@aol.com>
Cc: John Ramspott <jwramspott@sbcglobal.net>
Subject: "Right from NIOSH's Report", then they ignore this most important fact, Re: The Badges for 1964-66 !

Re:

John,

Thank you for all of the recent info from Dow and GSI. Please send me the proof that shows 400 hrs of AEC uranium work at GSI in 1962 compared with only 28 hrs in 1964, the year LJE says was the peak. This is most important to get in the record ASAP as clearly as possible to refute NIOSH's attempt to use 1964 badge data to bound the entire 1953-1966 AEC period at GSI. Thanks! -- Dan 1/18/09

As requested !

Effective Date: 6/25/2007 Revision No. 0 Page 2 of 12 (below) "Right from NIOSH's Report", then they ignore this most important fact !

Office of Compensation Analysis and
Document Number: Battelle-TBD-6000
Support Appendix BB

Effective Date: 6/25/2007 Revision No. 0 Page 2 of 12

General Steel Industries, Inc., at the same address. The ingots were in the form of cylinders 18 to 20 inches in diameter, approximately 18 inches long, and weighing up to 3000 pounds. The betatron x-ray equipment was Government owned. The uranium to be x-rayed was owned by the AEC and provided by Mallinckrodt3.

BB.2.2 Frequency of uranium X-rays

General Steel Industries work with uranium was performed under purchase orders with Mallinckrodt Chemical Works starting in March of 1958. These purchases orders cover the time period March 1, 1958 through June 30, 19664. These purchase orders indicate that the work was to "X-ray material as requested by Mallinckrodt...". They also

contained "Betatron labor charges, including operation and maintenance and all overhead shall be billed at \$16.00 per hour." The last purchase order covering the period of July 1, 1965 to June 30, 1966 indicated a billing rate of \$35.00 per hour. The purchase orders also indicated that the work was not to exceed a set cost. The first purchase order, covering the period March 1, 1958 to June 30, 1958 stipulated a monthly limit of \$500. That purchase order was extended to October 31, 1958 and added \$1800 to the total limit (an additional \$450 per month). A new purchase order covered the period November 1, 1958 to June 30, 1959 and stipulated a monthly limit of \$450 and a total limit of \$3600 (equal to \$450 per month). The next purchase order covered July 1, 1959 to June 30, 1960 and stipulated a monthly limit of \$450 with a total limit of \$7200. It should be noted that the total limit does not add up to 12 months at the monthly limit. This is the only purchase order with this conflict. Since these are limits and not estimates, the most limiting of the two values will be used in this appendix which is consistent with purchase orders written both before and after this one.

From that point on, the purchases orders were written annually covering a period of July 1 to June 30 of the next year. All but the last order stipulated a billing rate of \$16 per hour. The purchase order starting in 1960 stipulated no total limit. Only a monthly limit of \$450 per month was specified. After that, only a total limit was specified. These limits were \$7000 for the purchase order starting in 1961, \$2000 for the purchase order starting in 1962, and \$450 for each of the remaining purchase orders.

From this information, it is possible to determine the maximum hours per year that General Steel Industries spent on operations, maintenance and overhead associated with x-raying uranium for Mallinckrodt Chemical Works. Through June 30, 1961 the limit was generally \$450 per month at \$16 per hour or 337.5 hrs per year. The remaining years are shown below.

July 1, 1961 to June 30, 1962 437.5 hrs/yr (based on a total limit of \$7000)

July 1, 1962 to June 30, 1963 125 hrs/yr (based on a total limit of \$2000)

July 1, 1963 to June 30, 1965 28 hrs/yr (based on a total limit of \$450)

July 1, 1965 to June 30, 1966 13 hrs/yr (based on a total limit of \$450 at \$35/hr)

These estimated hours are considered the maximum hours that could have been spent x-raying uranium. These are considered maximum because the purchase orders set these costs as a limit. There is no indication how much of the available funds were actually

Ramspott: How can using Radiation badge information from 1964- 1966, if I understand correctly, be accurate if NIOSH/ Appendix BB. says:

" These estimated hours are considered the maximum hours that could have been spent x-raying uranium".

"Directly from": Appendix BB.2.2

Appendix A: McKeel critique of Allen2 January 2012 GSI white paper

July 1, 1961 to June 30, 1962	437.5 hrs/yr (based on a total limit of \$7000)	No Badges.	437.5 hrs/yr
July 1, 1962 to June 30, 1963	125 hrs/yr (based on a total limit of \$2000)	No Badges	125 hrs/yr
July 1, 1963 to June 30, 1965	<u>28 hrs/yr</u> (based on a total limit of \$450)	NIOSH using this information.	<u>28 hrs/yr</u>
July 1, 1965 to June 30, 1966	<u>13 hrs/yr</u> (based on a total limit of \$450 at \$35/hr)	(Note: Uranium was only at GSI until June 30, 66)	<u>13 hrs/yr</u>

"These estimated hours are considered the maximum hours that could have been spent x-

raying uranium"; These are considered maximum because the purchase orders set these

costs as a limit. There is no indication how much of the available funds were actually used. Also the cost was to include maintenance down time and overhead as well as the

cost of film.

Dan McKeel comment 2/27/12 -- This exchange shows that NIOSH DCAS/OCAS at two junctures, under two different Directors, deliberately distorted their own data to establish the false "fact" that 1964-66 were the peak years for MCW-AEC contracted uranium NDT work at the GSI AWE site. David Allen repeats and compounds this *same misinformation* in his January 2012 white paper on Betatron operations that will form the basis for REV 1 of Appendix BB. By the end of 1966 compared to 1961, uranium radiographic NDT activities had declined from 437.5 hrs in 1961 to just 13 hours in 1966, a whopping 97%! This is an example of NIOSH data manipulation being used to the severe detriment of GSI claimants. From these data, the GSI petitioner's long held view that 1964-66 are non-representative of the covered period from 1953-1966 for MCW-AEC uranium operations is even more firmly established.

**Appendix B: Nearest Building to Betatrons Analysis to Correct Data Presented
in GSI Betatron Operations White Paper dated January 2012**

Subject line: Fwd: Betatron Distance information.

E-mail date: Sat. Feb. 25, 2012 10:10 AM

FYI:

SC&A actually noted 76 meters.

GSI appears to have lied on their Application!

Subject: Fwd: Distance information.

From: John Ramspott <jwramspott@sbcglobal.net>

Date: June 27, 2009 5:42:46 PM CDT

To: Dan McKeel <danmckeel2@aol.com>

Subject: Fwd: Distance information.

Dan:

I asked Terry to contact some of the Betatron workers to get their estimation of the distance from Old and New Betatron Buildings.

Terry sent me their reply (see below)

I wanted to double check my own estimation using my "ruler and meter to feet calculations" formula.

(This was also based on SC&A's distance calculations)

Results:

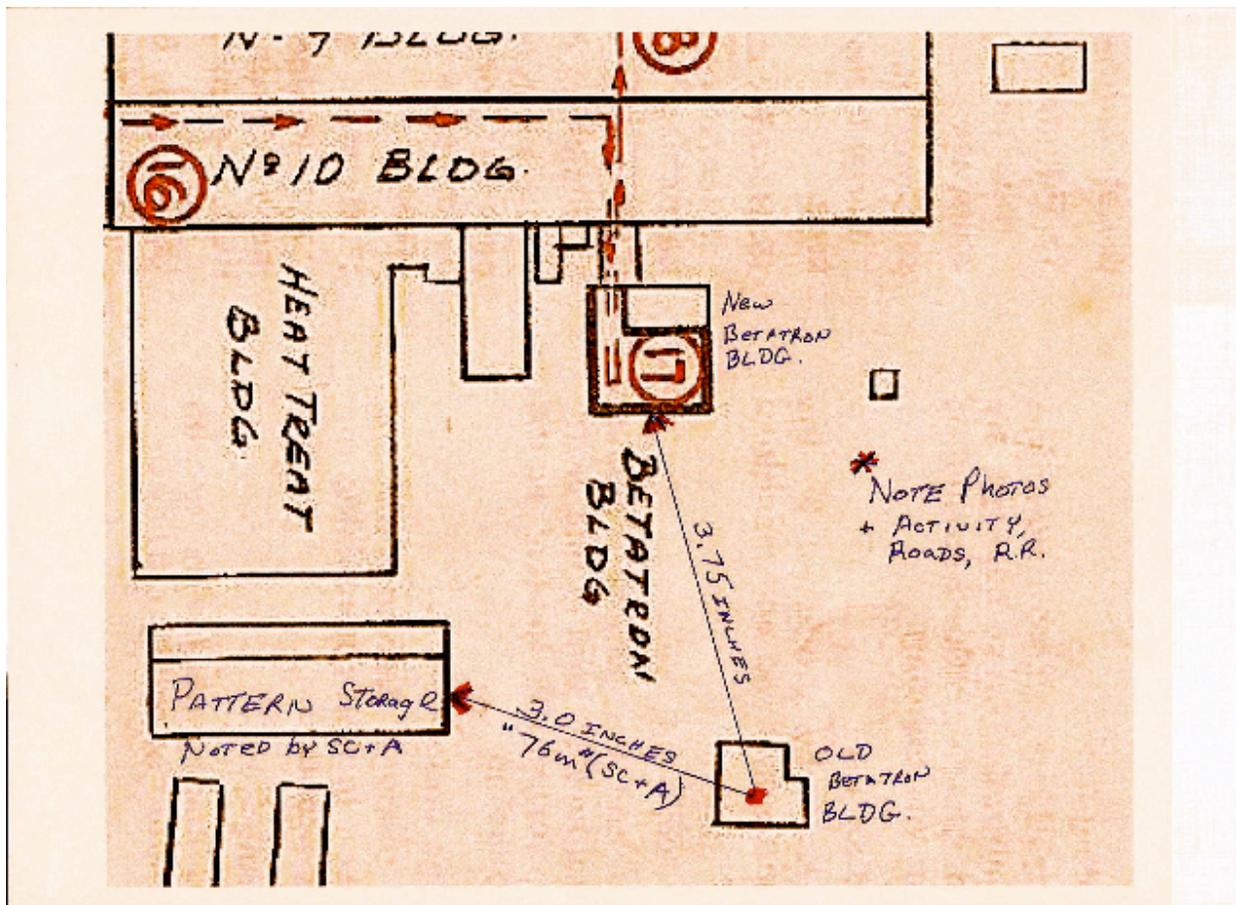
Workers- 300 feet.

Ramspott- 312 feet (approx. 95m x 3.28 ft. = 311.6 feet)

We "all" pretty much agreed .

My drawing etc. was actually pretty accurate !

[JWR Betatron drawing & measurements inserted here]



Begin forwarded message:

From: "john t. dutko" <tdutko@charter.net>
Date: June 26, 2009 3:20:42 PM CDT
To: "JOHN RAMSPOTT" <jwramspott@sbcglobal.net>
Subject: Re: Distance information.

JOHN--I CONTACTED GEORGE LUBER, JOE POLLO, DON PIPER, AND AS THE CROW FLYS, WE ESTIMATE THE DISTANCE FROM THE NEW BETATRON TO THE OLD BETATRON AT AROUND 300 FEET-----JOHN T. DUTKO

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

From: John Ramspott
Date: 6/26/2009 2:05:37 PM
To: Terry Dutko
Cc: Dan McKeel
Subject: Distance information.

Terry:

Can you check with some of the other GSI Betatron workers and estimate the distance from The "Old" Betatron Building to the "New" Betatron Building ?

Please include the worker's names after you contact them.

Thanks,
John

Dan McKeel Comment 2/27/12: I agree completely that the drawing on page 4 of the Allen DCAS/NIOSH January 2012 GSI Betatron Operations white paper shows that GSI misstated the true facts about the distance to the nearest building to the New Betatron facility in their AEC license application, which is the subject of NRC FOIA 2010-0012 that I first obtained. Such misrepresentation by GSI reinforces the petitioner's position that GSI was in many instances prone to deliver favorable but incorrect information to federal and state agencies that regulated them. This inured to the detriment of former workers and their survivors who are now EEOICPA claimants. *In toto*, these misrepresentations of facts by GSI, and their perpetuation by the current federal agencies and deliberative bodies and governmental commissions that implement the Act, converge to cause financial harm to GSI claimants in the form of denied compensation under EEOICPA 2000 as amended. This is true whether or not the factual misrepresentations by GSI and their perpetuation by others are "accidental" or intended. In addition, of course, the New Betatron building was less than 100 feet away from the 10 building at GSI that housed many never badged male and female GSI employees (burners, welders, chippers, etc.).



Legend. New Betatron to the left, 10 bldg. to right at GSI September 2006. Dan McKeel photo.