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

From: DanMcKeel2@aol.com
Sent: Friday, September 21, 2012 11:28 AM
To: NIOSH Docket Office (CDC)
Cc: danmckeel2@aol.com
Subject: Fwd: McKeel FINAL GSI slides 9.19.12
Attachments: McKeel FINAL GSI slides 9.19.12

Dear NIOSH Docket Office,

Attachment: <MCKEEL_9.19.12_final.pdf> 589 K

Please consider this message and the attached PDF file for posting to GSI DOCKET 140. This is my complete set of slides I presented to the ABRWH during the GSI SEC Update session on September 19, 2012, at the Denver meeting. [Note I had submitted Slides 1 through 5 that were sent to the Board prior to the 9/19/12 meeting date] The file includes SLIDES 6 and SLIDE 6 ADDENDUM that were part of my oral presentation on the 19th. In addition, I address several questions that Board members asked that I do not feel were answered adequately or accurately by either NIOSH or the chair of the TBD-6000 work group. Thank you.

Sincerely,

-- Dan McKeel 9/21/12
SEC-00105 co-petitioner

In a message dated 9/20/12 10:57:37 AM, DanMcKeel2@aol.com writes:

Dear Dr. Melius and Ted Katz,

Attachment: <MCKEEL_9.19.12_final.pdf> 589 K

Please find attached my final slides including SLIDE 6 and SLIDE 6 ADDENDUM with McKeel comments and answers to questions posed by several Board members during the September 19, 2012, ABRWH GSI SEC Update session. I presented slide 6 over the phone; this is the hard copy integrated with the slides that were projected to the Board yesterday. Ted Katz, please see that all Board members receive a copy of this cover message and the attached PDF file. Thank you.

-- Dan McKeel 9/20/12 Thursday 10:53 Mountain Time

Daniel W. McKeel, Jr., MD
GSI SEC-00105 co-petitioner
Phone: 573-323-8897
Fax: 573-323-0043
E-mail: danmckeel2@aol.com
US Mail: P.O. Box 15, Van Buren, MO 63965-0015

Daniel W. McKeel, Jr., MD
Phone: 573-323-8897
Fax: 573-323-0043
E-mail: danmckeel2@aol.com
US Mail: P.O. Box 15, Van Buren, MO 63965-0015

Daniel W. McKeel, Jr., MD

General Steel Industries (GSI)
SEC-00105 Co-petitioner
September 19, 2012

SLIDE 1

TITLE: **Real data AEC operational period 1953-June 1966**

- Landauer film badges on 89 radiographers Nov 1963-1966: 3% of workforce of 3000, one job out of hundreds, not assigned the highest external dose, not worn in plant outside OBB/NBB
- 1962 one time survey of photons in Bldg 6 radiography Co-60 by Nuclear Consulting Corp. (NCC)
- MCW Uranium Division purchase orders for Betatron NDT radiography 1958 through June 1966 (1953 through Feb 1958 missing) -- No uranium weights or information on percentage or numbers of 3300 lb dingots/ingots, billets and slices; all shipping manifests and weights and x-ray records missing

SLIDE 2

TITLE: **Real data on residual contamination period 7/1/66->1993**

- One time 1971 radiologic survey of New Betatron Building by GSI radiation safety officers using 80 Curie C0-60 source.
- Landauer film badge data on 19 additional radiographers from July 1, 1966 to close of GSI operations in 1973 (0.3% work force)
- Bechtel/ORNL/DOE uranium radiologic survey of NBB and OBB between 1988 and 1 week remediation in 1993 of uranium in Old Betatron building. Uranium alpha on floor, in vents, and in small industrial vacuum in OBB. No Ur found in NBB. [**FUSRAP program**]
- No survey ever of other GSI buildings that formed a long AEC uranium transport pathway: Weighing scales, loading dock, transfer to rail cars, RR tracks through Bldgs. 5 through 10 into OBB and NBB that formed only a tiny fraction of the air volume/space along the uranium contamination pathway (had uranium ever been surveyed there by GSI or DOE).

Slide 3

TITLE: **Key GSI events during the residual period 1966-1993**

- OBB had been power washed and cleaned in 1973 and 1984;
- NBB had been power washed/cleaned and renovated for offices in 1973, August 1978, and 1984;
- **National Steel** taught classes in the New Betatron Bldg. offices;
- Multiple companies used former GSI buildings for operations:
  a) 5 and 6 for steel "pickling" (conc. acid cleaning) rolled steel: **Granite City Pickling & Warehouse** from 1984 to present;
  b) 8, 9 and 10 for "slitting" steel rolls: **Michigan Metals Processing** (1978 through 1981) and **Affiliated Metals** (dates uncertain).
- Overhead crane w/magnet to clean dust from GSI Bldgs. 5 --> 10.
- Multiple users and intermittent operations = massive dust disturbance that make accurate modeling and bounding difficult or impossible.

Slide 4

TITLE: **Reasons GSI deserves an SEC recommendation by the Board**

Part 1

- Operational period: No MCW uranium purchase orders 1953-Feb 1968;
- Limited real data: 3 items AEC contract years; 3 items residual years;
- Nonexistent intake data sampling: breathing zone, general air, process;
- No urinary uranium bioassay for radiographers or anyone in workforce;
- Most of GSI work force should have been badged; worked on activated steel: 3% badged during 3 of 13 years of operation period; 0.7% were badged during 8 of 20 years of the residual period (99.3% no badge); 97% of GSI work force never badged 1953-1966. Not representative;
- Zero monitoring of beta or neutron doses at GSI 1953-1993;
- MCNPx models not validated by any real measurements of Betatron skyshine, activation products; results differ wildly with SC&A and over time: Betatron operators >~10-fold> Layout 2008; reverse found in 2012.
- NIOSH has not used valid models to bound all GSI sources: Ra-226 (2 sources), Co-60 (3 sources); Ir-192 (1 source); (2) 250 Kvp X-ray units.

2008 & 2012 Models Disagree

COMPUTER MODELED ANNUAL PHOTON DOSE DURING GSI COVERED PERIOD 1953-1966 (Rem/YR)

DATA SOURCE	2008 BETATRON	2012 BETATRON
NIOSH	**1.0-6.3** (App BB) **ND**[3] (SEC ER)	**0.2-.62 var.**
SC&A mcnpx	**12.4 - 13.6**	**1.35**

DATA SOURCE	2007-2008 OTHERS	2012 LAYOUT
NIOSH	**1.73** (App BB) **0.417** [note 1]	**1.02-2.03**
SC&A mcnpx	[see note 2]	**9.20**

Note 1: Annual dose assigned to only 1 of 3 non-Betatron worker exposure scenarios in SEC-00105 SEC evaluation report.

Note 2: SC&A review of Appendix BB, 4/21/08 Betatron doses bounded layout men and Co-60 operators which in turn bounded chainmen and all other workers. No actual values given for this large subset of the GSI work force.

[3] ND = not done; no annual dose values given in SEC ER

Slide 5

TITLE: **Reasons GSI deserves an SEC recommendation by the Board**

Part 2

- Rad safety program rudimentary 1953-1993. NCC license documents are inadequate based on Watertown Arsenal AEC compliance program;
- NIOSH has no valid Ur intake model 1953-1993; failed surrogate criteria; At least three previous attempts have failed to pass Board/WG scrutiny.
- NIOSH rejects SC&A alternate model that had to be withdrawn because Betatron buildings had been washed/cleaned multiple time 1973-1993.
- NIOSH "new" surrogate data not based on uranium ingots/dingots that was the product MCW primarily sent to GSI for betatron NDT radiography. NIOSH "better" surrogate sites were not stringently justified: 2 slug and 1 billet facilities proposed; no dingot facilities similar to MCW-GSI;
- NIOSH has never recovered from Mallinckrodt the multitude of Betatron NDT related records (shot logs, x-ray reports, shipping manifests, etc.) from GSI generated over 13 years of the AEC uranium NDT contract (only purchase orders February 1958-June 1966).

SLIDE 6

• NIOSH has made many **errors of fact** in APPENDIX BB that still need to be addressed and resolved with SC&A (see point 2). The NIOSH Betatron, steel casting activation, intake models are all not valid, not claimant favorable, and **not bounding**;

• **Exotic mixed activation/fission radionuclides** from 24-25 Mev Betatron interactions with steel castings and AEC/MCW uranium were limited to by NIOSH to Fe59, whereas petitioner supplied literature documents at least 30 different radionuclides were formed, some with half-lives of days. This oversimplification is not claimant favorable; NIOSH doses from this source were underestimated and were thus not bounded by NIOSH with sufficient accuracy;

• **Adley et al** Hanford Melt Plant 1952 data shows that uranium rod handling caused intake doses 2.5-fold higher than permitted limits.

Slide 6 (addendum)

- NIOSH's 3 new surrogate sites are not acceptable. None dealt with uranium ingots or dingots, but rather 2 are slug facilities as used in Harris-Kingsley 1959 and one is a billet facility.
- These GSI deliberations have been ongoing since Appendix BB was released in June 2007. There have been 13 TBD-6000 work group meetings but no final resolution of all Appendix BB issues or a final vote on SEC-00105 by the Board. Now NIOSH wants more time to develop a new uranium intake model.
- I urge the Board to vote YES to a GSI SEC today. I believe a GSI SEC is merited for 1953 through 1993 as its radiation safety program was rudimentary all of that time.

McKeel Comment on Board Discussion:

[1] TBD-6000 work group member **John Poston** and former member **Mark Griffon** were both absent today. Dr. Poston missed another important GSI SEC discussion. Wanda Munn and Josie Beach made no comments during the GSI update session.

[2] **Dr. Paul Ziemer, TBD-6000 work group chair**: There were no Board questions to Dr. Ziemer following his presentation that lasted 14 minutes.

[3] **SC&A** made no comments in person or on the phone.

[4] **Dave Allen of DCAS** stuck to his presentation closely. He reiterated the incorrect statement from Appendix BB that "GSI did not do an analysis of the X-ray." The exact meaning of this is unclear, however, GSI film readers, a distinct job category among "Betatron employees," made check lists of x-ray findings they sent to MCW-UR. All such records have been lost or destroyed at GSI. He minimized GSI exposures to uranium by statements such as "mere handling." He reviewed the uranium intake data from Heald,

Chambersburg and Leblond sites, admitting such intake data was "very limited" and the slug operations at the first 2 sites had limited data and were unlike GSI. The closest match was at Leblond where there were only "three BZ (breathing zone) air samples." based on drilling a hole in uranium billets." [NOTE: *Dan McKeel found it incredible that Leblond would be characterized as a "better surrogate site" among the three. Leblond drilled (machined) uranium and had only three bits of breathing zone data to be compared to GSI, where 3300 lb. uranium ingots and dingots were subjected to 24-25 Mev Betatron X-ray radiation producing at least 30 or more activation and fission products from uranium and steel castings, and had multiple isotopic sources besides the uranium and two Betatrons. Scientifically this is ludicrous and indefensible.*]

Note: The Board Q&A that followed Mr. Allen's presentation are discussed in section [6].

[5] **Dan McKeel's** co-petitioner slide presentation (title plus 6 slides) I added as a preface to my slides this statement: "I thank the Board for allowing me to share GSI materials with them. In the next 10 minutes or so, I will try to hit the highlights, but first need to address some of the Board discussion from today..."

Dr. Melius interrupted my talk during slide 2 and said "move it along, we are running late and are already overtime." This was a consequence of poor planning on his part and changing the allotted GSI time from 90 to only 45 minutes on the meeting agenda. Because of this I had to skip information on my slides and was unnecessarily hurried through my talk. Because the Rocky Flats SEC team was allowed 37 minutes for their presentation on September 18, and the Weldon Spring SEC petitioner's letter took Ted Katz, DFO for the Board, 15 minutes to "speed read" into the record, I feel I was unfairly discriminated against by the Board chair in truncating my presentation to only 10 minutes. As one can see from the Board questions that followed, many of their questions went unanswered or were inaccurately or incompletely answered, in part because of the Board chair imposed time allotted to the GSI SEC update session.

[6] Many **Board questions** were asked but not accurately answered by Dr. Ziemer and Dr. Melius. Here are some I recorded in my notes (questions answered adequately are not mentioned below). I want to set the record straight with answers that I believe Dr. Ziemer should have been able to provide to the Board:

Question 1: **Dr. Lockey** asked how many air samples had been obtained at Heald and Dave Allen and Dr. Ziemer did not know nor did they retrieve the answer that was in Dave Allen's original white paper. Apparently neither of them had the white paper data sheets in front of them and the question went unanswered.

McKeel comment: Both should have been prepared to answer such Board questions to maximize the usefulness of the SEC update session. Otherwise, since there was no vote, what was the purpose or utility of conducting the update session?

Dan McKeel's answer: The Heald data sheets show that 12 air intake samples not further characterized, are listed on Mr. Allen's single data sheet.

Question 2: **Brad Clawson** asked a direct question as to "what was the size of the slugs?" No direct answer was forthcoming from Dave Allen. Paul Ziemer stated the GSI uranium metal was larger and the "slugs could fit in your hand." The actual size of slugs at the 8/28/12 TBD-6000 work group meeting was given as "1/2 inches by 3/4 inches" for uranium slug pellet size. I believe that either Dave Allen or Dr. Ziemer should have been able to answer this question, as could I have if I had the opportunity.

Question 3: **Brad Clawson** asked "what size of ingots" that were used at GSI and got no direct answer. Any answer was avoided by DR. Ziemer and Dave Allen, who both should have known this information after holding 13 work group meetings spanning four years.

Dan McKeel's answer provided in his preamble to his slides was that MCW uranium ingots and dingots each weighed **3,300 pounds**.

Question 4: There was a discussion about **how many AWE sites there were** in reference to whether a better surrogate site for GSI air intakes could be identified, and no one seemed to know that answer among the Board.

Dan McKeel's comment: I would have liked to emphasize, again, to the Board that Larry Elliott (former OCAS Director) had written to a GSI site expert and to Dan McKeel in 2005-2006 that GSI was an absolutely "unique site" among AWE sites (the number 216 comes to mind). On 8/28/12 at the TBD-6000 work group meeting, I emphasized again that I doubted an AWE surrogate site for GSI could be found that passed the "stringently justified" or "process similarity" surrogate data criteria. NIOSH and the work group through SC&A has had 7 years to identify such an AWE surrogate.

Footnote: DFO Ted Katz, responding to repeated queries form Dan McKeel, had written an e-mail on 9/18/12 stating the TBD-6000 8/28/12 work group transcript that had been delivered to the Board the preceding Friday, "would be posted today." However, by 5 PM on Wednesday, September 19 (2 days later) the transcript had not been released to McKeel or the public. No reason why had been forthcoming.

Question 5: Brad Clawson asked whether ANSI NDT (nondestructive testing) rules had been followed at GSI, a perfectly reasonable question. Member Clawson said that ANSI guidelines "would tell you the number of required shots." No one answered Mr. Clawson's questions.

McKeel's answer: In a white paper I had submitted to the full Board on August 31, 2012. In that paper, I had presented both a drawing and an affidavit by two GSI Betatron personnel who had described in detail the four corner shot x-ray radiography protocol followed for MCW uranium at GSI. NIOSH has only retrieved MCW purchase orders. **They or DOE have not located a specific contract for the AEC MCW uranium NDT work**, so the answer to the question about whether ANSI guidelines were written into the contract, and were actually followed, could not be answered. In fact, it is not clear that ANSI guidelines in 1953-1966 existed that defined the procedure for NDT Betatron x-ray examination of uranium ingots, dingots, billets (of unknown size) and Betatron slices (unique MCW Destrehan Street uranium metal products, exact size not defined) would be shot. Mr. Clawson's question implied such ANSI guidelines for uranium metal radiography exist, but it is not clear this is in fact true.

I have attached as **APPENDIX A** to this document the affidavit and drawing concerning the GSI procedure for Betatron x-ray inspection of MCW-AEC uranium metal. I reiterate again the extreme and now urgent need for the MCW uranium NDT radiography records and technical reports for the GSI work 1953-66 be searched for and located. There is no evidence that an intensive MCW GSI records search, including classified records, has ever been attempted by NIOSH during the past seven years that have elapsed since Appendix BB Rev 0 was released 6/25/07.

Question 6: Brad Clawson asked about "*whether it was true that 'planchettes' at GSI had been activated, Had nickel content. What happened to that?*" Again, Dr. Ziemer

and Dave Allen did not directly addressed this valid question. I tried to make a comment over the phone but was not recognized.

McKeel answer to Q6: The petitioners and site experts and workers have reiterated to the work group and full Board on numerous occasions that the Betatron NDT x-ray film cassettes, which I assume Mr. Clawson was referring to, had been chronically activated, and that that this was especially concerning because of the high nickel content. These film cassettes were reutilized over and over, and were never decontaminated nor was this attempted to our knowledge.

I was amazed this point was not responded to by Dr. Ziemer, SC&A or Dave Allen and DCAS. We have mentioned to the work group and Board in this regard many times the pioneering paper by S. Guo and Paul Ziemer in 2004 on metal surgical instruments becoming activated in a medical Linac treatment facility [**REF 1**]. This paper delineates a large spectrum of activation radionuclide daughter products. This important source of dose exposure to GSI workers is just one of many aspects of dose to GSI workers that has not been bounded with sufficient accuracy. It was not addressed in Appendix BB.

Reference: Guo S, Ziemer PL. Health physics aspects of neutron activated components in a linear accelerator. Health Phys. 2004 May;86(5 Suppl):S94-S102.

Question 7: Board member Dr. Jim Lockey asked "have petitioner's concerns been addressed?" Dr. Ziemer answered a qualified yes—"trying to address, aware of, *though not to the petitioner's satisfaction*" (emphasis added) and cited the revocation of the 1993 DOE uranium dust sample as being valid, and the SC&A Alternate uranium intake model being rejected by the work group based on it because of petitioner information that both the Old and New Betatron facilities had been power washed during the residual period (1973, 1978, 1984) as an example.

McKeel response to Dr. Lockey: The question is appreciated. While Dr. Ziemer's statement about the withdrawn SC&A model was true, it is disingenuous to imply that petitioner concerns have been addressed in a comprehensive way. That is decidedly untrue. For example, numerous new facts in two white papers were introduced by Dan McKeel between the 8/28/12 work group meeting and this presentation on 9/18/12. Neither contribution was even acknowledged today by Dr.

Ziemer. SC&A is never tasked to review petitioner technical white papers. There is little on the record (i.e., transcript) documentation that the TBD-6000 and Board members have considered co-petitioner **concerns**. I emphasize *concerns*, because there is ample evidence that NIOSH, SC&A and the TBD-6000 work group have selectively used McKeel and ***voluminous data*** (papers, NRC FOIA license data, Landauer film badge records, GSI maps and photographs of equipment and processes and buildings and photographs) and affidavit testimony in their own reports and technical reviews.

Overall, my answer to Dr. Lockey's question is that Dan McKeel's overall contributions to the TBD-6000 as SEC-00105 co-petitioner have not been carefully scrutinized, discussed and acted upon. And they should have been.

(1) a comprehensive list of McKeel submitted papers to the TBD-6000 work group, his Board Public Comments, or his SEC-00105 presentations to the Board has not been compiled and circulated to the full Board.

(2) SC&A has never been tasked by the Board or by the TBD-6000 work group to review most (or any) of the numerous McKeel white papers that are often as or more detailed than the offerings from NIOSH.

(3) The original McKeel critique to Appendix BB was responded to as a white paper by OCAS.

(4) Larry Elliott did respond in writing to many of Dan McKeel's concerns in a meaningful way while he was OCAS Director.

(5) Many McKeel communications to the TBD-6000 work group and Board have not been acknowledged or responded to.

(6) Dan McKeel's Public Comments to the ABRWH about GSI were never responded to by the Board or by NIOSH.

APPENDIX A

GSI Betatron operator and supervisor testimony on nondestructive testing (NDT) radiography procedures for MCW-UR uranium radiography used at the General Steel Industries AWE site during 1953-1966

[Exhibit 1]

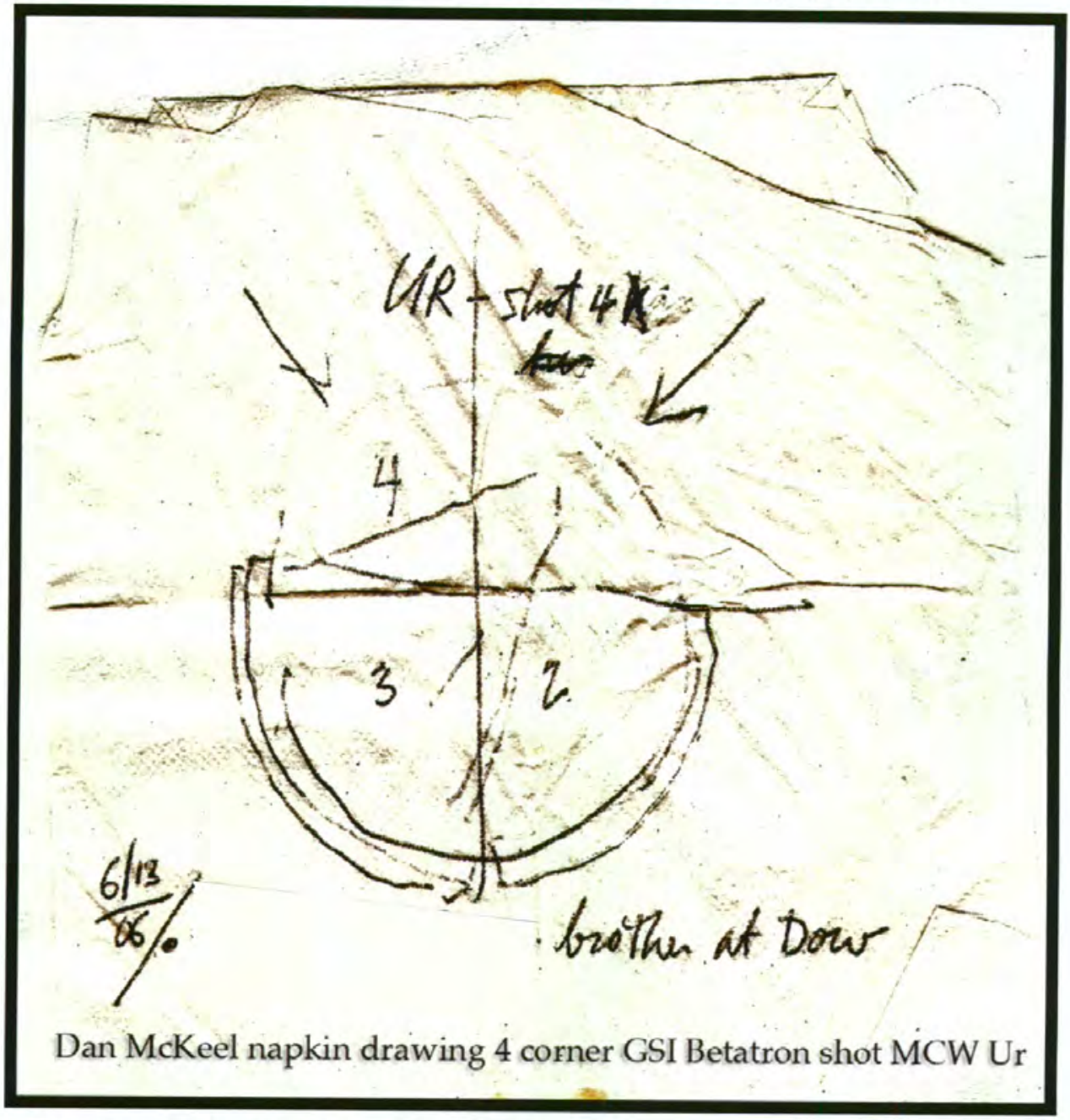
- A © 2006 napkin drawing given to SEC-00105 co-petitioner Dan McKeel by a GSI Betatron operator ( ) showing a schematic of the MCW uranium four corner NDT radiography shooting protocol he personally used. There has not been any mention of following ANSI guidelines for NDT radiography work at GSI 1953-66.

[Exhibit 2]

- An affidavit from a former GSI Betatron supervisor ( ) obtained and reported to the Board by GSI Betatron operator (deceased) on detailed GSI Betatron NDT radiography methodology.

Note: Both of these documents have been previously submitted to the Board and the TBD-6000 work group.

[1] Napkin drawing of GSI Betatron 4 corner shot NDT radiography 1953-66



Dan McKeel napkin drawing 4 corner GSI Betatron shot MCW Ur

• This drawing was previously submitted to the full Board. The worker who contributed this concept drawing was a General Steel Industries Betatron operator. He actually "shot" MCW uranium with the Betatron and was an eye witness. The drawing was made on June 13, 2006. Mr. is not deceased.

[2] The following page testimony, a interview in 20__ is by GSI Betatron supervisor and film reader who is still alive.

[2] This info was conveyed in an e-mail dated 3/29/09 from GSI Betatron operator and radiographer, to GSI site expert: (quote)

From: '

Date: March 29, 2009 12:39:21 PM CDT

To: <

Subject: Ingots

-- I discussed "Ingot" shooting with the evening of 3/28/09 and the morning of 3/29/09. stated "I observed Ingots leaving the old betatron on the early morning weekend shifts. They were leaving on a flat bed truck and standing in a vertical position the same as they had been shot". referred to the ingots as Mellinckrodt Ingots. was a Betatron Supervisor and Film reader stated that the Ingots were around 20 inches high and 18 inches in diameter, were shot in a vertical position, and an upper left, upper right, Lower left, and lower right shots were fired. also said that after the upper left and upper right shots were fired, the ingot was turned over by betatron crane to shoot the two bottom shots to achieve a clear edge on the film. (Invert the ingot). It is known that at least four "glancing" corner shots were fired with multiple film to record variable thickness. There is a possibility of four more shots having been fired to complete the circumference quadrants of the ingots. (6 & !2 o'clock quadrants and 9 & 3 o'clock quadrants of the ingots) The shots were to achieve corner penetration of the ingot so as viewable depths could be checked for scraping or milling. The corner glancing shots were normally shot with 14 x 17 Metal cassettes sitting on wood blocks in the rear corners of the ingot with a lead scattershield. The edge of the cassettes would be placed in a manner so as the curvature of the ingot would flatten out on image of the edge of the ingot leaving a clear straight black edge on the film.

24 & 25 MEV Betatron & Magnaflux operator
GSI.

(end quote)

McKeel Note:

- "Mellinckrodt" was a misspelling; the word should have been Mallinckrodt.
- I believe this testimony is the most complete available description of what was done to MCW-UR uranium ingots under AEC contract at General Steel Industries, 1417 State Street, Granite City, IL, using the two 24 Mev and 25 Mev Allis-Chalmers Betatrons, from 1953 (perhaps as early as 1952) to June 1966 (last available MCW NDT purchase order).