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General Steel Industries (GSI)

SEC-00105 Co-petitioner

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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 <u>mcnpx</u>	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 <u>mcnpx</u>	[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).