

Hooker Electrochemical SEC Petition Evaluation Report and Technical Basis Document Reviews

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Background

- **Hooker Electrochemical classified as an Atomic Weapons Employer (AWE) facility from 1943 to 1948**
- **Residual contamination period through 1976**
- **Primarily produced non-radioactive chemicals (P-45) for the MED**
- **Concentrated uranium-contaminated magnesium fluoride slag using waste hydrochloric acid from P-45 process**



Background

(Continued)

- **Building was constructed to perform the concentrating operation; Building was completed on July 11, 1944**
- **Most slag-handling conducted outdoors**
- **P-45 operations ended January 15, 1946**
- **Concentration of incoming material was 0.2% uranium by mass**
- **Material was concentrated to 1% to 2%**



Petition Overview

- **Submitted on March 6, 2009 – proposed class was for the “furnace room”**
- **Proposed finding sent to petitioner May 15, 2009 – not qualified for evaluation**
- **Petitioner revised proposed class September 26, 2009**
- **Qualified for evaluation October 16, 2009**
- **Evaluation Report issued on May 3, 2010**



Key Review Documents

- NIOSH ER – May 2010
- SC&A ER Review – January 2011
- Hooker TBD – April 2011 (Revised June 2011)
- Allen White Paper (DCAS) – *Observation A & Finding F. Hooker Electrochemical SEC Review*, April 2011
- Allen White Paper (DCAS) – *Surrogate Data Evaluation: Hooker Electrochemical Company*, April 2011 (revised May 2011)
- SC&A White Paper – *Review Of NIOSH White Paper, “Surrogate Data Evaluation – Hooker Electrochemical Company,”* July 2011



Petition Bases and Concerns

- **Unmonitored workers**
 - **Petition presented an affidavit indicating there was no internal or external radiation monitoring at Hooker.**
 - **No indication of monitoring was found in records.**



Hooker TBD

- **Dose reconstruction methodology was originally described in Appendix AA to Battelle-TBD-6001**
- **Hooker TBD replaced Appendix AA and changed proposed method of dose reconstruction, including revising approach to use of surrogate data for the internal dose**



Process at Hooker

- **C-2 slag was received in 500-pound barrels from Electro Metallurgical**
 - **The barrels were dumped onto a conveyor belt that carried slag to one of three digest tanks**
 - **Waste HCL from the P-45 plant was added to the tank and diluted to a ph of 4.0**
 - **The tank was agitated for 20 hours**
 - **Once in two days the liquid was decanted and more HCL was added.**
 - **At the end of the digestion, the slurry was neutralized with lime and pumped to a filer press**
 - **The filtered material was rebarreled**



Internal Exposure Modeling

- **Based on air samples for handling C-2 slag at Electromet, Fernald, and Mallinckrodt**
- **Used 95th percentile of air sampling results**
- **More than 70% of air samples are BZ**
- **For residual period deposition/resuspension model used with resuspension factor of 1E-06/m and no source term decay**



External Exposure Modeling

- **Exposure to workers handling slag in wooden barrels based on MCNPX calculations**
- **Exposure to workers from surface contamination based on MCNP calculations of slag dust settling from 95th percentile air concentrations**
- **External doses rates for residual period same as for operating period**



Work Group Review – Resolution of Findings

- **In its initial review of Appendix AA of TBD-6001, SC&A developed 10 findings and 3 observations. These findings were resolved to the Work Group’s satisfaction based on new information included in the Hooker TBD.**
- **In its review of the ER, SC&A developed 7 findings and 1 observation. These findings were resolved to the Work Group’s satisfaction based on new information included in the Hooker TBD.**



Work Group Review – Use of Surrogate Data

- **In May 2011, NIOSH issued a white paper evaluating the use of surrogate data at Hooker against ABRWH criteria.**
- **The Work Group requested that NIOSH revise the white paper to fully document sources of air samples, and requested that SC&A review the revised white paper.**



Work Group Review of Use of Surrogate Data

(Continued)

- **SC&A reviewed the revised NIOSH white paper and concluded that:** *“Based on our review, we believe that NIOSH has addressed the ABRWH surrogate data criteria in an appropriate manner, and that the use of surrogate data at Hooker is consistent with the Board criteria. Use of the selected surrogate data will result in plausible bounding estimates for internal exposures at Hooker.”*



Work Group Recommendation

- **Work Group believes that doses for workers at Hooker can be plausibly reconstructed using information in the Hooker TBD (revised June 2011).**
- **Work Group recommends that Petition SEC-0014 be rejected.**

