

Hooker Electrochemical Special Exposure Cohort Petition Evaluation Update

Henry A. Anderson, M.D.
Chairman
Uranium Refining AWE Work Group

**December, 2011
Tampa, FL**



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%**



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**



Special Cohort 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**



Petition Timeline Overview

- **Submitted on March 6, 2009 – proposed class was for the “furnace room”**
- **Proposed finding sent to petitioner 5/15/2009 – not qualified for evaluation**
- **Petitioner revised proposed class 9/26/2009**
- **Qualified for evaluation 10/16/ 2009**
- **Evaluation Report issued on 5/3/2010**
- **AWE Workgroup assigned review**



Petition Timeline Overview

(Continued)

- **8/2011 AWE Workgroup recommends denial**
- **8/2011 ABRWH Board tables motion**
 - requests expanded paper on surrogate data assessment
 - Allow more time for petitioner review
- **AWE Workgroup tasks SC&A to prepare
whitepaper – Thurber Sept 22 memo**
- **AWE Workgroup meets 11/21/2011**



Internal Exposure Modeling

Use of Surrogate Data

- Based on 18 air samples for handling C-2 slag at Electromet, Fernald, and Mallinckrodt
- Used upper 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 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

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 Review

Use of Surrogate Data

(Continued)

- **Thurber Sept 22, 2011 memo**
 - SC&A review includes an expanded group of air samples – 67-72 vs NIOSH 18
 - 95% upper confidence limit in the range of NIOSH's
 - NIOSH 806 dpm/m³ SC&A 555 - 759 dpm/m³
 - The 95th percentile is not particularly sensitive to reasonable but differing technical judgments in sample selection



Work Group Recommendation

- **After 11/17 meeting discussions, Work Group continues to believe surrogate data use proposed follows ABRWH criteria**
- **Doses for workers at Hooker can be plausibly reconstructed using information in the Hooker TBD (revised June 2011).**
- **Work Group continues to recommend that Petition SEC-0014 be rejected.**



Remaining Issues for ABRWH

- **Is proposed use of surrogate data appropriate?**
- **Is the Fernald monitoring data reliable?**
- **Petitioners have requested ABRWH Board defer decision until after petitioners receive response to FOIA request**

