Review of Site Profile for Hooker Electrochemical Company Niagara Falls, NY

Work Group on Uranium Refining AWEs
Presented at ABRWH Meeting
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Santa Fe, NM

Hooker Operations

- Processed C-2 slag from ElectroMetallurgical Company from July 11, 1944, through January 15, 1946.
- C-2 slag was byproduct of bomb reduction of UF_4 at Electromet.
- Hooker treated slag with HCl to increase U content.
- Upgraded slag returned to Electromet.

Chronology of Site Profile Review Activities

- 6/15/2007 – Appendix AA (Hooker Electrochemical Company) to TBD 6001 issued by NIOSH (NIOSH 2007).
- 5/3/2010 – SEC Petition Evaluation Report on Petition SEC-00141 issued by NIOSH (NIOSH 2010).
- 9/9/2010 – SC&A presented review of Appendix AA (SC&A 2010).
- 1/19/2011 – SC&A provided focused review of Petition SEC-00141 (SC&A 2011).

Chronology of Site Profile Review Activities (cont.)

- 4/4/2011 – Technical Basis Document (TBD) DCAS-TKBS-0009, Revision 00 for Hooker issued as free-standing site profile to replace Appendix AA (NIOSH 2011a).
- 6/17/2011 – TBD Revision 1 issued (NIOSH 2011b).
- 3/28/2013 – SC&A issued review of TBD Revision 1 documenting 6 findings (SC&A 2013).
- 12/8/2015 – NIOSH issued TBD Revision 2 (NIOSH 2015).

Chronology of Site Profile Review Activities (cont.)

- 6/2016 – SC&A provided review of TBD Revision 2 (SC&A 2016).
- 7/19/2016 – URAWE Work Group reviews all findings and determines that three are closed, one is open (Finding 4), and two are in abeyance pending revision of TBD.
- 9/13/2016 – NIOSH issues TBD Revision 3 (NIOSH 2016)
- 11/21/2016 - SC&A's review of TBD Revision 3 is being edited prior to submittal to the URAWE Work Group.

SEC Determination for Hooker

- The conclusion regarding the exclusion of Hooker employees from the SEC (2/2/2012 determination) was challenged by a petitioner, leading H&HS to form an administrative review panel.
- The panel found that Hooker employees with radiation exposure during the operating period should be included in the SEC, reversing the prior decision, and the petitioner was so advised on 9/22/2015.
- The primary problem cited by the review panel was use of surrogate air sampling data to construct internal doses.
- Consequently, the TBD can be used only to estimate external doses during the operating period for non-specified cancer claims and during the residual period for both internal and external doses for all cancers.

Resolution of Findings on Revision 1 of Hooker TBD

- *Finding 1. NIOSH should review the assumptions regarding the composition slag and the outgoing concentrate.*
- Resolution: In TBD Revision 2, NIOSH emended the slag composition from 0.2% U to 2.65% U based on new data (Thomas 1944). Similarly, the outgoing concentrate was increased from 1–2% U to 9.87% U. Based on these revisions, the Work Group was satisfied that Finding 1 was resolved.

Resolution of Findings on Revision 1 of Hooker TBD (cont.)

- *Finding 2: NIOSH should re-examine its position that external exposures were based on slag input to the leaching process of 10 tons per month. It is possible that external exposures are understated by a factor of about 5.*
- Resolution: NIOSH developed a new production scenario that better fit the available information, increasing the monthly plant throughput from 10 tons per month to 89 tons per month. Based on these revisions, the Work Group was satisfied that Finding 2 was resolved.

Resolution of Findings on Revision 1 of Hooker TBD (cont.)

- *Finding 3: The basis for assuming that internal exposure from slag dust occurred 5% of the time needs to be re-examined as does the assumption that the concentrate contained 2% U. It appears that the exposure time is understated by about a factor of five and the amount of uranium in the concentrate is understated by at least a factor of 2.5.*
- Resolution: Based on new data, NIOSH revised assumptions regarding exposure from 5% to 25% of the work day and increased the U content of the concentrate to 9.87% (dry basis). Based on these revisions, the Work Group was satisfied that Finding 3 was resolved.

Resolution of Findings on Revision 1 of Hooker TBD (cont.)

- *Finding 4: NIOSH should review the ingestion intake to ensure that it is calculated in a manner consistent with calculation of inhalation intake.*
- Resolution: NIOSH did not address this finding in TBD Revision 2. At the July 19, 2016 URAWE Work Group meeting, NIOSH agreed that ingestion needed to be addressed. Therefore resolution of this finding is open until the Work Group evaluates the ingestion methodology
  - Addressed in TBD Revision 3 – SC&A review of TBD Revision 3 assesses impact on Finding 4

Resolution of Findings on Revision 1 of Hooker TBD (cont.)

- *Finding 5: NIOSH should confirm that the correct units of measure are cited in Tables 2 and 3.* [Tables 3 and 4 in NIOSH 2015]
- Resolution: Typographic/data entry errors exist in Tables 4, 5, and 7 of NIOSH 2015. NIOSH has agreed to correct these errors in the next revision of the TBD. Therefore, resolution of this finding is in abeyance.
  - Addressed in TBD Revision 3 – SC&A review of TBD Revision 3 assesses impact on Finding 5

Resolution of Findings on Revision 1 of Hooker TBD (cont.)

- *Finding 6: NIOSH should review the units of measure for the photon dose conversion factors in Table 4* [now Table 5] *and determine if they are correct. If they are correct, the companion text needs to be revised to discuss exposure rates rather than dose rates.*
- Resolution: In an e-mail dated 7/25/2016 from J. Neton (DCAS) to W. Thurber (SC&A), Neton confirmed that the units of measure in Table 4 in Revision 1 of the TBD (now Table 5 in Revision 2) were correct, and that the supporting text would be revised to discuss exposure rates. On that basis, resolution of Finding 6 is in abeyance until a new revision of the TBD is issued.
  - Addressed in TBD Revision 3 – SC&A review of TBD Revision 3 assesses impact on Finding 6

References

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- NIOSH 2010. *SEC Petition Evaluation Report, Petition SEC-00141: Hooker Electrochemical*, National Institute for Occupational Safety and Health, May 3, 2010.
- NIOSH 2011a. *Technical Basis Document for the Hooker Electrochemical Company*, DCAS-TKBS-0009, Revision 00, Division of Compensation Analysis and Support, National Institute for Occupational Safety and Health, Cincinnati, Ohio. April 4, 2011.
- NIOSH 2011b. *Technical Basis Document for the Hooker Electrochemical Company*, DCAS-TKBS-0009, Revision 1, Division of Compensation Analysis and Support, National Institute for Occupational Safety and Health, Cincinnati, Ohio. June 17, 2011.
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- SC&A 2016. *SC&A Review of DCAS-TKBS-0009, Revision 2 for Hooker Electrochemical Company*, SCA-TR2016-SP006, Revision 0, SC&A Inc., Vienna, Virginia. June 28, 2016.
- Thomas 1944. W.G. Thomas, *Technical Report – Concentration of C-2 Slag*, M-4562, United States Atomic Energy Commission. February 17, 1944. [SRDB Ref. ID 127827]