TBD-6000 Work Group

Recommendations on SEC Petition 00105 for General Steel Industries

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Background information on SEC Petition 00105

- Submitted February 25, 2008
- Qualified for evaluation May 15, 2008
- Evaluation Report issued by NIOSH on October 3, 2008
- SC&A Review of NIOSH Evaluation Report of SEC Petition 00105 issued July 24, 2009

Proposed and Evaluated SEC Class

- **Petitioner proposed class definition:**

  "All individuals who worked in any location at the General Steel Industries site, located at 1417 State Street, Granite City, Illinois, from January 1, 1953 through December 31, 1966, and/or during the residual period from January 1, 1967, through December 31, 1992."

- **Class evaluated by NIOSH:**

  "All individuals who worked in any location at the General Steel Industries site, located at 1417 State Street, Granite City, Illinois, from January 1, 1953 through June 30, 1966, and/or during the residual period from July 1, 1966, through December 31, 1992."

Review of the SEC Petition

- Since the time of the ER and the 2009 review by SC&A, there has been a great deal of additional information obtained about the GSI site. This includes a substantial amount of information provided by the Co-petitioner (Dr McKeel) through FOIA requests and other means, as well as information from former workers and site experts.
- The NIOSH web site includes a number of white papers issued by NIOSH and SC&A, as well is specific information and critiques from the Co-petitioner.
- The Work Group has met 12 times since the ER was issued in 2008, with most of its focus being on GSI (Appendix BB of TBD-6000 and SEC petition 00105)

Format for Today's WG Report

- NIOSH will review its proposed models for reconstructing dose at GSI in support of its recommendation to deny an SEC class at GSI (Dave Allen)
- SC&A will provide a summary of its findings and position on the NIOSH dose models (Bob Anigstein)
- The Work Group recommendations will be presented (Paul Ziemer)
- The Co-petitioner will present his issues and concerns with the NIOSH proposal and WG recommendations (Dan McKeel)

Reports from NIOSH and SC&A

Time Line for Sources at GSI

- Jan. 1, 1953: Beginning of Operational Period
  - 1st Betatron used to X ray uranium ingots
  - 2 radium radiography sources in use (500 mCi each)
- Mar. 7, 1962: Original AEC license application
  - License granted April 18, 1962
  - 2 cobalt-60 sources (260 and 280 mCi) purchased May 5, 1962
  - 2nd Betatron put into operation in 1963
  - 2 portable X-ray units obtained for radiography, 1963
- June 30, 1966: End of Operational Period

Resolution of SC&A Findings for the SEC Petition 00105 Evaluation Report

- Earlier this month all Board members received a copy of the Issues Resolution Matrix for the GSI petition with a delineation of WG actions taken on each item.
- We will not cover these in detail today, but the issues and their resolution will be summarized briefly

Issues Resolution

- Issue 1: Lack of radiation monitoring data for 1953 – 1963
  - Concern about specific incidents
  - Concern about assumptions for reconstructing doses from radium sources
  - Concern about training, monitoring, and other controls during the early period

  - **NIOSH and SC&A agreed that doses could be bounded based on source size information and reasonable assumptions concerning work practices.**
  - **WG voted 2-1 not to recommend SEC status for early period on the basis of this issue.**

Issues Resolution

- Issue 2: Incomplete Monitoring of Workers, 1964 -1966
  - Film badges provided only for betatron workers and radiographers
  - No FB's used outside the betatron building

  - **NIOSH developed model for bounding doses to individuals working outside betatron room. Sc&A accepted this approach**

Issues Resolution Issues Resolution

- Issue 3: Lack of Documentation
  - Original concern dealt with lack of information on isotopic radiography sources, lack of information on monitoring data, and lack of evidence of an effective radiation safety program

  - **After identification of sources and additional information on practices, SC&A accepted NIOSH model for reconstructing dose.**

Issues Resolution

- Issue 4: Film Badge Dosimetry Dependence on Photon Energy and Exposure Geometry
  - Concern that FBs under respond for certain geometries and energies

  - **The modeled doses for betatron workers exceed the maximum FB values, even for the energies and geometries that produce the highest FB readings. SC&A accepted NIOSH model.**
  - **The WG closed this issue.**

Issues Resolution

- Issue 5: Lack of Validation of Models of Radiation Exposure to Betatron Operators
  - Concern that for period when FB reports were available, measured and modeled exposures did not agree
  - **Later models, normalized to the FB data, provided reasonable agreement. Both NIOSH and SC&A agreed that external doses could be bounded with sufficient accuracy through the use of MCNPX simulations. WG closed this issue.**

Issues Resolution

- Issue 6: Underestimate of External Exposure to Unmonitored Workers
  - Concern based on early models that focused only on radiographers vs. “non-exposed” plant and office personnel
  - **Current models assign exposures to all workers and include exposures originating from betatron and isotopic sources as well as support activities.**

Issues Resolution

- Issue 7: Dose Reconstructions Not Based on Best Available Science
  - Concern was actually an error in calculation plus a difference in model codes used by NIOSH and SC&A
    - **Not an SEC issue. Resolved in later models used by NIOSH and SC&A**

Issues Resolution

- Issue 8: Incomplete Model Used for Exposure Assessments
  - Concern was similar to Issue 7 and involved omission of neutron doses in the NIOSH model
  - **Resolution similar to Issue 7**

Issues Resolution

- Issue 9: Underestimate of Beta Dose
  - Concern based on neglecting what is known as the Putzier Effect as well as omitting skin dose to those who were not betatron operators.

  - **Putzier effect addressed and to be included in Appendix BB. Skin doses to other workers addressed in most recent NIOSH models**

Issues Resolution

- Issue 10: Lack of consistency in Assigning External Exposures
  - Concern focused on an error in NIOSH calculations in its early model.

  - **Not an SEC issue. This item was moved by the WG to Appendix BB in 2010 and subsequently closed.**

Summary of SEC 00105 Issues

- Issue 1: Closed
- Issue 2: Transferred to Appendix BB
- Issue 3: Transferred to Appendix BB
- Issue 4: Closed
- Issue 5: Closed
- Issue 6: Transferred to Appendix BB
- Issue 7: Transferred to Appendix BB
- Issue 8: Transferred to Appendix BB
- Issue 9: Transferred to Appendix BB
- Issue 10: Closed

Work Group Recommendation

- The Work Group recommends that the Board not take action today on SEC Petition 00105, but rather defer action until the next full Board meeting.
- This recommendation resulted from WG discussions on June 14, 2012 relating to the residual period and the desire of the Work Group to confirm the appropriateness of the use of the TBD-6000 model of a uranium slug facility as a surrogate for the handling of uranium at General Steel Industries. This applies both to the operational period as well as to the residual period.