



Review of Program Evaluation Report DCAS-PER-036

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Advisory Board on Radiation and Worker Health,
Subcommittee for Procedure Reviews

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Blockson Chemical Company (BCC) documents

- ◆ **September 11, 2006:** The National Institute for Occupational Safety and Health (NIOSH) issued technical basis document (TBD) OCAS-TKBS-0002, rev. 0, “Technical Basis Document for Atomic Energy Operations at Blockson Chemical Company, Joliet, Illinois”
- ◆ **June 20, 2007:** OCAS-TKBS-0002, rev. 01, issued, which expanded site descriptions, included new radiological data, and added several radionuclides
- ◆ **July 31, 2007:** OCAS-PER-020, rev. 0 (“PER-020”), issued to evaluate the impact of issuing rev. 01 of OCAS-TKBS-0002
- ◆ **November 21, 2007:** OCAS-TKBS-0002, rev. 02, of the BCC TBD issued
- ◆ **December 20, 2010:** DCAS-TKBS-0002, rev. 03, of TBD was issued

DCAS-PER-036 (“PER-036”)

April 5, 2012: Issued to address the impacts of changes introduced between TBDs revision 02 and revision 03 on previously adjudicated BCC claims

BCC operations

- ◆ BCC is an Atomic Weapons Employer facility in Joliet, Illinois, that manufactured wet-process phosphoric acid, which was used to manufacture other chemicals
 - ◆ Received phosphate ore concentrates from Florida mining operations
 - ◆ Operations processed about 6,000 net tons of phosphate rock per week, and produced about 50,000 pounds of dry powder uranium oxide per year
 - ◆ Operational period: 1951–June 1960
 - ◆ Residual period ended in October 2009
- ◆ Source terms:
 - uranium (U)-238
 - U-234
 - U-235
 - thorium (Th)-230
 - radium-226
 - radon (Rn-222)
 - background concentrations of Th-232



BCC monitoring

- ◆ Bioassay records available for uranium from 1954 through 1958
- ◆ No indication that external dosimetry was provided
- ◆ Special Exposure Cohort (SEC) issued because exposure to radon cannot be reconstructed from March 1, 1951, through June 30, 1960

SC&A's review of BCC documents

- ◆ **March 23, 2009:** SC&A issued its Subtasks 1–3 review of PER-020, which identified three findings associated with review of OCAS-TKBS-0002, rev. 01
- ◆ **October 15, 2013:** SC&A issued its Subtask 4 review of PER-020, which identified three findings
- ◆ **September 11, 2024:** SC&A issued its review of [PER-036 Subtasks 1–3](#)

Subtask 1: Changes necessitating program evaluation report (PER)

- ◆ **DCAS-TKBS-0002, revision 03:** Changes that may increase dose:
 - Radon exposure increased from 1963 to end of residual contamination period
 - Particulate intakes increased during the residual period after 1977
- ◆ **SC&A's Subtask 1 review:** No findings or observations

Subtask 2: Assess corrective action methods

- ◆ SC&A's Subtask 2 evaluation was performed under our review of PER-020, which included reviewing revisions 01, 02, and 04 of the BCC TBD
- ◆ SC&A's three PER-020 Subtasks 1–3 findings associated with review of TBD rev. 01:
 - Building 55 worker may have been exposed to type S uranium compounds
 - If ingested, a lower solubility uranium material would imply a lower f1 value
 - Estimates of indoor radon concentrations used inappropriate surrogate data resulting in low exposure values
- ◆ SC&A's three PER-020 Subtask 4 findings:
 - Internal dose calculation used inappropriate pathway based on OCAS-TKBS-0002, rev. 02, guidance
 - Calculation of inhalation dose not consistent with OCAS-TKBS-0002, rev. 02, guidance
 - Identification of a potential error in the Blockson Building 55 inhalation tool
- ◆ All findings closed with issuance of TBD rev. 04, establishment of SEC, and an update to Building 55 inhalation tool
- ◆ SC&A had no findings or observations for PER-036 Subtask 2 review

Subtask 3: Potentially affected claims

- ◆ NIOSH identified two separate populations of potentially affected claims, since dose increased for two exposure pathways:
 - Population 1: Increase in radon exposure
 - Population 2: Changes in particulate intake

Subtask 3: PER selection criteria for determining dose reconstructions (DRs) requiring a rework

Population 1 selection criteria

- ◆ Probability of causation (POC) less than 50%
- ◆ DR was approved on or prior to December 20, 2010 (issue date of TBD rev. 03)
- ◆ Employment at BCC after 1962 (residual period dates impacted)
- ◆ Verified cancer of a respiratory tract organ

Population 2 selection criteria

- ◆ POC less than 50%
- ◆ DR was approved on or prior to December 20, 2010 (issue date of TBD rev. 03)
- ◆ Employment at BCC after 1977 (years where particulate intakes increased)

NIOSH identification of potential number of DRs requiring a rework

Population 1

- ◆ Four claims identified
- ◆ Three included in SEC and had no additional non-presumptive cancer
- ◆ One reworked case resulted in POC less than 50%

Population 2

- ◆ To establish employment periods where TBD rev. 03 would result in a higher intake, NIOSH compared integrated intake rates for both versions of the TBD from varying start dates:
 - Energy employees (EEs) with employment starting after 1974 and continuing to the end of the residual period would have higher intake under TBD rev. 03
- ◆ 32 claims identified with employment after 1977
 - All claims had employment start dates prior to 1975 and were eliminated

SC&A's Subtask 3 assessment

- ◆ SC&A did not have access to NIOSH Claims Tracking System when reviewing PER-036 to identify and quantify those cases that qualify for reevaluation but considers screening criteria to be scientifically sound
- ◆ Using inhalation and ingestion intakes in TBD rev. 02 and 03, SC&A independently compared integrated intake rates for various years:
 - Confirms that EEs with employment dates prior to 1975 would have lower total particulate intakes derived from TBD rev. 03 than those calculated with rev. 02
 - Concurs with NIOSH's evaluation of impact on the Population 2 claims and agrees that no case reworks were necessary
- ◆ SC&A has no findings or observations for Subtask 3

Subtask 4: Audit of reevaluated DRs

SC&A recommends that the single reworked case associated with the increase in radon dose during the residual contamination period (Population 1) be reviewed



Questions?