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Advisory Board on Radiation and Worker Health
National Institute for Occupational Safety and Health

A Review of NIOSH's Program Evaluation Report DCAS-PER-093, "Texas City Chemicals, TBD Rev. 01"

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Abbreviations and Acronyms

ABRWH, Board	Advisory Board on Radiation and Worker Health
AEC	Atomic Energy Commission
DR	dose reconstruction
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
ER	evaluation report
NIOSH	National Institute for Occupational Safety and Health
ORAUT	Oak Ridge Associated Universities Team
PER	program evaluation report
POC	probability of causation
SDC	Smith-Douglas Corporation
SEC	Special Exposure Cohort
SRDB	Site Research Database
TBD	technical basis document
TCC	Texas City Chemicals, Inc.

1 Statement of Purpose

To support dose reconstruction (DR), the National Institute for Occupational Safety and Health (NIOSH) and the Oak Ridge Associated Universities Team (ORAUT) assembled a large body of guidance documents, workbooks, computer codes, and tools. In recognition of the fact that all of these supporting elements in DR may be subject to revisions, provisions exist for evaluating the effect of such programmatic revisions on the outcome of previously completed DRs. Such revisions may be prompted by document revisions due to new information, misinterpretation of guidance, changes in policy, and/or programmatic improvements.

A program evaluation report (PER) provides a critical evaluation of the effects that a given issue or programmatic change may have on previously completed DRs. This includes a qualitative and quantitative assessment of potential impacts. Most important in this assessment is the potential impact on the probability of causation (POC) of previously completed DRs with POCs less than 50 percent.

During a teleconference by the Advisory Board on Radiation and Worker Health (Board) Subcommittee for Procedure Reviews on February 15, 2022, the Board tasked SC&A to review DCAS-PER-093, revision 0 (NIOSH, 2021), which was issued to address the impacts of issuing revision 1 to the Texas City Chemicals, Inc. (TCC) technical basis document (TBD), DCAS-TKBS-0011 (NIOSH, 2020a), on previously completed claims. In conducting a PER review, SC&A is committed to perform the following five subtasks, each of which is discussed in this report:

- **Subtask 1:** Assess NIOSH's evaluation and characterization of the issue addressed in the PER and its potential impacts on DR. Our assessment intends to ensure that the issue was fully understood and characterized in the PER.

- **Subtask 2:** Assess NIOSH's specific methods for corrective action. When the PER involves a technical issue that is supported by documents (e.g., white papers, technical information bulletins, procedures) that have not yet been subjected to a formal SC&A review, subtask 2 will include a review of the scientific basis and/or sources of information to ensure the credibility of the corrective action and its consistency with current/consensus science. Conversely, if such technical documentation has been formalized and previously subjected to a review by SC&A, subtask 2 will simply provide a brief summary and conclusion of this review process.

- **Subtask 3:** Evaluate the PER's stated approach for identifying the universe of potentially affected DRs and assess the criteria by which a subset of potentially affected DRs was selected for reevaluation. The second step may have important implications where the universe of previously denied DRs is very large and, for reasons of practicality, NIOSH's reevaluation is confined to a subset of DRs that, based on their scientific judgment, have the potential to be significantly affected by the PER. In behalf of subtask 3, SC&A will also evaluate the timeliness of the completion of the PER.

- **Subtask 4:** Conduct audits of DRs affected by the PER under review. The number of DRs selected for audit for a given PER will vary. (It is assumed that the Board will select the DRs and the total number of DR audits for each PER.)

- **Subtask 5:** Prepare a written report that contains the results of DR audits under subtask 4, along with our review conclusions.

2 Relevant Background Information

The TCC plant in Texas City, TX, has an Energy Employees Occupational Illness Compensation Program Act (EEOICPA) Atomic Weapons Employer covered operational period from October 5, 1953, through September 1955. The site also has a covered residual contamination period from October 1, 1955, through 1977.

Construction on the TCC plant began in 1952. The site was designed to produce animal feed and fertilizer from phosphate rock. The plant had a contract with the Atomic Energy Commission (AEC) to construct a uranium recovery plant to extract uranium as a byproduct of the phosphates. TCC also had a development contract with the AEC to evaluate leach zone material.

Preliminary operations began at both the new fertilizer plant and uranium recovery plant on October 5, 1953. The uranium recovery plant encountered a number of problems during startup and produced only a limited amount of uranium (approximately 400 pounds) for the AEC during the first few months of operation. Due to equipment problems, the plant never reached full-scale uranium production. TCC ceased operations in 1956 and filed for bankruptcy. Following bankruptcy in 1956, the Smith-Douglas Corporation (SDC) acquired TCC. SDC did not pursue uranium work with the AEC. SDC was later acquired by Borden Chemical, which operated the phosphate plant until it closed in 1977.

3 Subtask 1: Identify the Circumstances that Necessitated DCAS-PER-093

3.1 Chronology of events

Special Exposure Cohort (SEC) Petition Evaluation Report (ER) SEC-00088, revision 0: On August 17, 2007, Petition SEC-0088 qualified for evaluation. NIOSH issued revision 0 of the SEC petition ER for Petition SEC-00088 on January 18, 2008 (NIOSH, 2008).

SC&A's Draft Review of SEC Petition SEC-00088: During its April 7–9, 2008, meeting in Tampa, FL, the Board directed SC&A, Inc. to review the TCC SEC-00088 ER (ABRWH, 2008). That report was issued July 18, 2008, and identified nine findings (SC&A, 2008).

SEC Petition ER SEC-00088, revision 1: During the May 8, 2009, Surrogate Data Work Group meeting, NIOSH reported that a series of developments, including the discovery of new information since the initial issue of the ER, led to the need to revise the ER (ABRWH, 2009). Because of this, SC&A's findings in the ER review were not addressed in detail at the work group meeting. NIOSH amended the ER on October 19, 2010 (NIOSH, 2010). The amended ER modified the covered period to October 5, 1953, through September 30, 1955, based on newly discovered documentation. The amended ER also recommended granting the SEC based on an inability to bound radon dose with sufficient accuracy.

SEC Granted for SEC Petition SEC-0088: On November 17, 2010, the Board voted to accept the NIOSH SEC class recommendation (ABRWH, 2010). The SEC class includes:

> all Atomic Weapons Employer employees who worked at Texas City Chemicals, Inc., from October 5, 1953, through September 30, 1955, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort. [NIOSH, 2010, p. 4]

DCAS-TKBS-0011, revision 00: On November 2, 2017, NIOSH issued a site profile for TCC, DCAS-TKBS-0011, revision 00 (NIOSH, 2017a), which included guidance for the DR of TCC workers not covered during the SEC period and during the residual period.

SC&A's Draft Review of DCAS-TKBS-0011, revision 00: The Board tasked SC&A to conduct a technical review of revision 00 of DCAS-TKBS-0011 in December 2017. SC&A's (2018) review looked at the extent to which previous site findings were incorporated into the TBD, because the SEC findings were never resolved formally by the Board. All previous findings were determined to be either no longer applicable or resolved and recommended to be closed. Additionally, the review evaluated the DR methods presented in the TBD. The review identified two new observations and no findings.

DCAS-TKBS-0011, revision 01: NIOSH issued revision 01 of the TBD for TCC on April 27, 2020 (NIOSH, 2020a), to (1) address comments from SC&A's (2018) review, (2) revise ingestion intakes during the residual period, and (3) implement text changes and update the document's format. NIOSH issued a memorandum on May 19, 2020 (NIOSH, 2020b),

addressing SC&A's two observations and SC&A's summary of the nine SEC findings (SC&A, 2018). This included making clarifying changes to tables 7, 8, and 9 in the TBD and revising the methods used to calculate ingestion intakes from residual contamination. As a result of these changes, ingestion intakes increased for the years 1955 through 1977.

SC&A's Draft Review of DCAS-TKBS-0011, revision 01: SC&A was tasked in June 2020 to review NIOSH's May 2020 memorandum (NIOSH, 2020b) in conjunction with revision 01 of the TCC TBD (NIOSH, 2020a). SC&A's (2020) review looked at the extent to which previous site issues were incorporated into the TBD, because the SEC findings and TBD observations were never resolved formally by the Board. All previous findings and observations were determined to be either no longer applicable or resolved and recommended to be closed.

3.2 SC&A's comments

SC&A reviewed each of the documents leading up to changes incorporated into revision 01 of the TCC site profile (NIOSH, 2020a). SC&A agrees with NIOSH that these changes and their impacts on TCC worker doses mandate the need for DCAS-PER-093 (NIOSH, 2021).

There are no findings pertaining to subtask 1.

4 Subtask 2: Assess NIOSH's Specific Methods for Corrective Action

In the publication record of revision 01 of the TCC site profile, NIOSH (2020a) described some of the revisions as follows:

> Revision to address comments from SC&A on ingestion intakes and interpretation/format of Tables 7, 8 and 9. Revised methods to calculate ingestion intakes from residual contamination. Ingestion intakes in Table 9 increased for years 1955 through 1977. No other dose or intakes values were changed. The updated calculation methods are described in section 4.3. Changes were made in the explanation of calculations in sections 4.1 and 4.2 to better explain the ingestion calculations. Table 7 was revised to include dose for all of 1955 (operational and residual periods). Tables 8 and 9 were changed to include intakes only for years 1956 through 1977. [NIOSH, 2020a, p. 3]

4.1 SC&A's comments

In revision 01 of the TCC site profile (NIOSH, 2020a), NIOSH modified the methods used to calculate ingestion doses during the residual period (October 1, 1955, through 1977). Revision 01 of the TBD provides updated residual ingestion intake rates that assume the initial residual ingestion intake rate is equal to the ingestion intake rate during uranium recovery operations. The ingestion rate declines gradually according to the depletion factors in ORAUT-OTIB-0070, revision 01 (NIOSH, 2012). The ORAUT-OTIB-0070 depletion factors have been extensively discussed with the Board.

There are no findings associated with subtask 2.

5 Subtask 3: Evaluate the PER's Stated Approach for Identifying the Number of DRs Requiring Reevaluation of Dose

5.1 NIOSH's selection criteria

Section 3.0 of DCAS-PER-093 described the following criteria NIOSH used to identify previously completed claims requiring reevaluation using guidance in revision 01 of DCAS-TKBS-0011 (NIOSH, 2020a): (1) claims with TCC employment after October 1, 1955, and (2) a POC below 50 percent. Application of these criteria identified 14 claims. NIOSH recalculated dose for all 14 claims using the guidance from revision 01 of DCAS-TKBS-0011; however, none of these claims were found to increase the POC above 50 percent. Thirteen of the claims resulted in a new POC less than 45 percent, and one resulted in a POC between 45 percent and 50 percent. Therefore, NIOSH concluded DCAS-PER-093 with the following:

> NIOSH will provide the Department of Labor with the list of all the claims evaluated under this PER. Since none resulted in a probability of causation greater than 50%, NIOSH will not request the return of any claims. [NIOSH, 2021, p. 2]

5.2 SC&A's comments

In November 2015, NIOSH provided SC&A with summary statistics on the number of claims filed at each site within EEOICPA. These statistics also contained information on the number of claims at each site that had POCs above and below 50 percent. At that time, 18 claims had been filed and received DRs for TTC. Three of those claims had a POC above 50 percent, and the remaining 15 claims had a POC below 50 percent. In February 2022, when updated data were provided by NIOSH, no additional claims had been filed. However, the updated data do not contain POC information, so SC&A cannot definitely conclude that POC data have not changed. The selection criteria used by NIOSH for previously completed DRs that require reevaluation under DCAS-PER-093 are broad enough that they captured all but one previously uncompensated TCC claims. Presumably, the additional uncompensated claim did not have employment during the residual period. SC&A agrees that all potentially impacted claims were captured by selecting all uncompensated cases with employment during the residual period.

There are no findings associated with subtask 3.

6 Subtask 4: Conduct Audits of a Sample Set of Reevaluated DRs Mandated by DCAS-PER-093

Previous sections of this report described changes introduced in revision 01 of the TCC site profile (NIOSH, 2020a) that increased the dose assigned during the residual period. Since NIOSH's evaluation of the TBD changes under DCAS-PER-093 did not warrant the return of any DR cases by the U.S. Department of Labor, SC&A recommends that the Board select a single case out of the 14 evaluated by NIOSH for additional evaluation. Since one case is specifically called out as having a higher POC than the others, SC&A believes the case with a POC between 45 and 50 percent is the ideal choice for evaluation.

7 References

Advisory Board on Radiation and Worker Health. (2008). *Meeting 54 Advisory Board on Radiation and Worker Health day one* [Transcript]. https://www.cdc.gov/niosh/ocas/pdfs/abrwh/2008/tr040708.pdf

Advisory Board on Radiation and Worker Health. (2009). *Surrogate Data Workgroup Friday, May 8, 2009* [Transcript of teleconference meeting]. https://www.cdc.gov/niosh/ocas/pdfs/abrwh/2009/wgtr050809.pdf

Advisory Board on Radiation and Worker Health (ABRWH). (2010). *73rd meeting Wednesday November 17, 2010* [Transcript]. https://www.cdc.gov/niosh/ocas/pdfs/abrwh/2010/tr111710.pdf

National Institute for Occupational Safety and Health. (2008). *SEC petition evaluation report Petition SEC-00088* (rev. 0). https://www.cdc.gov/niosh/ocas/pdfs/arch/sec/texcityer.pdf

National Institute for Occupational Safety and Health. (2010). *SEC petition evaluation report Petition SEC-00088* (rev. 1). https://www.cdc.gov/niosh/ocas/pdfs/sec/texascity/texascityer-88-r1.pdf

National Institute for Occupational Safety and Health. (2012). *Dose reconstruction during residual radioactivity periods at Atomic Weapons Employer facilities* (ORAUT-OTIB-0070, rev. 01). https://www.cdc.gov/niosh/ocas/pdfs/tibs/or-t70-r1.pdf

National Institute for Occupational Safety and Health. (2017a). *Technical basis document for Texas City Chemicals, Inc. Texas City, Texas* (DCAS-TKBS-0011, rev. 00). SRDB Ref. ID 168229

National Institute for Occupational Safety and Health. (2020a). *Technical basis document for Texas City Chemicals, Inc. Texas City, Texas* (DCAS-TKBS-0011, rev. 01). https://www.cdc.gov/niosh/ocas/pdfs/tbd/texascity-r1-508.pdf

National Institute for Occupational Safety and Health. (2020b, May 19). *Texas City Chemicals review* [Memorandum]. https://ftp.cdc.gov/pub/FOIAREQ/181028-508.pdf

National Institute for Occupational Safety and Health. (2021). *Texas City Chemicals, TBD rev. 01* (DCAS-PER-093, rev. 0). https://www.cdc.gov/niosh/ocas/pdfs/pers/dc-per93-r1-508.pdf

SC&A, Inc. (2008). *A focused review of the NIOSH evaluation report for the Texas City Chemical Company SEC petition* (SCA-SEC-TASK5-0063, rev. 0). https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-txcitysec88-r0.pdf

SC&A, Inc. (2018). *Evaluation of technical basis document for Texas City Chemicals, Inc., Texas City, Texas* (SCA-TR-2018-SP004, rev. 0). https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-txcityevaltbd-r0-508.pdf

SC&A, Inc. (2020). *Evaluation of revision 01 of the technical basis document for Texas City Chemicals, Inc., Texas City, TX* (SCA-TR-2020-SP002, rev. 0). https://ftp.cdc.gov/pub/FOIAREQ/183182-508.pdf