Review of NIOSH's Program Evaluation Report DCAS-PER-093, "Texas City Chemicals"

Rose Gogliotti, MS, SC&A, Inc.

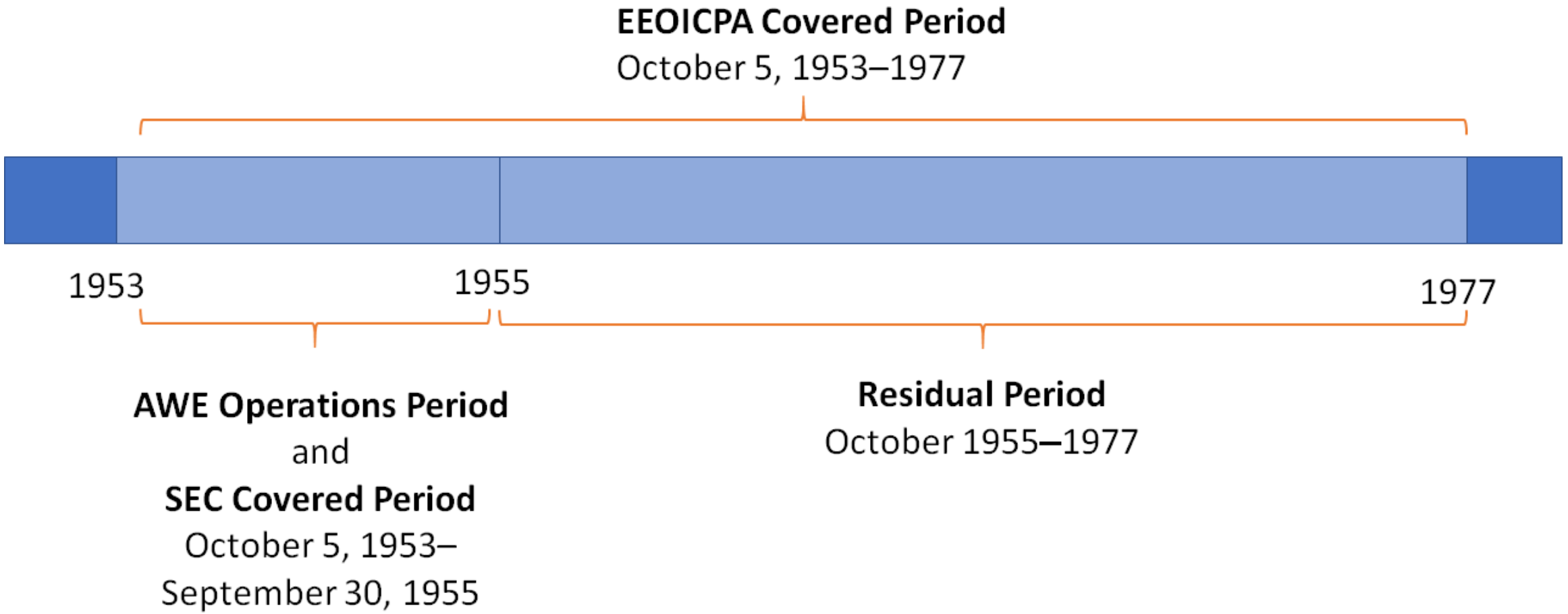
Advisory Board on Radiation and Worker Health,
Subcommittee for Procedure Reviews

February 16, 2023

DCAS-PER-093 purpose

Address the impacts of issuing revision 01 to the technical basis document (TBD) for Texas City Chemicals (TCC), DCAS-TKBS-0011, on previously completed cases

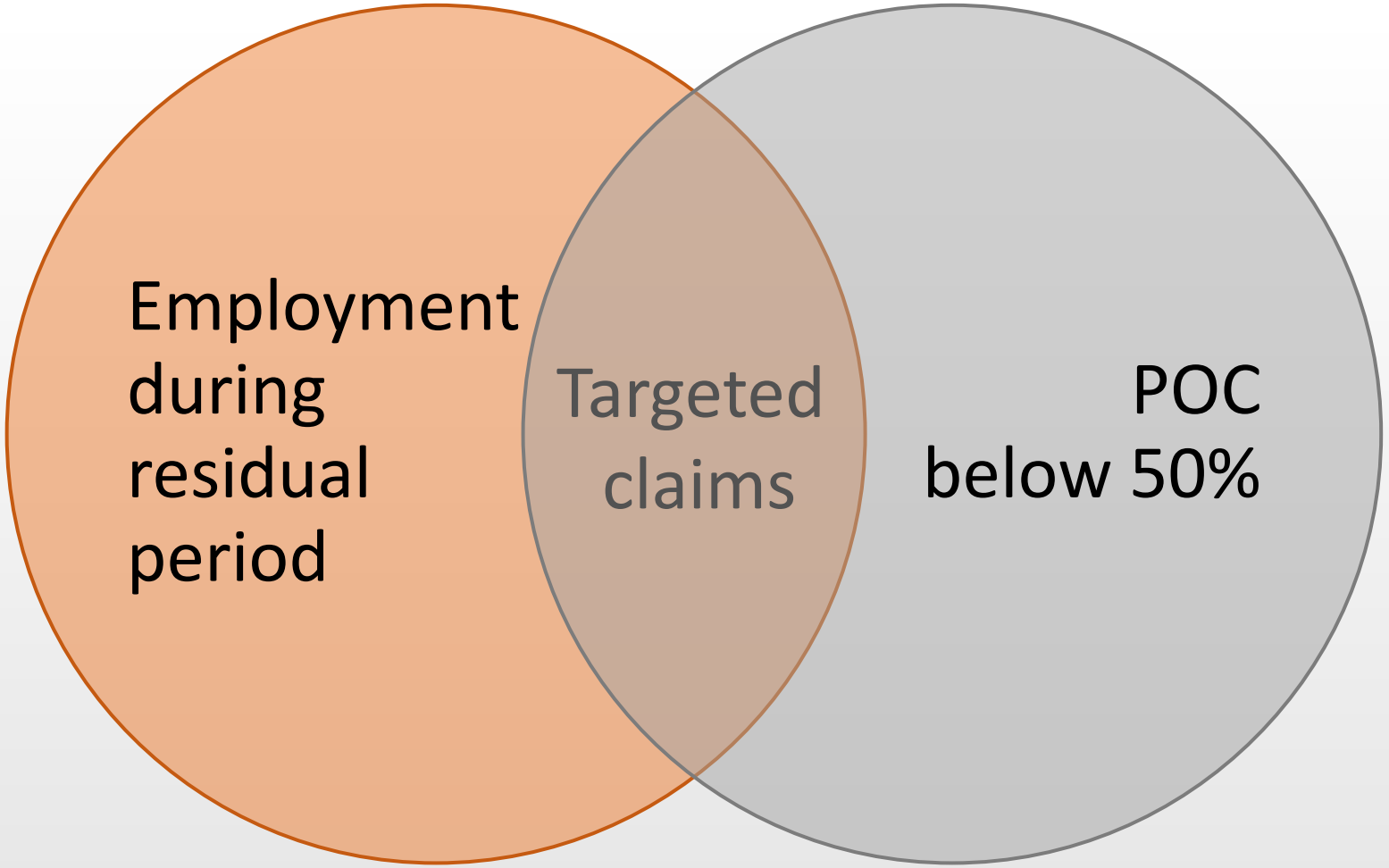
TCC timeline



Changes necessitating PER

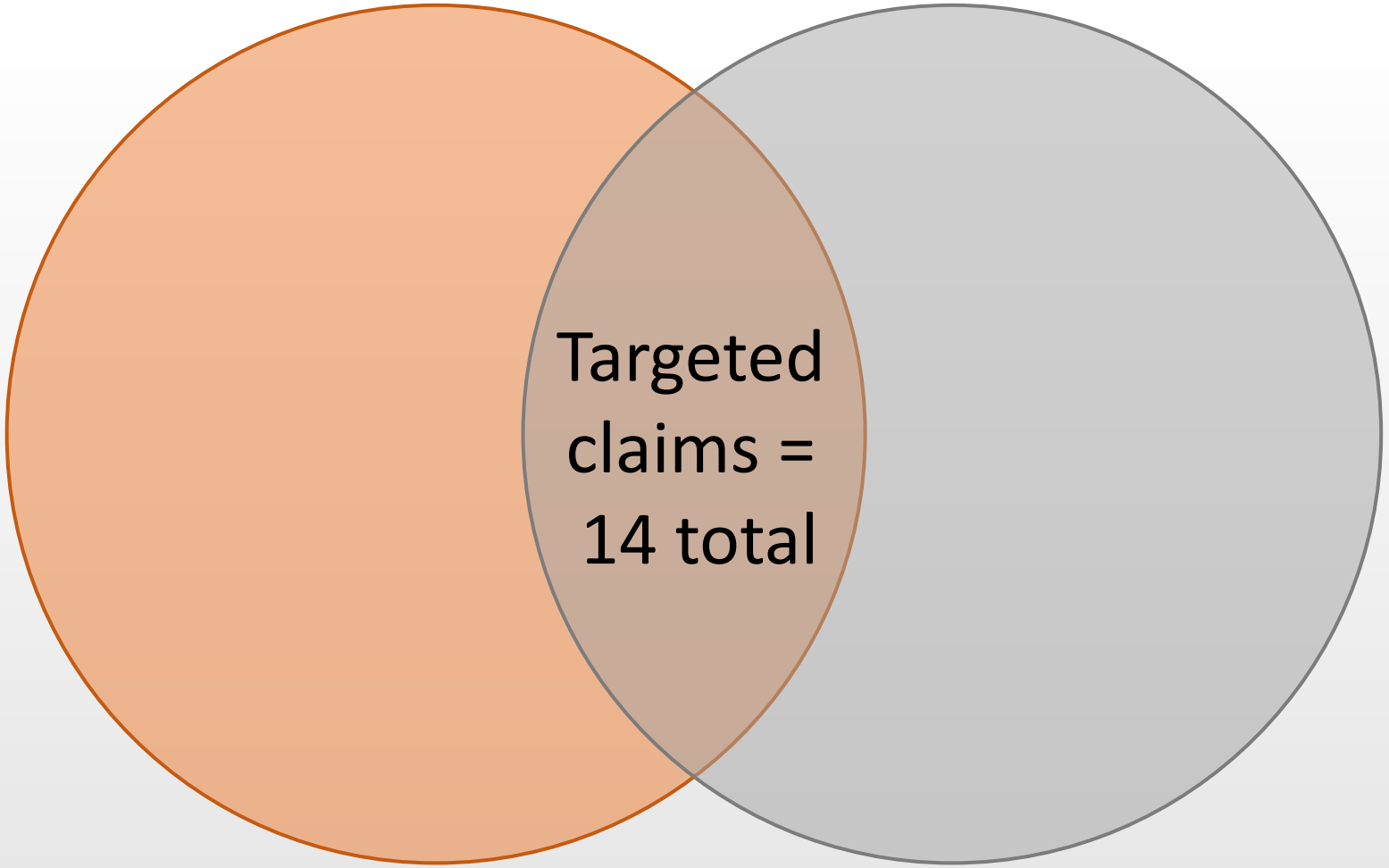
- Revision 01 of the TBD provides updated residual ingestion intake rates that assume the initial residual ingestion intake rate is equal to the ingestion intake rate during uranium recovery operations
  - Ingestion intakes increased from 1955 through 1977
  - No other dose or intake values changed between rev. 00 and rev. 01

PER selection criteria



SC&A

PER selection criteria: Targeted claims



SC&A

NIOSH's evaluation of impacted claims

- 14 claims reevaluated
  - 13 claims had new POC <45%
  - 1 claim had a POC between 45% and 50%
  - None found to increase POC above 50%
- No claims requested back from the U.S. Department of Labor
- SC&A recommended a single case from the 14 impacted cases be selected for review
- In September 2022, the SPR agreed with SC&A's recommendation and tasked SC&A to review one case

Case details

- EE employed at TCC during a portion of the operational and residual years
- Short TCC employment length
- EE worked throughout the plant
- No monitoring history
- multiple cancers
- SC&A's review identified 4 findings and 1 observation

Finding 1: Background information

The dates in table 7-11 changed between the issuance of the SEC petition evaluation report (SEC ER) and the issuance of TBD rev. 00 (renumbered table 11).

Document detail	ER rev. 1	TBD rev. 00
Table number in document	7-11	11
Start of residual period doses	**April 1, 1955**	**October 1, 1955**
Operations period photon dose (rem/day)	0.00060	0.00060
Residual period photon dose (R/day)	0.00016	0.00016

Finding 1: Impact of issue

- Longer operations period results in larger dose
- Most cases impacted by this change were caught by the PER's broad selection criteria
- If a case was completed before November 2, 2017 (TBD rev. 00 issued) with employment that ended between April 1, 1955, and October 1, 1955, this change would be missed by the PER selection criteria
  - Unlikely 6 months of external dose would have a significant impact on a case
  - NIOSH should explore and verify this to be true

Comparison of original and reworked case

Dose categories	Percent change in dose assigned in rework
External	<10%
Medical x-ray	No change
Internal	<10%
Total	<10%
Cancer-specific POC	10–25%
Final POC	~10%

Internal dose

Original:

- Used inhalation and ingestion intake values in table 7-7 of the TCC SEC ER, revision 01
- CAD used to assign doses

Reworked:

- Used inhalation and ingestion intake values in tables 7, 8, and 9 of the TCC TBD, revision 01
- CAD used to assign doses
  - Internal dose increased by <10%

Finding 2: Incorrect inhalation intakes

- Finding 2: Incorrect inhalation intake assigned for some radionuclides from April 1, 1954, through September 30, 1955
- SC&A found that NIOSH assigned an intake of *34.9* pCi/day of U-238, Th-230, U-234, Ra-226, Pb-210, and Po-210 from April,1 1954, through September 30, 1955
- Table 7 of the TBD lists this inhalation intake as *39.4* pCi/day
- This resulted in a reduced intake and dose assigned to target organs

Finding 3: Missing ingestion intakes

- NIOSH did not assign an ingestion intake of 0.021 pCi/day Th-232, Ra-228, and Th-228 during the period from April 1, 1954, through September 30, 1955, as specified in table 7 of the TBD.
- SC&A believes this would underestimate dose by under 0.001 rem

Finding 4: Missing ingestion intakes

- NIOSH did not assign an ingestion intake of 0.307 pCi/d Ra-226 during the period from October 1, 1955, through December 31, 1955, as specified in table 7 of the TBD.
- SC&A believes this would underestimate dose by under 0.001 rem

Observation 1

- SC&A reviewed the Web CAD output and found that the TCC inhalation and ingestion default values are not a selection option in the dropdown window.
- Therefore, when a dose reconstructor wants to assign these doses, they must manually enter each of the CAD entries from tables 7, 8, and 9 in the TBD.
- Although SC&A is unaware of anything that requires the site values be available in the CAD, prepopulated values reduce the likelihood of data entry errors.

Questions?