Summary of Five Document Reviews Approved by the Subcommittee for Procedure Reviews

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Advisory Board on Radiation and Worker Health

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SCPR-approved documents

- DCAS-PER-049, rev. 0, “Paducah Gaseous Diffusion Plant”
- OCAS-PER-008, rev. 0, “Modification of NIOSH-IREP Lung Cancer Risk Model: Effect of ‘Combined’ Lung Model on Non-compensable Lung Cancer Claims”
- OCAS-PER-006, rev. 0, “External Dosimetry Target Organ for Prostate Cancer”
- ORAUT-OTIB-0023, rev. 00, “Assignment of Missed Neutron Doses Based on Dosimeter Records”
- DCAS-PER-066, rev. 0, “Huntington Pilot Plant”

DCAS-PER-049, rev. 0

- Title: “Paducah Gaseous Diffusion Plant”
- Issued August 5, 2016
- Determines the effect of several revisions to the Paducah technical basis document (TBD)
- Doses increased due to revisions in TBD sections:
  - Section 3: Occupational medical x-ray exam frequency default increased in rev. 03, August 23, 2012
  - Section 4: Occupational environmental external doses increased for some assigned years in rev. 03, August 24, 2012
  - Section 6: Occupational external dose increased due to assigned dose from neutrons and inclusion of Tc-99 in rev. 04, August 24, 2012

SC&A's review of PER-049, rev. 0

- Paducah TBD reviewed separately
- SC&A identified 25 findings that were resolved under the work group (WG) on K-25, Paducah, and Portsmouth gaseous diffusion plants
- PER-049 review consisted of only subtask 4 protocol for evaluation of a sample set of impacted cases

Subtask 4 case selection

- Case selected based on criteria:
  - Nonsmoker with site default x-ray frequency assigned between 1951 and 1973
  - External environmental dose assigned for some years
  - Increase in neutron dose assigned
  - Tc-99 external dose assigned
- Cases were selected from six cases where the rework resulted in a POC between 45% and 50%
- Among the six cases, none had external environmental dose or Tc-99 external dose assigned

SC&A's subtask 4 review of PER-049, rev. 0

- SC&A reviewed one case
  - Energy employee (EE) was assigned site default occupational x-rays
  - EE was assigned neutron dose
- Review limited to assessing only those methods that relate to issues addressed in PER-049
- SC&A submitted its subtask 4 report March 2, 2018
- No findings
- SC&A presented its review to the SCPR at the October 31, 2018, meeting

PER-049 case background

- EE worked at Paducah for ~1 decade
- Worked throughout the facility
- Monitored for external and internal radiation exposure
- Diagnosed with qualifying cancer ~4 decades after termination of employment

Comparison of NIOSH's reworked doses and original doses for PER-049 case

Dose categories	Reworked vs. original dose percentage
External	9% decrease
Occupational medical	84% decrease
Internal	81% increase
Total	24% increase
POC	15% increase

Original occupational medical dose calculation for PER-049 case

- Used default x-ray exams and frequency recommendations from Paducah TBD-3, rev. 00
- Assigned dose as specified in Paducah TBD-3, rev. 00
- Total dose ~3.5 rem

Reworked occupational medical dose calculation for PER-049 case

- Frequency of exams based on DOE records
- Also assumed pre-employment exam
- Assigned dose as specified in Paducah TBD-3, rev. 03
- Total dose ~0.5 rem
- Note: Although exam frequency increased, the lumbar spine dose decreased from 2,900 mrem to 347 mrem

SC&A's review of reworked occupational medical dose calculations

- Identified eight posterior-anterior x-rays and a lumbar spine exam in DOE records
- Pre-employment exam included in accordance with TBD-3 rev. 03 guidance
- Assigned dose based on tables 3-3 and 3-4 of Paducah TBD-3, rev. 03
- Verified total dose ~0.5 rem
- Doses appropriately entered in IREP as normal distributions with 30% uncertainty

Original neutron dose for PER-049 case

- Neutron dose not considered
- Paducah TBD-6, rev. 00, did not recommend assignment of neutron dose based on job title and work location

Reworked neutron dose calculation for PER-049 case

- Neutron dose calculated based on guidance of TBD-6, rev. 04:
  - neutron-to-photon ratio value of 0.2 applied to measured, missed, and unmonitored photon doses
  - International Commission on Radiological Protection adjustment factor of 2.0
  - energy range of 0.1 to 2 MeV
- Applied OCAS-IG-001 dose conversion factor (DCF) values
- Assigned total neutron dose of ~4 rem

SC&A's review of reworked neutron dose calculations for PER-049 case

- Confirmed that neutron dose calculations were based on guidance of TBD-6, rev. 04
- Verified that appropriate IG-001 DCF values were applied
- Recalculated measured, missed, and unmonitored neutron doses
- Total assigned neutron dose was correctly calculated
- Annual doses entered in IREP appropriately

Environmental and Tc-99 doses

- Neither original nor reworked DRs considered external environmental dose because measured, missed, and unmonitored dose were assigned
- Neither original nor reworked DRs considered dose from exposure to Tc-99 because organ of interest would not be impacted by nonpenetrating dose
- SC&A concurs with NIOSH's conclusions on environmental and Tc-99 doses

Internal dose calculations for PER-049

- SC&A did not verify the accuracy of internal dose, because it was not impacted by PER-049
- SC&A noted that the significant increase in internal dose was based on:
  - Original DR used hypothetical intakes
  - Reworked DR used EE's bioassay data

Board discussion of DCAS-PER-049

OCAS-PER-008, rev. 0

- Title: “Modification of NIOSH-IREP Lung Cancer Risk Model: Effect of ‘Combined’ Lung Model on Non-compensable Lung Cancer Claims”
- Issued April 12, 2007
- Determines the impact of NIOSH-IREP 5.5 issued February 28, 2006, followed by version 5.5.1 issued May 16, 2006
- IREP revision:
  - compares POCs calculated using NIOSH-IREP and NIH-IREP for lung, trachea, or bronchus cancers and reports the higher
  - incorporates a bias correction factor for random errors in dosimetry for “never smoker” exposed to radon

SC&A's review of PER-008, rev. 0

- PER-008 review submitted December 15, 2010
- Identified two findings
- SC&A presented review to the SCPR at the March 22, 2011, meeting
- SCPR determined subtask 4 case review was not necessary, because only IREP was re-run and no DRs were reworked

Issue resolution for PER-008 finding 1

Finding date	Finding description	NIOSH response	Finding resolution
12/15/2010	NIOSH-IREP lung model generates excessively high probability of causation values due to the model's failure to account for the age at exposure, as well as the attained age of the exposed individual at the time of cancer diagnosis.	**3/22/2011.** Scientific Issues WG Chair has "age of exposure" on the list of issues to be evaluated. Therefore, this finding is broader than PER-008 and should be considered an overarching issue.	**3/22/2011.** SCPR agreed that the finding should be addressed under the Scientific Issues WG and closed the finding.

Issue resolution for PER-008 finding 2

Finding date	Finding description	NIOSH response	Finding resolution
12/15/2010	NIH-IREP lung model adjusts on a limited basis the effects of age at exposure and attained age. A potentially significant shortcoming of this model is that there is no further adjustment for attained age greater than age 50 years.	**3/22/2011.** Scientific Issues WG Chair has "age of exposure" on the list of issues to be evaluated. Therefore, this finding is broader than PER-008 and should be considered an overarching issue.	**3/22/2011.** SCPR agreed that the finding should be addressed under the Scientific Issues WG and closed the finding.

Board discussion of OCAS-PER-008

OCAS-PER-006, rev. 0

- Title: “External Dosimetry Target Organ for Prostate Cancer”
- Issued September 15, 2006
- Assesses the impact of changing external dosimetry target organ for prostate cancer from testes to bladder
  - Dosimeter external doses decreased due to bladder DCF < testes DCF
  - Occupational medical surrogate organ dose increased slightly, but offset by measured, missed, and unmonitored external doses
- No cases reevaluated because dose and POC will not increase

SC&A's review of PER-006, rev. 0

- Review submitted October 29, 2007
- Concurs that bladder is more appropriate surrogate organ:
  - Bladder deep in the body cavity
  - Bladder close to prostate
  - Testes significantly overestimates external beta and low-energy photons since close to body surface
- SC&A had one administrative finding

Issue resolution for PER-006 finding 1

Finding date	Finding description	NIOSH response	Finding resolution
10/29/2007	The structure of PER-006 does not strictly follow the guidance provided by OCAS-PR-008 "Preparation of Program Evaluation Reports and Program Evaluation Plans." PER-006 has a single Evaluation section rather than separate Issue and Probability of Causation Evaluation sections and is missing Summary section.	**12/9/2008.** NIOSH agrees that PER does not include the specific sections described in PR-008 but does include all required information for determining if claims required rework. The PER process has change significantly over time and PR-008 will be revised or canceled.	**12/9/2008.** SC&A and SCPR agreed with NIOSH's response and closed the finding. PR-008 was later canceled.

Board discussion of OCAS-PER-006

ORAUT-OTIB-0023, rev. 00

- Title: “Assignment of Missed Neutron Doses Based on Dosimeter Record”
- Provides guidance to determine when it is appropriate to assign neutron doses to EEs at DOE sites using the half limit of detection (LOD/2) method
- Revision 00 issued March 7, 2005
- Revision 01 issued May 14, 2008

OTIB-0023, rev. 00, guidance

- When neutrons were monitored using reliable dosimeters and results are zero, the LOD/2 method is appropriate
- Missed neutron dose is not assigned if both of the following conditions are met:
  1. Neutron missed dose estimate (nLOD/2) exceeds 75% of measured and missed photon dose
  2. Based on work location and site-specific data, it is determined EE neutron dose was zero or incidental relative to assigned external dose

SC&A's review of OTIB-0023, rev. 00

- Review submitted June 8, 2006
- Review identified eight findings
- Findings discussed and resolved during many SCPR meetings in 2007 and 2008

Issue resolution for OTIB-0023 finding 1

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	The procedure lacks clarity by failing to provide clear definitions and is inconsistent in its terminology. Primary concern is inconsistencies between OTIB-0023 and OCAS-IG-001.	**10/2/2007.** All guidance must be used by dose reconstructors in their entirety and judge which guideline best applies to a given DR. Consistency in interpretation and application of the array of guidance is achieved through training and QA. There may be a need to provide further clarification in OTIB-0023.	**10/2/2007.** SCPR requested that NIOSH and SC&A hold teleconference with technical experts and report on clarification discussions at the next SCPR meeting.

Issue resolution for OTIB-0023 finding 1 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** Section 2.0 and other portions of this OTIB will be revised in conjunction with a revision to section 2.2.2.2.1 of IG-001 to clarify guidance regarding the application of missed neutron dose. One of the significant changes to OTIB-0023 will be the removal of “Condition #1” in section 6.	**11/7/2007.** Issues resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 2

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	When LOD/2 method is not used, detailed information is required that will not be readily available to the dose reconstructor.	**10/2/2007.** Same as finding 1.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next SCPR meeting.

Issue resolution for OTIB-0023 finding 2 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call. All issues were resolved.	**11/7/2007.** IG-001 and OTIB-0023 will be revised to expand on the options for reconstructing missed dose when LOD/2 method does not provide appropriate result.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 3

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	OTIB-0023 references OCAS-IG-001 as the basis for its guidance; however, guidance contained in OTIB-0023 and OCAS-IG-001 is inconsistent. Reference to reliable versus unreliable neutron dosimeter differs between guidance documents.	**9/25/2007.** The guidance is not inconsistent; rather it seeks to provide DR staff with additional guidance with respect to section 2.2.2.2.1 of OCAS IG-001. This purpose is stated in section 1.0. In addition, it is critically important to review this and other TIBs considering other information available to DR staff.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 3 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** OTIB-0023 will be revised (in conjunction with a revision to section 2.2.2.2.1 of IG-001). Revision will remove "Condition #1" in section 6 of OTIB-0023 and will expand IG-001 on the possible options for reconstructing missed dose when dosimeters are unreliable or when the LOD/2 method does not provide an appropriate result.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 4

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	It is questionable whether dose reconstructors are in a position or have the information to make the potentially subjective decisions required.	**9/25/2007.** OTIB is not intended for best estimate dose reconstructions. It is intended to provide additional information to DR staff regarding the application of missed neutron dose using the LOD/2 method. Missed neutron dose must be considered regardless of the "type" of DR. Additionally, the DR staff does have access to the information needed to make decisions regarding the application of missed neutron dose.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 4 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** NIOSH has agreed with SC&A's finding and will introduce appropriate changes in a future revision of the procedure.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 5

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	OTIB-0023 references OCAS-IG-001 as the basis for its guidance; however, guidance contained in OTIB-0023 and OCAS-IG-001 is inconsistent. The need for neutron survey data and stay times when missed neutron doses exceed 75% of photon doses is prescribed in IG-001. Same condition in OTIB-0023 requires second condition to be met.	**9/25/2007.** Same response as finding 3: The guidance is not inconsistent; rather, it seeks to provide DR staff with additional guidance with respect to section 2.2.2.2.1 of OCAS-IG-001. This purpose is stated in section 1.0. In addition, it is critically important to review this and other TIBs considering other information available to DR staff.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 5 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** OTIB-0023 will be revised (in conjunction with a revision to section 2.2.2.2.1 of IG-001). Revision will remove "Condition #1" in section 6 of OTIB-0023 and will expand IG-001 on the possible options for reconstructing missed dose when dosimeters are unreliable or when the LOD/2 method does not provide an appropriate result.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 6

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	The reconstruction of missed neutron doses from “numerous neutron measurements and accurate time information” is unrealistic.	**9/25/2007.** If survey data are not available, other types of data sources as listed in the hierarchy of data (table 1.1 of OCAS-IG-001) could be used. Use of any approach for neutron missed dose requires a description of the method in the DR report.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 6 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** IG-001 and OTIB-0023 will be revised to expand on the options for reconstructing missed dose when LOD/2 method does not provide appropriate result.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 7

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	The regulatory recommendation for "striking a balance between the need for technical precision and process efficiency" has been ignored.	**9/25/2007.** Significant effort has been expended to ensure precision and efficiency in the DR process with respect to missed neutron dose.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 7 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** OTIB-0023 will be revised to remove condition 1 from section 6.0; only condition 2 must be satisfied in order to conclude that missed neutron dose need not be included in a reconstruction. In addition, IG-001 and OTIB-0023 will be revised to expand on the options for reconstructing missed dose when the LOD/2 method does not provide appropriate result.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Issue resolution for OTIB-0023 finding 8

Finding date	Finding description	NIOSH response	Finding resolution
6/8/2006	The generic assumption of a neutron-to-photon ratio of 0.75:1 as a limiting value for the application of nLOD/2 is neither technically defensible nor claimant favorable.	**9/25/2007.** The rationale for the guidance in IG-001 section 2.2.2.2.1 is reflected in the language of section 5.0 of OTIB-0023. Additionally, it is common practice to apply missed neutron dose (during site NTA film eras) based on the application of the site-specific neutron-to-photon ratio to measured and missed photon dose. This approach is both technically defensible and claimant favorable.	**10/2/2007.** Transferred to item 1 of the review of this OTIB. NIOSH and SC&A will report on technical clarification discussions to the SCPR at the next meeting.

Issue resolution for OTIB-0023 finding 8 followup

Finding date	Followup action	NIOSH response	Finding resolution
6/8/2006	**11/5/2007.** SC&A and NIOSH held conference call to discuss finding.	**11/7/2007.** NIOSH has agreed with SC&A's finding and will introduce appropriate changes in a future revision of the procedure.	**11/7/2007.** Issue resolved to satisfaction of the SCPR. NIOSH should report back when procedure has been revised.

Final issue resolution for all OTIB-0023 findings

Finding date	NIOSH followup	SC&A followup	Finding resolution
6/8/2006	**5/14/2008.** OTIB-0023, rev. 01, issued.	**6/17/2008.** SC&A reviewed OTIB-0023, rev. 01, and found it adequately addresses the eight findings.	**6/24/2008.** SCPR closed all findings.

Board discussion of ORAUT-OTIB-0023

DCAS-PER-066, rev. 0

- Title: “Huntington Pilot Plant”
- Issued November 30, 2015
- Determines the effect of rev. 01 of the Huntington Pilot Plant TBD, DCAS-TKBS-0004, issued December 12, 2013
- Revision added intakes for Am-241, Th-230, and Tc-99 for the periods 1956–1963 and 1978–1979, which increased internal dose estimates for all claims

History of Huntington Pilot Plant TBD

- ORAUT-TKBS-0004, “Technical Basis Document: Basis for Development of an Exposure Matrix for Huntington Pilot Plant,” rev. 00 (October 2003)
- ORAUT-TKBS-0004, “Technical Basis Document: Basis for Development of an Exposure Matrix for Huntington Pilot Plant,” rev. 01 (January 2004)
- OCAS-PER-025 (September 2007) evaluated addition of electron dose in revision 01
- OCAS-TKBS-0004, “Technical Basis Document for the Huntington Pilot Plant, Huntington, West Virginia,” rev. 00 (August 2008), added intakes for total uranium, Pu-239, and Np-237
- DCAS-PER-033 (December 2011) evaluated increase in internal dose

SC&A's review of PER-066, rev. 0

- SC&A's previous reviews included:
  - OCAS-TKBS-0004, rev. 00 (focused review under Subcommittee for Dose Reconstruction Reviews) (reviewed March 2013)
  - OCAS-PER-025, rev. 0 (reviewed July 2013)
  - OCAS-TKBS-0004, rev. 00 (reviewed June 2013)
  - OCAS-PER-033, rev. 0 (reviewed July 2013)
- PER-066 review consisted of only a sample set of impacted cases (Subtask 4)
- SC&A submitted its subtask 4 report October 11, 2016
- SC&A identified one finding
- Review presented to SCPR at the October 31, 2018, meeting

PER-066 subtask 4 case selection and review process

- NIOSH identified two reworked cases with POCs between 45% and 50%; these cases were selected for review
- Review was limited to evaluating only those methods and corrective actions that relate to issues addressed in PER-066
- SC&A's review evaluated only internal dose calculations

Huntington Pilot Plant history

- Alternative name: Reduction Pilot Plant
- Covered period: 1951–1963, 1978–1979
- Supplied nickel powder used to make gaseous diffusion barrier for Paducah and Portsmouth gaseous diffusion plants
- Sources of feed material were nickel oxide and barrier scrap contaminated with uranium and associated radionuclides from the uranium enrichment process

PER-066 case 1 background

- EE worked at Huntington Pilot Plant for many years
- No records of external or internal monitoring available
- EE classified as a plant worker
- Diagnosed with a qualifying cancer after termination of employment

Comparison of NIOSH's reworked doses and original doses for PER-066 case 1

Dose categories	Reworked vs. original dose percentage
External	~69% decrease
Occupational medical	~3% decrease
Internal	>40,000% increase
Total	~202% increase
POC	~47% increase

Original internal dose calculations for PER-066 case 1

- DR performed in 2003
- Used internal intake values from table 5 of ORAUT-TKBS-0004, rev. 00
- Calculated doses using CADW for total uranium, Pu-239, and Np-237
- Resulted in assigning a total dose of >0.100 rem

Reworked internal dose calculations for PER-066 case 1

- Used appropriate inhalation and ingestion intake values from table 5 of DCAS-TKBS-0004, rev. 01
- Calculated doses using CADW for total uranium, Pu-239, Np-237, Am-241, Th-230, and Tc-99
- Compared absorption types as specified in table 5
- Doses entered in IREP as constant values
- Resulted in assigning a total dose of nearly 9.0 rem

SC&A's conclusions about internal dose calculations for PER-066 case 1

- Concurs that EE should be classified as a plant worker
- Verified correct inhalation and ingestion intake values from table 5 of DCAS-TKBS-0004, rev. 01
- Confirmed the greater dose was assigned considering the potential solubility types
- Re-ran CADW used rev. 01 TBD-specified values
- Entered annual doses in IREP
- Calculated a POC that approximated NIOSH's POC
- No findings about rework of case 1

PER-066 case 2 background

- EE worked at Huntington Pilot Plant for many years
- No records of external or internal monitoring available
- EE classified as a plant worker
- Diagnosed with qualifying cancers several years after termination of employment

Comparison of NIOSH's reworked doses and original doses for PER-066 case 2

Dose categories	Cancer 1 reworked vs. original dose percentage	Cancer 2 reworked vs. original dose percentage
External	~72% decrease	~72% decrease
Occupational medical	~37% decrease	~37% decrease
Internal	~718% increase	~721% increase
Total	~263% increase	~272% increase
POC	~25% increase	~9% increase

Original internal dose calculations for PER-066 case 2

- DR performed in 2004
- Used internal intake values from table 5 of DCAS-TKBS-0004, rev. 01
- Calculated doses using CADW for total uranium, Pu-239, and Np-237
- Resulted in assigning a total dose of ~6.000 rem for both cancers

Reworked internal dose calculations for PER-066 case 2

- Used appropriate inhalation and ingestion intake values from table 5 of DCAS-TKBS-0004, rev. 01
- Calculated doses using CADW for total uranium, Pu-239, Np-237, Am-241, Th-230, and Tc-99
- Compared absorption types as specified in table 5
- Doses entered in IREP as constant values
- Resulted in assigning a total dose of >22.0 rem for cancer 1 and >23.0 rem for cancer 2

SC&A's conclusions about internal dose calculations for PER-066 case 2

- Concurs that EE should be classified as a plant worker
- Verified correct inhalation and ingestion intake values from table 5 of DCAS-TKBS-0004, rev. 01
- Confirmed the greater dose was assigned considering the potential solubility types
- Re-ran CADW used rev. 01 TBD-specified values
- Using IREP, SC&A calculated a POC that approximated NIOSH's POC
- No findings about the rework of case 2
- SC&A did have one finding about TBD rev. 01

Issue resolution for PER-066 subtask 4, finding 1

Finding date	Finding description	NIOSH followup	Finding resolution
6/8/2006	TKBS-0004, rev. 01, table 5, has errors associated with inhalation and ingestion for Administrative Workers: • Th-230 ingestion intake value of 6.3E-1 pCi/day is incorrect; the correct value is 1.7E-3 pCi/day • Tc-99 inhalation intake value of 1.9E-1 pCi/day is incorrect; the correct value is 5.2E-4 pCi/day • Tc-99 ingestion intake value of 4.0E-3 pCi/day is incorrect; the correct value is 1.1E-5 pCi/day	**10/31/2018.** NIOSH acknowledged that there were errors in these three entries in table 5. They are in the process of revising the TBD to correct those values.	**10/31/2018.** SCPR closed the finding but requested that the BRS be updated when the TBD was revised. NIOSH revised the TBD November 5, 2018, and table 5 values were corrected.

Board discussion of DCAS-PER-066