



Review of One Advisory Board-Selected Case Reworked for the Evaluation of Anaconda Technical Basis Document Revisions (DCAS-PER-065, Subtask 4)

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DCAS-PER-065, “Anaconda”

- ◆ Issued November 2015 due to revisions to Anaconda site profile (Battelle-TBD-6000, appendix G)
- ◆ Revision increased external dose for all job categories in all years of operation
- ◆ SC&A reviewed DCAS-PER-065 in June 2017: no findings

DCAS-PER-065, subtask 4 – review of one reworked case

- ◆ ABRWH selected one reworked case for SC&A's review March 2021, based on following criteria:
 - assignment of external dose for operators and laborers
 - employment during the period 1956–1958
- ◆ SC&A reviewed reworked case in August 2021

NIOSH reworked DR

- ◆ NIOSH's rework of the case:
 - Used applicable DR tools
 - Recalculated all annual doses
 - Re-ran IREP
- ◆ Revised DR report not sent to DOL because the compensation decision did not change

SC&A's review of reworked DR

- ◆ SC&A' review was generally limited to reevaluation of pathways addressed in the PER
- ◆ External doses increased due to Anaconda site profile changes
- ◆ SC&A also assessed internal exposure to evaluate significant differences in NIOSH's original and reworked doses

Case background

- ◆ Energy employee (EE) worked at Anaconda for three decades
- ◆ EE worked throughout site
- ◆ EE was not monitored for radiation exposure
- ◆ Diagnosed with qualifying cancer several years after employment termination

Comparison of NIOSH's reworked doses versus original doses

Dose categories	Reworked vs. original dose percentage
External	95% reduction
Medical	261% increase
Internal	99.6% reduction
Total	71% reduction
POC	86% reduction

Original external dose calculations

- ◆ Performed prior to issuance of Battelle-TBD-6000, appendix G, using Scherpelz (2006)
- ◆ Assumed EE exposed 1 foot from a rectangular uranium slab for 3 days in 1956 and 30 days in 1959 for 10 work hours/day at 2.08 mrem/hour
- ◆ Bladder assumed as surrogate organ for photon dose conversion factor (DCF) of 1.523
- ◆ Assigned external dose of >1.0 rem

Reworked external dose calculations

- ◆ Used guidance in TBD-6000, appendix G, rev. 1
- ◆ Calculated external dose using annual photon doses for each year of uranium operations from table G.2
- ◆ Per ORAUT-OTIB-0005, rev. 05, liver assumed as surrogate organ for photon DCF of 1.064
- ◆ Assigned external dose of ~0.050 rem

Original medical dose calculations

- ◆ Assumed annual x-ray for each year of employment
- ◆ Urinary bladder assumed as surrogate organ
- ◆ Used dose data from table 6-5 of OTIB-0006, revision 03 PC-1
- ◆ Assigned external dose of ~0.1 rem

Reworked medical dose calculations

- ◆ Assumed annual x-ray for each year of employment
- ◆ Gallbladder assumed as surrogate organ
- ◆ Used dose data from table 6-5 of OTIB-0006, revision 03 PC-1
- ◆ Assigned external dose of >0.3 rem

Original internal dose calculations

- ◆ Uranium intakes assigned for extrusion and rolling in 1956 and 1959 using operator data from table 7.8 of Scherpelz (2006)
- ◆ Air sampling data derived from summary of Atomic Weapons Employer metal-working sites
- ◆ 30-day intake for each process applied for each year
- ◆ Intakes of recycled uranium components from plutonium-239 and neptium-237 were scaled from uranium intakes
- ◆ Type M solubility was claimant favorable
- ◆ Inhalation and ingestion intakes applied as inhalation
- ◆ Assigned internal dose of ~0.250 rem

Reworked internal dose calculations

- ◆ Uranium intakes assigned based on inhalation/ingestion intakes from TBD-6000, appendix G, table G.1
- ◆ Appendix G used highest reported air monitoring data (39 dpm/m³) in work areas in 1956 and 1959
- ◆ Doses calculated for each year of uranium operations
- ◆ Type M solubility found to be claimant favorable
- ◆ Assigned internal dose of 0.001 rem

SC&A's conclusions on external dose

- ◆ Reworked external dose:
 - Appropriate dose assigned based on appendix G
 - Surrogate organ based on current revision of OTIB-0005
 - Doses entered into IREP correctly
- ◆ Reworked occupational medical dose:
 - Appropriate dose assigned based on OTIB-0006
 - Surrogate organ selection based on OTIB-0005
 - Doses entered into IREP correctly

SC&A's conclusions on internal dose

- ◆ Reworked internal dose:
 - Appropriate intake values used as specified in appendix G
 - Input data entered into IMBA correctly
 - Assumptions claimant favorable
- ◆ SC&A had no findings with the selected reworked case impacted by PER-065

References

- ◆ National Institute for Occupational Safety and Health. (2011). *Dose reconstruction from occupational medical x-ray procedures* (ORAUT-OTIB-0006, revision 04). <https://www.cdc.gov/niosh/ocas/pdfs/arch/tibs/or-t6-r4.pdf>
- ◆ National Institute for Occupational Safety and Health. (2012). *Internal dosimetry organ, external dosimetry organ, and IREP model selection by ICD-9 code* (ORAUT-OTIB-0005, rev. 05). <https://www.cdc.gov/niosh/ocas/pdfs/arch/tibs/or-t5-r5.pdf>
- ◆ National Institute for Occupational Safety and Health. (2014). *Site profiles for Atomic Weapons Employers that worked uranium metals: Appendix G – Anaconda* (Battelle-TBD-6000 Appendix G, rev. 1). <https://www.cdc.gov/niosh/ocas/pdfs/tbd/b-6000-apg-r1.pdf>
- ◆ Scherpelz, R. I. (2006). *Site profiles for Atomic Weapons Employers that worked uranium and thorium metals* (PNWD-3738, rev. 0). Pacific Northwest Division, Battelle, Richland, WA.



Questions?