



# SC&A's Review of ORAUT-TKBS-0060, revision 00, "Grand Junction Facilities"

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November 3, 2021



# Introduction

- ◆ The Grand Junction Facilities (GJF) were located in Grand Junction, CO; covered period 1943–2006
- ◆ The site was under contract to the U.S. Atomic Energy Commission to support uranium processing, assaying, and milling remediation
- ◆ Some limited thorium exposures
- ◆ 1986 – Start of GJF remedial action project
- ◆ 2006 – GJF site released
- ◆ Special Exposure Cohort (SEC) 1943 through 1985 due to lack of internal dose reconstructability

# Grand Junction Facilities dose reconstruction

- ◆ Before technical basis document (TBD) issued, NIOSH used a dose reconstruction (DR) template, “Dose Reconstruction Methodology for the Grand Junction Facilities,” September 15, 2015 (NIOSH, 2015a)
- ◆ ORAUT-TKBS-0060, revision 00, “Site Profile for Grand Junction Facilities,” issued on May 18, 2018 (NIOSH, 2018)
- ◆ Subcommittee for Procedure Reviews tasked SC&A with reviewing the TBD at the February 18, 2021, meeting

# Other GJF documents

- ◆ DCAS-PER-047, issued in 2014 (NIOSH, 2014)
- ◆ SCA's 2015 review of PER-047 (SC&A, 2015)
- ◆ NIOSH's 2015 addendum to the petition evaluation report for SEC Petition SEC-00175 (NIOSH, 2015b)
- ◆ SCA's review of NIOSH's addendum to Petition SEC-00175 (SC&A, 2016)
- ◆ NIOSH issued DCAS-PER-090 (NIOSH, 2019) on July 17, 2019, to address DR methods modified by issuing the GJF TBD to replace the previous DR template for GJF
  - SC&A has not been tasked to review PER-090

# ORAUT-TKBS-0060 outline

- ◆ Section 1.0 – Introduction
- ◆ Section 2.0 – Site Description
- ◆ Section 3.0 – Occupational Medical Dose
- ◆ Section 4.0 – Occupational Onsite Ambient and Environmental Dose
- ◆ Section 5.0 – Occupational Internal Dose
- ◆ Section 6.0 – Occupational External Dose

# SC&A's review of section 2.0 site description

- ◆ Section 2.0 contains a reasonable amount of information about GJF that provides a useful background for the dose reconstructor
- ◆ Table 2-1 summarizes the buildings and their usage periods
- ◆ SC&A had no findings or observations in this section

# SC&A's review of section 3.0 occupational medical dose

- ◆ 1943–1946: Preemployment, annual, and postemployment
- ◆ 1947–1961: Taken off site, no occupational medical dose to be assigned
- ◆ 1962–1969: Preemployment, annual, and postemployment
- ◆ 1970–present: Taken off site, no occupational medical dose to be assigned
- ◆ SC&A found that the recommended occupational medical x-ray methodology was consistent with other DOE sites
- ◆ SC&A had no findings but did have one observation

# Observation 1

## **Observation 1: The term “each year” needs to be replaced**

The recommendations for 1943–1946 contain the term “each year.” This could be misleading, because all the x-ray exams would not be assigned for each and every year. This observation was also identified in SC&A’s (2015) review of DCAS-PER-047 as observation 2 (p. 16) but does not appear to have been corrected in the recent TBD.

# SC&A's review of section 4.0 occupational onsite ambient and environmental dose

- ◆ Section 4.0 recommends that no onsite ambient and environmental dose be assigned because it is accounted for in any co-exposure data assigned to unmonitored workers, and there is no indication that ambient doses were subtracted from the monitored doses
- ◆ SC&A concurs with this recommendation and had no findings or observations in this section

# SC&A's review of section 5.0 occupational internal dose

- ◆ SC&A verified the prorated intake values for the Supervisor and Administrative personnel in the intake tables
- ◆ SC&A verified the ingestion intake values in the tables based on OCAS-TIB-009, revision 0 (NIOSH, 2004, p. 4)
- ◆ SC&A concurs with the recommendations in this section and has no findings
- ◆ SC&A did have two observations

# Observation 2

## Observation 2: Apparent inconsistency in DAC values

In section 5.3.4 of the TBD, NIOSH used a Th-230 derived air concentration (DAC) value of  $3.00 \times 10^{-12}$  microcurie per milliliter ( $\mu\text{Ci}/\text{ml}$ ) to derive intake values for table 5-6 for co-exposure intakes after 1990. However, NIOSH's (2017) memorandum indicated that a DAC value of  $7 \times 10^{-12}$   $\mu\text{Ci}/\text{ml}$  was being used at the site. There appears to be an inconsistency in the DAC values used that needs clarification.

# Observation 3

## Observation 3: Potential radon calibration chamber exposure

- ◆ The TBD states (p. 20):
  - Any exposure from radon while working around the radon calibration chamber were calculated as WLM and should be provided in a workers exposure file.
- ◆ Did NIOSH examine the claimant files and find that workers who entered the chamber had such working level month (WLM) dose records in some claim files?
- ◆ The radon calibration chamber could be a source term that may not be appropriately bounded by the 5.7 pCi/L found in Building 30B

# SC&A's review of section 6.0 occupational external dose

- ◆ According to the GJF SEC, unmonitored external dose cannot be reconstructed prior to 1960. Therefore, this section is applicable to the period 1960 forward.
- ◆ SC&A reviewed the references in the TBD for the limit of detection (LOD) values and exchange frequencies and found them to be correct.
- ◆ Assignment of 100 percent 30–250 keV photons, 100 percent >15 keV betas, and 0.1–2 MeV neutrons is consistent with the potential radiation exposures at GJF (mainly uranium and decay products).
- ◆ SC&A analyzed the co-exposure methods for photons, betas, and neutrons presented in the TBD.
- ◆ SC&A has no findings concerning co-exposure photon dose data or their application.

# SC&A's review of section 6.5.2 occupational external dose – betas

- ◆ The TBD (p. 27) recommends the use of a beta-to-photon dose ratio of 1.5 derived from the Radiation Exposure Monitoring System (REMS) database
- ◆ SC&A (2015, p. 14) reviewed the REMS data and concurred with using the beta-to-photon dose ratio of 1.5
- ◆ Since NIOSH recommends using the same ratio value of 1.5 in the TBD, SC&A has no finding concerning co-exposure beta dose or its application

# SC&A's review of section 6.5.3 occupational external dose – neutrons

- ◆ SC&A spot checked the missed dose data using the appropriate LOD and exchange values as summarized in table 6-3 of the TBD
- ◆ SC&A derived the same total neutron co-exposure doses as recommended in column 5 of table 6-5 in the TBD
- ◆ SC&A has no findings concerning co-exposure neutron dose data but did have two observations concerning assigning co-exposure neutron doses



# Observation 4

## **Observation 4: Assigning 95th percentile neutron doses to geologist only**

Workers with job titles other than geologist may have handled sources of neutrons in performing work and could have been in the 95th percentile exposure category.

Geologists themselves may not have handled the tools as much as laborers and other workers.

# Observation 5

## **Observation 5: Need substantiation for not assigning co-exposure neutron dose after 1985**

The TBD states (p. 28):

After 1985, based on a review of GJF records, neutron dosimetry records are assumed to be complete. Therefore, no unmonitored dose should be assigned after 1985.

SC&A could not locate information in the TBD that supports this assumption. A summary of NIOSH's review of the GJF records and the resulting assumption that monitoring for neutron exposure was complete would be appropriate to include in the TBD.

# Summary

- ◆ SC&A reviewed the GJF TBD and compared the present TBD with the previous GJF DR template and previous SC&A reviews
- ◆ SC&A found the TBD to provide reasonable and technically based recommendations, which were consistent with other DOE site profiles and the previous GJF DR template
- ◆ SC&A had no findings in this review but did have five observations concerning:
  1. the wording of text in the occupational medical section
  2. DAC values used
  3. radon calibration chamber exposure
  4. neutron 95th percentile dose assignments
  5. support of neutron dose recommendations in the external dose section



# Questions?

# References

National Institute for Occupational Safety and Health. (2004). *Estimation of ingestion intakes* (OCAS-TIB-009, rev. 0).

<https://www.cdc.gov/niosh/ocas/pdfs/tibs/oc-t9-ro.pdf>

National Institute for Occupational Safety and Health. (2014). *Grand Junction Operations Office* (DCAS-PER-047, rev. 0).

<https://www.cdc.gov/niosh/ocas/pdfs/pers/dc-per47-r0.pdf>

National Institute for Occupational Safety and Health. (2015a). *Dose reconstruction methodology for the Grand Junction Facilities*.

National Institute for Occupational Safety and Health. (2015b). *SEC petition evaluation report Petition SEC-00175, addendum*.

<https://www.cdc.gov/niosh/ocas/pdfs/sec/gjoo/gjfer-175add.pdf>

# References 2

National Institute for Occupational Safety and Health. (2017, July 27). *Grand Junction monitoring program in 1991* [Memorandum].

<https://www.cdc.gov/niosh/ocas/pdfs/dps/dc-gjoosec175r0-072717.pdf>

National Institute for Occupational Safety and Health. (2018). *Site profile for Grand Junction Facilities* (ORAUT-TKBS-0060, rev. 00).

<https://www.cdc.gov/niosh/ocas/pdfs/tbd/gjf-r0-508.pdf>

National Institute for Occupational Safety and Health. (2019). *Grand Junction Operations Office* (DCAS-PER-090).

<https://www.cdc.gov/niosh/ocas/pdfs/pers/dc-per90-r0-508.pdf>

# References 3

SC&A, Inc. (2015). *A review of NIOSH's program evaluation report DCAS-PER-047, "Grand Junction Operations Office"* (SCA-TR-PR2015-0093, rev. 1). <https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-per47-r1.pdf>

SC&A, Inc. (2016). *A focused review of the NIOSH SEC evaluation report for Grand Junction Operations Office, addendum to Petition SEC-00175* (SCA-TR-2016-SEC006, rev. 0). <https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-gjfsec66-r0.pdf>