



Review of NIOSH Program Evaluation Report DCAS-PER-079, “Pinellas Plant TBD Revision”

Stephen L. Ostrow, PhD, SC&A, Inc.

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

January 28, 2026



DCAS-PER-079 purpose and review summary

- ◆ **Purpose:** Assess the impacts of rev. 02 of the Pinellas Plant occupational external dose technical basis document (TBD) (12/11/2017) on previously completed dose reconstructions (DRs)
- ◆ **October 27, 2020:** NIOSH issued DCAS-PER-079
- ◆ **March 14, 2024:** Subcommittee for Procedure Reviews (SPR) tasked SC&A to review the PER
- ◆ **September 26, 2024:** SC&A issued its [PER subtask 1-3 review report](#)

Pinellas Plant background

- ◆ Constructed by General Electric in 1956 on a 100-acre site near Clearwater, FL
- ◆ Operations:
 - Manufactured neutron generators (NGs), containing tritium
 - After 10 years, expanded to include other electronic components, including thermoelectric generators (RTGs), containing plutonium
- ◆ Site consisted of:
 - One large building, Building 100, which contained many different areas
 - 17 smaller, surrounding buildings, which themselves also contained different areas and rooms
- ◆ At its peak, the plant employed about 2,000 people
- ◆ Covered periods:
 - Operational period: 1957–1994
 - Decontamination and decommissioning activities: 1995–1997
 - Remediation period 1999, 2008–2009

Radiation sources at Pinellas

Radioactive material

- ◆ **Tritium** targets in NGs
- ◆ **Pu-oxide** heat sources in RTGs
- ◆ Borosilicate glass structures that contain **uranium** and may store **tritium** as well
- ◆ Leak-detection systems contain **krypton-85**
- ◆ Instrumentation calibration, check sources, and assorted small quantities of other radioisotopes
- ◆ **Carbon-14** as a radioactive label in some lab solvents

Radiation-generating devices

- ◆ NGs, which are small linear accelerators, generate fusion **neutrons** when operating
- ◆ Ion accelerators for ion implantation, target assessment, materials analysis, etc.
- ◆ X-ray diffraction and electron-beam equipment
- ◆ Medical x-ray exam equipment

Potential external exposure hazards

- ◆ **Tritium** (low-energy beta emitter)
 - Occurred as tritiated water, tritium gas, organically bound tritium, metal tritides
 - Low external radiation hazard
- ◆ **Krypton-85** (beta-emitting noble gas)
 - Beta energy is high enough to cause a skin dose if exposed to leaking gas
 - No evidence of such an exposure has been found
- ◆ **Plutonium** (Pu-238)
 - Pu decay also produces neutrons and gammas from spontaneous fission
 - daughter products also emit radiation
- ◆ **Uranium** (natural or depleted)
 - Emit alpha particles and x-rays
 - Some decay chain progeny also emit different types of radiation
- ◆ **Carbon-14** (beta emitter)
 - Used in small amounts as a radioactive label in some solvents
 - Considered negligible hazard
- ◆ **Nickel-63** (beta emitter)
 - Used in krytrons (high-speed switch used in nuclear weapons)
 - Low energy and negligible amount

External worker exposures

◆ Electrons

- TBD concludes no external electron hazard since tritium, the principal source of electrons, produces only low-energy betas that cannot penetrate the skin

◆ Photons

- Neutron generation production area exposures were from testing of neutron tubes and neutron generators
- RTG production area radiation exposures were from the plutonium oxide ($^{238}\text{PuO}_2$) heat sources

◆ Neutrons

- Neutron generators, which accelerated deuterium ions into deuterium- or tritium-containing targets, produce neutrons from fusion reactions
- Sealed $^{238}\text{PuO}_2$ heat sources used for the RTGs

External monitoring techniques

TBD (rev. 02) provides information in Section 6 on external radiation dosimetry through the years in tables 6-3 through 6-7

Table	Contents
6-3	Historical dosimetry events from 1957 through October 1994, when the primary mission changed from defense to cleanup
6-4	Whole body beta-gamma dosimeters, 1957–1997
6-5	Whole body neutron and beta-gamma neutron dosimeters, 1957–1991
6-6	Wrist beta-gamma dosimeters, 1974–1997
6-7	Ring beta-gamma dosimeters, 1957–1997

Subtask 1: changes necessitating PER

- ◆ NIOSH produced the current version (rev. 02) of the occupational external dose TBD in response to several SC&A and SPR reviews and discussions that were conducted since the previous version (rev. 01) of the TBD
- ◆ PER-079 lists two revisions to the TBD that resulted in increased (“claimant favorable”) assigned doses:
 - Eliminated the assignment of online ambient external dose and replaced it with the more favorable unmonitored dose (“co-exposure dose”)
 - Monitored and unmonitored tritium doses increased for all years
- ◆ SC&A assessed NIOSH’s evaluation and characterization of the issues addressed in PER-079 and its potential impacts on dose reconstruction, and SC&A concurs with NIOSH’s determination

Subtask 2: Assess corrective action methods

- ◆ PER Section 2.0 implies that “Eliminating the assignment of onsite ambient external dose and replacing it with the more favorable unmonitored dose” is a factor that increases the assigned external dose in a DR
- ◆ SC&A notes that this is following the guidance of section 6.5.1 and attachment B of the external dose TBD (rev. 02)
 - The TBD assumes that workers with potential for external exposures were monitored and those with little potential were not; hence, whatever doses the unmonitored workers might have received were less than those of the monitored workers
 - The TBD assigns a claimant-favorable annual unmonitored external dose (100% 30–250 keV photons) of 100 mrem as justified in attachment B

Subtask 2: SC&A conclusion

- ◆ SC&A reviewed rev. 02 and previous versions of the occupational external dose TBD and determined, with the concurrence of the Pinellas Work Group, that all issues were resolved
- ◆ SC&A believes that **it is acceptable to use its assumptions, methodologies, and data in performing dose reconstruction reviews**
- ◆ SC&A has no findings associated with subtask 2

Subtask 3: PER selection criteria

- ◆ 529 previously completed DRs identified
- ◆ 16 claims removed by DOL for various reasons
- ◆ 7 claims “active at NIOSH” after being returned for rework and a new DR
- ◆ 76 claims eliminated because the original DR had POC >50%
- ◆ 4 claims compensated under a non-Pinellas SEC
- ◆ 39 claims had no Pinellas employment or visit
- ◆ 3 claims eliminated because they were completed after the TBD was revised
- ◆ 4 claims returned to NIOSH prior to this evaluation and will be revised based on the revised TBD
- ◆ 149 claims were removed in total, leaving **380 claims to reconsider**

Subtask 3: SC&A conclusion

- ◆ Although SC&A does not have access to NOCTS to review the data used to identify and quantify those cases that qualify for reevaluation, SC&A agrees that the selection criteria should include all affected noncompensated claims
- ◆ SC&A has **no findings** associated with subtask 3

Subtask 4: Audit of reevaluated DRs

- ◆ SC&A recommends that the Board select two cases for production workers covering the operational periods with POCs still <50% after NIOSH reworked the DRs



Questions?