



SC&A Supplemental Review of SEC-00256 Petition Evaluation Report for Pinellas Plant

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

Advisory Board on Radiation and Worker Health, Pinellas
Work Group

January 29, 2026



Report background

- ◆ SC&A's April 2025 Supplemental Review Report augments SC&A's June 16, 2023, "Interim SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256: Pinellas Plant" (Interim Review Report) and makes 4 additional observations (14–17)
- ◆ Pinellas Work Group (WG) at November 20, 2023, meeting tasked SC&A to:
 - Evaluate newly received petitioner material
 - Respond to areas of particular WG concern
 - Continue identifying and examining other relevant documents
 - Issue a report to supplement its initial review report



Ongoing investigation

SC&A recognizes that evaluating the petition evaluation report (ER) remains a moving target with the final decision coming from the Board and, thus, expects that this report does not represent the final word on assessing the validity of NIOSH's claims in the ER.

Pinellas Plant background

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

Radiation sources

Radioactive material

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

Radiation-generating devices

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

Observation 14: additional sources of radiation exposure

- ◆ SC&A examined other documents since its June 2023 Interim Review Report and has not found any additional sources of radiation exposure or intakes that would require extra monitoring measures beyond those already used to monitor for radiation exposure from the sources already known at Pinellas.
- ◆ SC&A reviewed government contracts for activities that could possibly have introduced new or different radiation sources at Pinellas and did not identify any required additional or new monitoring practices.

Radiation monitoring

- ◆ Section 4 of SC&A's Interim Review Report summarizes Pinellas's internal and external radiation monitoring:
 - Section 4.1: Monitoring during the SEC period, 1957–1990
 - Section 4.2: Period of SEC evaluation excluded from SEC petition, 1991–1997
 - Section 4.3: Internal monitoring records
 - Section 4.4: Additional Tiger Team findings about internal dosimetry
 - Section 4.5: External monitoring

Observation 15: radiation monitoring sufficiency

- ◆ After issuing its Interim Review Report, SC&A conducted further research using documents for transuranic radionuclide sampling both inside the plant and outside (environmental).
- ◆ SC&A located uranalysis bioassays, air sampling, and environmental sampling for Pu-238 and Pu-239 during plant's operating period.
- ◆ SC&A analyzed these data for indication of potential for worker intakes above normal background exposures and fallout concentrations.
- ◆ SC&A examined approximately 100 samples, and results did not indicate the uptake, or the potential for uptake, of plutonium or other transuranic radionuclides arising from plant operations.

Government contracts

- ◆ SC&A reviewed information on approximately 200 government contracts that could be categorized as research and development (R&D) and searched for any other related documents that could contain information concerning government contracts relevant to potential radiation exposure or radioactive material intakes to workers at Pinellas.
- ◆ SC&A found that most of the contracts were for non-radiation-producing projects: metals, ceramics, testing, analysis, etc.
- ◆ Those that contained any potentially relevant information were investigated further. Nine projects were considered.

Government contracts 1–5

1. External electron-beam impulse heating (1968)
2. Design and evaluation of a lab neutron generator (1969)
3. Nondestructive determination of areal density and tritium content of tritided erbium films using beta excited x-rays (1973)
4. Hydrogen isotope measurements for neutron tube targets (1975)
5. Pinellas plant ion acceleration facility and nuclear reaction analysis: An apparatus for low-energy ion scattering (1977)

Government contracts 6–9

6. Uranium bed oxidation vacuum process system (1977)
7. A pulsed neutron generator for logging (1977)
8. Pulse neutron generator and control circuits (1978)
9. Applications of nuclear reaction analysis to metal hydride film characterization at the General Electric Nuclear Devices 200 kiloelectron volt accelerator facility (1985)

Observation 16: examination of contracts for additional health physics monitoring

- ◆ SC&A did not find anything unusual or likely new to the Pinellas site in these contracts considering that Pinellas handled tritium and neutron-producing devices routinely as part of its main product line.
- ◆ The documents did not directly address radiation exposures from these projects, but there were no potentially abnormal or unusual external and internal exposure conditions that routine Pinellas health physics monitoring would not have covered.

NIOSH response to SC&A interim review report

- ◆ SC&A's Interim Review Report had no findings and 13 observations, summarized in the Executive Summary section.
- ◆ NIOSH responded to the SC&A report on October 11, 2023, and presented its response to the WG on November 20, 2023.
 - NIOSH concurs with most of the observations; several of the responses commit NIOSH to update the occupational internal dose technical basis document (TBD).
 - SC&A reserves further assessment until the revised TBD is available.

Petitioner material

- ◆ Section 6 of SC&A's Interim Review Report discusses petitioner concerns through January 2023.
 - Section 6.1 summarizes concerns expressed in the SEC petition and identifies 12 general issues.
 - Section 6.2 examines the 9 issues NIOSH summarizes in the ER from the petition to assess if the ER adequately addresses all the concerns.
 - Section 6.3 examines additional petitioner concerns submitted following the December 2022 Board meeting.

Observation 17: petitioner documents

- ◆ SC&A examined all the documents submitted by the APR, including those on subjects of particular interest to the Board.
- ◆ Many of them are either non-technical, do not contain new relevant information related to dose reconstruction (DR) and assessment of the ER, or are duplicates or repetitious.
- ◆ However, some of them provide a deeper understanding of activities at the plant that can help interpret and clarify other documents and DR guidance.
- ◆ SC&A is continuing to look deeper into some of the documents but has not yet identified any that suggest that doses are not bounded by NIOSH's DR approach.

Petitioner issues of particular interest to Board

- ◆ The APR submitted over 400 documents.
- ◆ Over 60 documents specifically concern plutonium.
- ◆ The Supplemental Review Report addresses several issues related to plutonium raised by the APR and of particular interest to Board members:
 - Heather Project
 - Bioassays
 - Air Monitors
 - RTG Models

Heather project

- ◆ Developed a glass component (a.k.a. a “helix” or “bent glass”) as part of the tritium delivery system in a nuclear weapon, which was not treated in Interim Review Report.
- ◆ The project began c. 1956 as part of the W68 Poseidon submarine-launched nuclear ballistic missile program and ran to c. 1970.
- ◆ The Pinellas newsletter, the *Pinellas Headliner*, devoted a special issue to Heather in 1991 and stated:

Due to the classification of the product, building 300 was constructed and used solely for this product line. All of the processes required for fabrication of its piece parts and processing of them were performed in that building and access was strictly controlled.

Heather: NIOSH references

- ◆ In addition to reviewing APR documents, SC&A noted any references to Heather in the NIOSH project documents. ER table A2-2 refers to documents that NIOSH examined related to Heather, and Attachment 2 states that:

NIOSH reviewed each of the additional documents for information pertinent to dose reconstruction feasibility. None of the reviewed documents indicated difficulties that could hinder or impede dose reconstruction to the class of workers, and none of the documents pertained to radiological exposures, lack of dosimetry information, or any other condition that would negatively impact dose reconstruction for the class of workers under evaluation.

Heather: SC&A conclusions

- ◆ SC&A concludes that none of the NIOSH documents, including the TBDs, exclude any of the areas where there was a potential for personnel exposure to radiation because it would have been detected by the overall plant's health physics programs, such as internal and external monitoring, area monitoring, and contamination control.
- ◆ Hence, there is no basis to expect that the rooms housing the Heather Project and the personnel working in them would not be similarly covered.

Bioassays

- ◆ The Board expressed interest in how many plutonium bioassays were performed and whether any were “positive.”
- ◆ Pinellas conducted Pu-238 and Pu-239 urine bioassays while plutonium was present at Pinellas to confirm that workers were not being subjected to plutonium intakes.
- ◆ For example, two data sources contain 45 plutonium bioassay results from 1987, 1989, and 1990.

Plutonium bioassays

- ◆ The ER states:
 - “NIOSH considered plutonium because the Pinellas Plant implemented a bioassay program to ensure there was no internal exposure resulting from RTG work with the triply-encapsulated plutonium sources. The program confirmed there was no internal exposure resulting from plutonium at the Pinellas Plant.”
 - The plutonium used at the Pinellas Plant in RTG production from 1975 through 1990 was not a potential source of internal exposure. The RTG heat-source containment rendered the plutonium non-dispersible, and there was no plutonium contamination within the facility. However, out of an abundance of caution, the Pinellas Plant performed plutonium bioassay.
- ◆ The WG concluded that it does not consider the potential for personnel internal dose from activities involving plutonium as credible. Therefore, an internal dose reconstruction methodology for plutonium is not necessary.

Air monitors

- ◆ The Board inquired whether there were plutonium air monitors in-plant, especially in the 100 and 400 areas.
- ◆ SC&A determined that there were air monitors in several locations in the plant, which sampled for plutonium contamination. For example:
 - A Pinellas report describes the air monitoring system in building 400, which included monitoring for plutonium.
 - A data source presents 42 sample results for 1976–1977, and another presents air monitoring data in 1987 as well as gives the locations of monitors/filters, including maps.
- ◆ SC&A hasn't seen any documentation to indicate that plutonium was ever present in building 100.

RTG models

- ◆ The Board asked how many different RTG models Pinellas produced.
- ◆ SC&A examined a few dozen documents provided by the APR, NIOSH documents, and other primary sources of information such as from Los Alamos National Laboratory (LANL) concerning its Milliwatt Generator Project, which ran from about 1986 to 1996.
- ◆ SC&A believes that 3 different Pu heat sources (MC2893, MC2893A, MC3559) powered 3 different RTG models (MC2730, MC2730A, MC3500). The heat sources produced either 4.0-watt or 4.5-watt thermal power and as stated in a LANL document: “The heat sources for milliwatt RTGs are identical except for the amount of plutonium oxide granules contained in the 4.0-watt and 4.5-watt models.”

RTG models: SC&A conclusion

- ◆ SC&A concludes that there is no material distinction for the purpose of assessing the ER and underlying dose reconstruction methodology between the models with and without the “A” suffixes.
- ◆ SC&A finds that the number of different RTG models (2 or 3) is not relevant to dose reconstruction or assessment of the ER.

SC&A summary

- ◆ SC&A evaluated
 - petitioner material received since SC&A's June 2023 Interim Review Report
 - several areas of particular interest to the WG, including potential additional sources of radiation, government R&D contracts, the Heather project, and transuranic radionuclide monitoring
- ◆ SC&A made four observations with the common theme that SC&A hasn't identified any additional sources of radiation exposure or intakes that would not be detected by routine health physics practices at the plant or that could not be bound by the NIOSH dose reconstruction approach.
- ◆ ER assessment remains ongoing as new information becomes available.

NIOSH follow up

- ◆ NIOSH issued a response paper to the SC&A Supplemental Review Report: “NIOSH Response to ‘Supplemental SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256:Pinellas Plant,’” June 6, 2025.
- ◆ The NIOSH paper concludes: “NIOSH concurs with the four observations in *Supplemental SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256:Pinellas Plant*” . . . and notes no response is required.”



Questions?