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National Institute for Occupational Safety and Health

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

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Abbreviations and Acronyms

ABRWH, Board	Advisory Board on Radiation and Worker Health
ALARA	as low as reasonably achievable
APR	Authorized Petitioner Representative
CDC	Centers for Disease Control and Prevention
DCAS	Division of Compensation Analysis and Support
DFO	Designated Federal Official
DOE	U.S. Department of Energy
ER	evaluation report
g	gram
GE	General Electric Company
GEND	General Electric Neutron Devices
LANL	Los Alamos National Laboratory
MeV	mega-electron volt
NA	not applicable
NG	neutron generator
NIOSH	National Institute for Occupational Safety and Health
NOCTS	NIOSH DCAS Claims Tracking System
ORAUT	Oak Ridge Associated Universities Team
Pinellas	Pinellas Plant
Pu	plutonium
RTG	radioisotope thermoelectric generator
SEC	Special Exposure Cohort
SRDB	Site Research Database
TBD	technical basis document
WG	work group

1 Executive Summary

This report ("Supplemental Report") augments SC&A's June 16, 2023, interim review report (SC&A, 2023a) by summarizing SC&A's activities since then in assessing the National Institute for Occupational Safety and Health (NIOSH) October 13, 2021, Pinellas Plant Special Exposure Cohort (SEC) Petition SEC-00256 evaluation report (ER) (NIOSH, 2021). At its November 20, 2023, meeting, the Pinellas Work Group (WG) tasked SC&A to evaluate newly received petitioner material, respond to areas of particular WG concern, continue identifying and examining other relevant documents, and issue a review report to supplement the initial review report. Evaluating the ER remains a moving target with the final decision coming from the Advisory Board in Radiation and Worker Health (ABRWH, "Board"), so it is expected that this report does not represent the final evaluation of the validity of NIOSH's claims in the ER.

SC&A makes four observations in this Supplemental Report, summarized in table 1. Since the interim report (SC&A, 2023a) had 13 observations, observation numbering here continues with number 14.

Table 1. Supplemental report observations

Number	Observation
14	**No additional sources of radiation exposure found** 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 be taken other than those that would have been used to monitor for radiation exposure from sources already known to be at Pinellas. Additionally, SC&A reviewed government contracts that could possibly have introduced new or different radiation sources at Pinellas and did not identify any required additional or new monitoring practices.
15	**Radiation monitoring is sufficient** After issuing the interim review report in June 2023, SC&A conducted further research using documents for transuranic radionuclide sampling. SC&A located urinalysis bioassays, air sampling, and environmental sampling for plutonium (Pu)-238 and Pu-239 during the plant's operating period. SC&A analyzed the data from approximately 100 samples for indication of the potential for workers' intakes above normal background exposures and fallout concentrations. This analysis did not indicate elevated sample levels coming out of the stack scrubbers, nor the uptake or the potential for uptake of plutonium or other transuranic radionuclides arising from plant operations.
16	**Examination of contracts indicated no additional health physics monitoring required** 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 identified that normal Pinellas health physics monitoring would not have covered during standard practices such as the bioassay, external badging, and area contamination/air survey programs.

Number	Observation
17	**Petitioner documents provide background information** SC&A examined all the documents submitted by the Pinellas Authorized Petitioner Representative. The general impression is that many of them are either nontechnical, do not contain new and relevant information related to dose reconstruction at Pinellas and assessment of the ER, or are duplicates or repetitious. However, some of them give a deeper background understanding of activities at the plant, which can help interpret and clarify other documents and dose reconstruction guidance. SC&A is continuing to look deeper into some of the documents but has not yet identified any that suggest that doses cannot be bounded by the information available to NIOSH for dose reconstruction.

1.1 History of Advisory Board activities

There has been a long history of Board activities related to Pinellas beginning in 2004, which are summarized in table 2.

Table 2. Summary of Advisory Board meetings and activities

Meeting date	Meeting group/purpose
September 2, 2004	NIOSH worker outreach
November 2, 2005	NIOSH worker outreach
May 27–29, 2006	SC&A conducted worker interviews
February 28–29, 2008	NIOSH outreach on SEC petitioning process
June 11, 2008	Work Group on Pinellas Plant
June 11, 2009	Work Group on Pinellas Plant
October 13, 2011	Work Group on Pinellas Plant
November 19, 2012	Work Group on Pinellas Plant
February 11, 2016	Work Group on Pinellas Plant
March 10, 2016	Work Group on Pinellas Plant
March 23–24, 2016	ABRWH meeting, SC&A status report
August 9–10, 2016	ABRWH meeting, SC&A final status report
December 8–9, 2021	ABRWH meeting, NIOSH SEC presentation
December 8, 2022	ABRWH meeting, SC&A ER review update presentation
November 20, 2023	Work Group on Pinellas Plant
December 7, 2023	ABRWH meeting, WG update
August 7–8, 2024	ABRWH meeting, NIOSH and SC&A status reports
December 5, 2024	ABRWH meeting, SC&A status report

After the June 16, 2023, issue of SC&A's interim review report, NIOSH issued a response paper in October 2023 (NIOSH, 2023b). SC&A presented the interim review to the WG at its November 20, 2023, meeting (SC&A, 2023b). At the same meeting, NIOSH presented its ER (NIOSH, 2023a) and its October 2023 response paper (NIOSH, 2023c).

1.2 Site Information

Extensive site information can be found in the Pinellas site profile, particularly in the site description technical basis document (TBD) (ORAUT, 2011), as well as in other documents. In brief, the Pinellas Plant ("Pinellas" or "the plant"), formerly located on a 100-acre site near Clearwater, Florida, was constructed by General Electric in 1956 to manufacture tritium-containing neutron generators (NGs) for the nuclear weapons program. The plant was expanded after 10 years to include other electronic components; prominent among them from a

radiological standpoint were radioisotope thermoelectric generators (RTGs), containing a triply encapsulated plutonium heat source.

The site had one large building (Building 100), which contained many different areas, and 17 smaller surrounding buildings, which also held different areas and rooms. At its peak, the plant employed about 2,000 people, many of whom did not routinely encounter sources of radiation. The plant operated 1957–1994, followed by decontamination and decommissioning activities through 1997 and remediation activities up to 2009.

2 Sources of Exposure and Potential Exposure Hazards

Section 3.1 of SC&A's interim review of the SEC-00256 ER (SC&A, 2023a) summarizes the potential Pinellas radiation sources and provides details concerning each of the sources. Sources at the plant can be categorized as either radioactive materials that continuously emit radiation through radioactive decay, or radiation-generating devices that produce radiation only when they are operating. Principal examples of the two categories are:

1. **Radioactive material**
    - miniature linear accelerator-type neutron generators (containing **tritium** targets) used to initiate nuclear fission reactions
    - **tritium** storage systems, some incorporating **uranium**
    - RTGs containing **plutonium** oxide heat sources that arrived at the plant as triply encapsulated units
    - borosilicate glass structures containing **uranium**
    - leak-detection systems containing **krypton-85**
    - **carbon-1**4, a radioactive label in some lab solvents
    - **nickel-63** used in krytrons (sealed, gas-filled glass tubes used as very high-speed switches in nuclear weapons)
    - instrumentation and dosimeter calibration and check sources, and assorted small quantities of other radioisotopes
2. **Radiation-generating devices**
    - The primary product of the plant was neutron generators, which contained very small linear accelerators enclosed in vacuum tubes. The NGs were used in the triggering mechanism of nuclear weapons to accelerate ionized deuterium into either a tritium-containing or a deuterium-containing target to generate either 14.1 mega-electron volt (MeV) or 2.4 MeV fusion neutrons respectively. The fusion neutrons can then produce other types of radiation from secondary interactions.
    - Ion accelerators for ion implantation, target assessment, materials analysis, etc.
    - X-ray diffraction and electron-beam equipment
    - Medical x-ray exam equipment

Potential exposure hazards can be either external or internal. External hazards are discussed in detail in the occupational external dose TBD (ORAUT, 2017) and internal hazards in the occupational internal dose TBD (ORAUT, 2016). A Pinellas as low as reasonably achievable (ALARA) report for 1990 (Harder, 1991) states that the Pu-238 dioxide heat sources in RTGs produced an estimated 67 percent of the plant's photon dose in 1990. However, the ER emphasizes that the majority of the plant's employees were not exposed to external radiation sources and were, therefore, not monitored. The ER identifies tritium as the only source of internal radiation exposure risk to personnel.

Observation 14: No additional sources of radiation exposure found

SC&A examined other documents since its June 2023 interim review report (SC&A, 2023a) and has not found any additional sources of radiation exposure or intakes that would require extra monitoring measures be taken beyond those that would have been used to monitor for radiation exposure from sources already known to be at Pinellas. Additionally, SC&A reviewed government contracts that could possibly have introduced new or different radiation sources at Pinellas and did not identify any required additional or new monitoring practices; refer to section 4 of this report for details.

3 Radiation Monitoring

Section 4 of SC&A's interim review report (SC&A, 2023a) 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 is sufficient

After issuing the interim review report in June 2023, SC&A conducted further research using documents for transuranic radionuclide sampling. SC&A located urinalysis bioassays, air sampling, and environmental sampling for Pu-238 and Pu-239 during the plant's operating period. SC&A analyzed the data from approximately 100 samples for indication of the potential for workers' intakes above normal background exposures and fallout concentrations. This analysis did not indicate elevated sample levels coming out of the stack scrubbers, nor the uptake or the potential for uptake of plutonium or other transuranic radionuclides arising from plant operations.

4 Government Contracts

SC&A reviewed information on approximately 200 government contracts[1] that could be categorized as research and development 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. In general, 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:

1. External electron-beam impulse heating (1968), GEPP-40, R-68-ND17 (APR, 2024, PDF p. 7)
2. Design and evaluation of a laboratory neutron generator (GEND, 1969)
3. Nondestructive determination of areal density and tritium content of tritided erbium films using beta excited x-rays (GEND, 1973)
4. Hydrogen isotope measurements for neutron tube targets (1975), GEPP-314; CONF-770575-5 (APR, 2024, PDF p. 47)
5. Pinellas plant ion acceleration facility and nuclear reaction analysis: an apparatus for low-energy ion scattering (GEND, 1977a)
6. Uranium bed oxidation vacuum process system (GEND, 1977b)
7. A pulsed neutron generator for logging (GEND, 1977c)
8. Pulse neutron generator and control circuits (GEND, 1978)
9. Applications of nuclear reaction analysis to metal hydride film characterization at the General Electric Nuclear Devices 200 kiloelectron volt accelerator facility (GEND, 1985)

SC&A found that these contracts were related to tritium (tritium targets, transfer apparatus, etc.), neutron generators (2.4 MeV neutrons from deuterium-deuterium fusion or 14.1 MeV neutrons from deuterium-tritium fusion), and relatively low energy ion accelerators. Electron-beam impulse heating can present the normal industrial hazards but does not involve radioactivity.

Observation 16: Examination of contracts indicated no additional health physics monitoring required

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 identified that normal Pinellas health physics monitoring would not have covered

[1] Leads to these contracts were found in the Site Research Database (SRDB) and/or provided by the Authorized Petitioner Representative (APR) in a 62-page email to the Designated Federal Official (DFO) on April 14, 2024, and in 17 "contracts" folders containing 96 attached documents sent to the DFO on August 31, 2024, and September 1, 2024.

during standard practices such as the bioassay, external badging, and area contamination/air survey programs.

5 NIOSH Response to SC&A's Interim Review Report

SC&A's interim review report (SC&A, 2023a) had no findings and 13 observations. Observations 1–5 and 11–13 are based on review of the ER (NIOSH, 2021), and observations 6–10 are based on review of the 1990 Tiger Team report (U.S. Department of Energy (DOE), 1990). NIOSH responded to the SC&A report on October 11, 2023 (NIOSH, 2023b) and made a presentation to the WG on November 20, 2023 (NIOSH, 2023c).

The observations are summarized in the "Executive Summary" of the interim review report. Table 3 summarizes NIOSH's responses to SC&A's observations; the text of the observations has been augmented in the table in some cases for clarity. Several of NIOSH's responses relate to commitments to revise the occupational internal dose TBD (ORAUT, 2016); SC&A reserves its further assessments until the revised TBD is available for review.

Table 3. Summary of NIOSH responses to SC&A interim review report observations

Observation and elucidation	NIOSH response
1 – "Neutron generator production was fairly steady"	NIOSH concurs. No response required.
2 – "Potential for tritium contamination is adequately addressed" This observation relates to how NIOSH treats potential exposures to stable metal tritides.	NIOSH concurs. NIOSH committed to update the occupational internal dose TBD (ORAUT, 2016) with a clarification: "When periods are identified during which an individual claimant should have been monitored but was not, internal dose from insoluble tritium (based on the methodology in section 5.8.1.2) will be included in addition to soluble tritium dose" (NIOSH, 2023b, p. 4).
3 – "The ER does not reference recent special tritium compound document"	NIOSH concurs. NIOSH will revise the occupational internal dose TBD (ORAUT, 2016) to reference ORAUT-OTIB-0066, "Calculation of Dose from Intakes of Special Tritium Compounds" (ORAUT, 2020).
4 – "Lack of bioassays records for 1988–1990"	NIOSH notes that the information cited by SC&A was from the ER based on internal monitoring data compiled prior to dose reconstruction. However, a more complete set is available for that time period and is used for dose reconstruction.

Observation and elucidation	NIOSH response
5 – "Bioassay schedule noncompliance by the plant" SC&A recommended that NIOSH demonstrate that an appropriate co-exposure model can be constructed to address apparent incompleteness in the tritium bioassay program.	NIOSH does not believe that a co-exposure model is needed, and that the ER affirmed NIOSH's ability to accomplish dose reconstruction even with noncompliance issues. Points made by NIOSH include: (1) improved bioassay compliance in response to the Tiger Team did not result in increased measured doses, (2) examination of NIOSH DCAS Claims Tracking System (NOCTS) claims confirmed that Pinellas monitored workers expected to have potential for internal exposure, (3) none of the interviewed workers knew of noncompliance issues, (4) workers with greater exposure potential were more compliant in following bioassay requirements than other workers, and (5) NIOSH applies the 95th percentile whole body dose (100 millirem) to unmonitored workers as a claimant-favorable approach. NIOSH committed to update the occupational internal dose TBD (ORAUT, 2016) to explain the approaches for determining internal tritium dose when needed for unmonitored personnel.
6 – "Radiological protection program commended by Tiger Team"	NIOSH concurs. No response required.
7 – "Bioassay sampling frequency requirements not followed as noted by Tiger Team"	NIOSH concurs and notes that (1) the Tiger Team finding was one of the bases for qualification of the SEC-00256 petition and (2) this observation relates to the discussion of observation 5.
8 – "Contamination controls found generally good by Tiger Team"	NIOSH concurs with the statement and notes that the Tiger Team characterization of "generally good" contamination controls applies in general to the plant. SC&A's comment also mentions a particular instance of surface contamination on a step-off pad and adjacent hallway. NIOSH does not believe that such occasional occurrences compromise reconstructing internal doses.
9 – "Bioassay sampling program implementation inadequacies noted by the Tiger Team"	NIOSH concurs and notes that this was one of the bases for qualifying the SEC-00256 petition and that this observation relates to the discussion of observation 5.
10 – "Tiger Team assessment of deficiency root causes: emphasis on production and mindset that Pinellas poses no unusual radiological risks"	NIOSH concurs with the cited Tiger Team statement. The Tiger Team assessment from the management assessment portion of the report mentions some management deficiencies that do not compromise NIOSH's ability to reconstruct doses.
11 – "Transition Year of 1990 after Tiger Team assessment led to overall reduced exposures" SC&A has not found any issues with exposure records that would compromise dose reconstruction feasibility for the SEC period 1957–1990, nor for the period 1991–1997.	NIOSH concurs. No response required.
12 – "ER is consistent with interview records"	NIOSH concurs. No response required.

Observation and elucidation	NIOSH response
13 – "Pinellas Plant diligent in following up on contamination-related incidents and personnel exposures" However, lack of bioassay records for 1988–1990 may imply that the program might not have identified all contamination incidents that might have affected internal exposures.	NIOSH has addressed the issue related to bioassay compliance in observations 5, 7, and 9 and concluded that there is no adverse impact to the feasibility of reconstructing internal dose.

6 Petitioner Material

SC&A's continuing review of the ER and attendant issues has been, in part, informed by the voluminous amount of material provided by the Pinellas Authorized Petitioner Representative (APR). Section 6 of SC&A's interim review report (SC&A, 2023a) discusses petitioner concerns through January 2023. Section 6.1 of the interim report summarizes concerns expressed in the SEC petition and identifies 12 general issues. Section 6.2 examines the nine issues NIOSH summarized from the petition in sections 7.4.1 through 7.4.9 of the ER to assess if the ER adequately addresses all the concerns. Section 6.3 examines additional petitioner concerns submitted following the December 2022 Board meeting.

In all, the APR submitted 7 documents in 2022, 42 in 2023, about 375 in 2024, and 3 (to date) in 2025. The 2024 submission includes over 350 documents submitted in 74 folders over a few days in August and September. Many of the submissions were accompanied by a letter from the APR and contain multiple excerpts from and/or full documents appended together within the same file. Many of the folders of the large submission in August and September are organized by subjects, such as:

- Pinellas contracts: 17 folders, 96 documents
- Plutonium: 9 folders, 56 documents
- Tritium: 4 folders, 28 documents
- Neutron generators: 2 folders, 12 documents

It should be noted that additional documents pertaining to the preceding subjects also appear in other, differently named folders.

In addition, SC&A assessed and addressed several issues raised by the APR, mostly related to plutonium, of particular concern to Board members. The following sections summarize these issues.

6.1 Heather project

The APR submitted several documents after the closing date (early 2023) of SC&A's interim review report related to the "Heather" project, which was not discussed in the report. SC&A reviewed all those APR materials and some additional materials that it found in the open literature. Although parts of the Heather project were classified, all the materials examined were

unclassified. It appears that the Heather project developed a glass component (sometimes referred to as a "helix" or "bent glass") as part of the tritium delivery system in a nuclear weapon.

The Pinellas newsletter, the *Headliner* (GEND, 1991b), devoted a special issue to Heather in 1991. Heather production began over 20 years before the date of the newsletter (dating the start as circa 1970) as part of the W68 Poseidon program (a submarine-launched nuclear ballistic missile). "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" (p. 1). Later, the Heather product was used on the W76 Trident program (another submarine-launched missile) and other systems. After the Heather program was almost cancelled, it was resurrected, and the process considerably improved and was ongoing at the time of the newsletter (1991). A later edition of the *Headliner* (Martin Marietta, 1994, p. 1) provides further information about the date of the Heather project by stating that neutron generator production is ending at Pinellas after about 38 years (dating the start at circa 1956), signaling welding of the last Heather MC3321A cap assemblies.

In addition to reviewing the documents submitted by the APR, SC&A also examined other materials, including any references to Heather in the NIOSH project documents. Table A2-2 of the ER, "Supporting Documents for SEC-00256 Provided Post-Qualification," refers to documents that NIOSH examined related to the Heather program. ER Attachment 2, "Review of Petitioner-Provided Documentation," 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. [NIOSH, 2021, p. 126]

SC&A concludes that none of the NIOSH Pinellas documents, such as the ER or TBDs, exclude from the plant's health physics programs any of the areas where there was a potential for personnel exposure to radiation. 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.

6.2 Bioassays

The Board expressed interest in how many plutonium bioassays were performed and whether any were "positive." General Electric Neutron Devices (GEND) 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, GEND (1988, PDF pp. 16–20) and GEND (1991a, PDF pp. 9–11, 24, 29, 30, 35) contain 45 1987, 1989, and 1990 plutonium bioassay results. A few of the bioassay results were invalid and repeated later. 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. [NIOSH, 2021, p. 32]

The ER also states:

> 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. An internal dosimetry practices document from 1983 states that "No leakage [of the $^{238}PuO_2$ heat sources] has occurred during the eight years that those sources have been used at the site…" . . . . Workers assigned to the RTG project, working with the RTG sources, submitted annual samples while assigned to the work . . . , and NIOSH has access to the bioassay results as discussed in Section 5.2.2. [of the NIOSH ER which] concludes plutonium was not available in the work area for inhalation or ingestion by workers. The ABRWH Pinellas Plant Work Group concluded that they do 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. [NIOSH, 2021, p. 63]

6.3 Air monitors

The Board inquired whether there were plutonium air monitors in plant, especially in the 100 and 400 areas. SC&A concluded that there were air monitors in several locations in the plant, which sampled for potential plutonium contamination. For example, a Pinellas report (GEND, 1982, PDF pp. 53–56) describes the air monitoring system in Building 400, which included monitoring for plutonium; the Site Research Database (SRDB) file "Air Sample Data" (1977) presents 42 sample results for 1976–1977; and GEND (1987) presents air monitoring characterization in 1987, gives the locations of monitors/filters, and includes maps. SC&A hasn't seen any documentation to indicate that plutonium was ever present in Building 100.

6.4 RTG models

SC&A examined a few dozen documents provided by the APR, NIOSH documents, and other primary sources of information to attempt to determine the number of different RTG models produced at Pinellas. None of these answer the question directly. The Pinellas site description TBD (ORAUT, 2011) states: "RTG production took place in Building 400 at the Pinellas Plant from late 1975 through 1990" (p. 21). Also:

> Two different heat sources were used in the RTG units. One contained 8.75 g of plutonium dioxide and the other contained 10 g. The configuration of both types of heat sources is the same; both were triple encapsulated. [p. 21]

The occupational external dose TBD (ORAUT, 2017) repeats this information. Both TBDs reference General Electric (GEND, 1982) as evidence. However, although there were two different heat sources, it does not necessarily follow that there were also two different models of RTGs produced by Pinellas.

SC&A consulted a series of what it considers primary references, such as progress reports and other documents issued by Los Alamos National Laboratory (LANL) on the lab's Milliwatt Generator Project, which began in 1986 and ran for about 10 years. SC&A believes that three different plutonium heat sources, models MC2893, MC2893A, and MC3559, powered three different RTG models, MC2730, MC2730A, and MC3500. SC&A concludes that for the purpose of assessing the ER and underlying dose reconstruction methodology, there is no material distinction between the models with and without the "A" suffixes; perhaps the ones with "A" had some internal improvement or other modifications over the ones without "A.". The heat sources produced either 4.0-watt or 4.5-watt thermal power; as stated in the LANL Nuclear Materials Technology Division's *Actinide Research Quarterly*: "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" (LANL, 1994, p. 3). In any event, SC&A believes that the number of different RTG models, whether two or three, is only of academic interest and not relevant to dose reconstruction.

Observation 17: Petitioner documents provide background information

SC&A examined all the documents submitted by the Pinellas Authorized Petitioner Representative. The general impression is that many of them are either nontechnical, do not contain new and relevant information related to dose reconstruction at Pinellas and assessment of the ER, or are duplicates or repetitious. However, some of them give a deeper background understanding of activities at the plant, which can help interpret and clarify other documents and dose reconstruction guidance. SC&A is continuing to look deeper into some of the documents but has not yet identified any that suggest that doses cannot be bounded by the information available to NIOSH for dose reconstruction.

7 References

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