NIOSH Response to "Weight of Evidence for SEC Petition 256, Pinellas Plant Special Exposure Cohort Class"

Response Paper

National Institute for Occupational Safety and Health

March 25, 2026

Joseph Guido, CHP
Pat McCloskey, CHP, CIH
Oak Ridge Associated Universities Team

Reviewed by Madeline Cook
Brant Ulsh, Ph.D., CHP
Division of Compensation Analysis and Support

INTRODUCTION

In correspondence addressed to the Advisory Board on Radiation and Worker Health (ABRWH), dated January 14, 2026, the [redacted] transmitted a document titled "Weight of Evidence for SEC Petition 256, Pinellas Plant Special Exposure Cohort Class" [redacted 2026]. [Redacted] [2026] requested the Advisory Board consider additional radiological sources at the Pinellas Plant other than just exposures to tritium. The requested exposures for consideration included unencapsulated plutonium-239 (Pu-239), limited exposures to plutonium-238 (Pu-238), exposures to uranium compounds, possible exposures to both thorium and americium, and to special tritium compounds. Acknowledging it was possible some were check sources and sources used for laboratory work, [redacted] [2026] included a list of additional radionuclides that [redacted] research showed were on inventory at the Pinellas Plant, but did not include information regarding form, quantity, activity, or monitoring. [Redacted] [2026] requests the Advisory Board consider the weight of evidence, public policy, and the time the petition has been under evaluation in their decisions and designate a special exposure cohort for Pinellas Plant workers for 1957 through 1997 (plant closure).

The [redacted] acknowledges tritium was the primary radionuclide of concern throughout the operation of the Pinellas Plant. The following sections identify the additional radiological sources and details of some Pinellas Plant processes that [redacted] [2026] asserted show a "lack of documentation needed to verify whether some source terms can be properly characterized" [PDF p. 3]. At the end of each section, NIOSH provides detailed responses to the issues presented in [redacted] [2026].

PLUTONIUM-238

Pu-238 Assertion 1

Regarding Pu-238 shipments, [redacted] [2026] states the following:

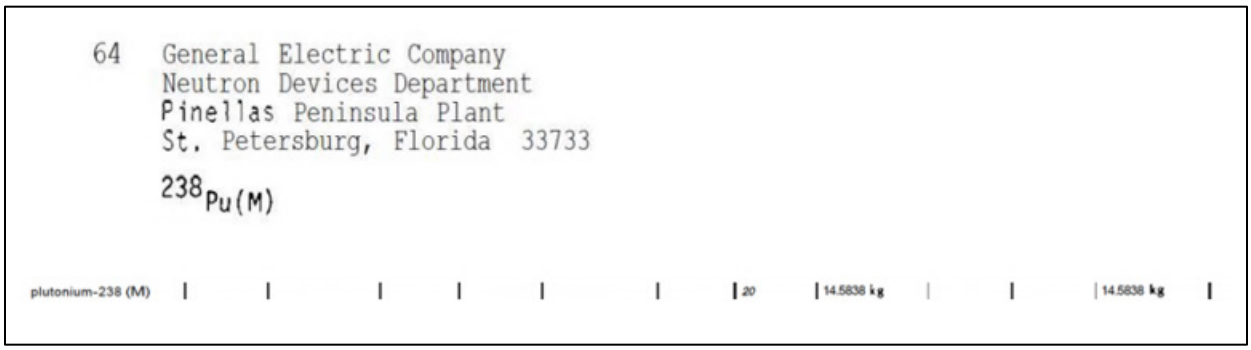
> *However, two unaccounted shipments of Pu-238, totaling 91.4938 kg, were shipped from Mound to Pinellas Plant. Pinellas Plant has no record of these shipments, nor does it identify any projects or work for which it was used. What were those shipments used for? Why is there no accountability for that material?* [PDF p. 3]

91 General Electric Company
Neutron Devices Department
Pinellas Peninsula Plant
St. Petersburg, FL 33733

$^{3}H(M)$, $^{238}Pu(M)$

Plutonium-238(M)	-			39	76.91 kg	39	76.91 kg

Figure 1. FY1977 Shipments of Pu-238 [Simmons 1978, PDF pp. 16, 45; [redacted] 2026, PDF p. 3]



64 General Electric Company
Neutron Devices Department
Pinellas Peninsula Plant
St. Petersburg, Florida 33733

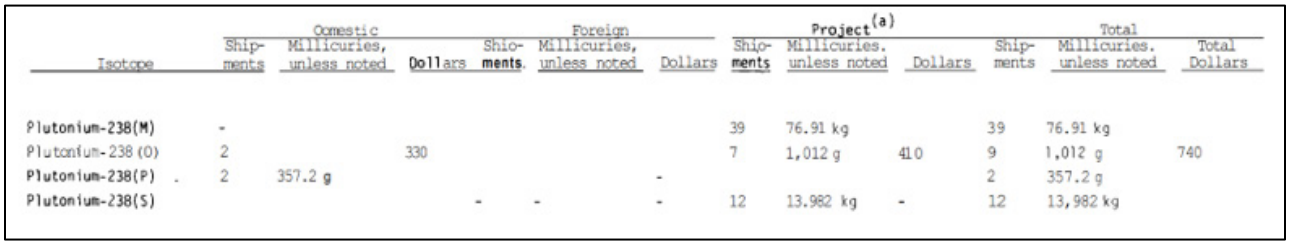
$^{238}Pu(M)$

plutonium-238 (M)							20	14.5838 kg			14.5838 kg	

Figure 2. FY1978 Shipments of Pu-238 [Burlison and Laidler 1979, PDF pp. 16, 50; [redacted] 2026, PDF p. 4]

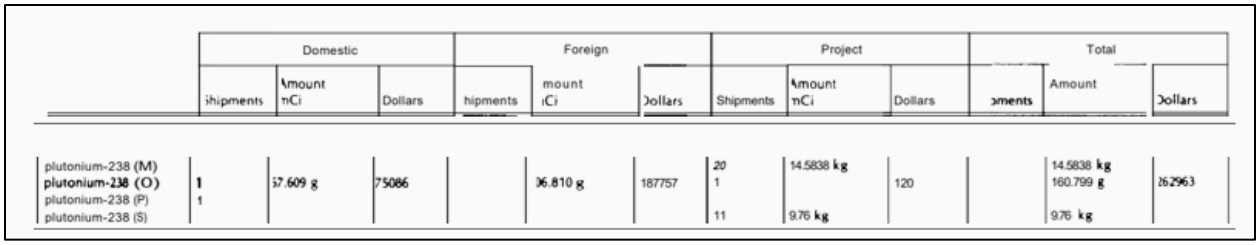
NIOSH Response to Pu-238 Assertion 1

The stated quantity of 91.4938 kg represents an erroneous interpretation of the referenced FY1977 and FY1978 radioisotope shipment source documents [Simmons 1978; Burlison and Laidler 1979]. While the line items representing the shipment of Pu-238 for both FY1977 and FY1978 (76.91 kg and 14.5383) provided in [redacted] [2026] (Figures 1 and 2 above) are accurate, the headers for each table were omitted. The complete table entries, including the headers, are reproduced in Figures 3 and 4 below.



Isotope	Domestic Shipments	Domestic Millicuries, unless noted	Domestic Dollars	Foreign Shipments	Foreign Millicuries, unless noted	Foreign Dollars	Project[a] Shipments	Project[a] Millicuries, unless noted	Project[a] Dollars	Total Shipments	Total Millicuries, unless noted	Total Dollars
Plutonium-238(M)	-						39	76.91 kg		39	76.91 kg	
Plutonium-238(O)	2		330				7	1,012 g	410	9	1,012 g	740
Plutonium-238(P)	2	357.2 g				-				2	357.2 g	
Plutonium-238(S)				-	-	-	12	13.982 kg	-	12	13,982 kg	

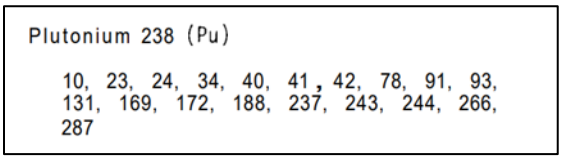
Figure 3. FY1977 Shipments of Pu-238 [Simmons 1978, PDF p. 45]



	Domestic			Foreign			Project			Total		
	Shipments	Amount nCi	Dollars	hipments	mount iCi	Dollars	Shipments	Amount nCi	Dollars	oments	Amount	Dollars
plutonium-238 (M)							20	14.5838 kg			14.5838 kg	
plutonium-238 (O)	1	37.609 g	75086		36.810 g	187757	1		120		160.799 g	262963
plutonium-238 (P)	1											
plutonium-238 (S)							11	9.76 kg			9.76 kg	

Figure 4. FY1978 Shipments of Pu-238 [Burlison and Laidler 1979, PDF p. 50]

Given the additional context of the table headers, the 76.91 kg (FY1977) and 14.5838 kg (FY1978) figures are not specific to Pinellas. They instead represent the total quantities of Pu-238 shipped from Mound (M) to all customers across 39 and 20 individual shipments during Fiscal Year 1977 and 1978, respectively [Simmons 1978; Burlison and Laidler 1979]. Both shipment reports include an alphabetical list of isotopes cross-referenced to customer numbers, thus providing a list of facilities associated with each isotope shipment. The entries for FY1977 and FY1978 are shown in Figures 5 and 6 below.

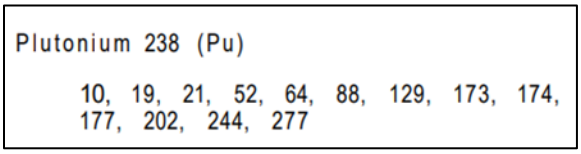


Plutonium 238 (Pu)

10, 23, 24, 34, 40, 41, 42, 78, 91, 93, 131, 169, 172, 188, 237, 243, 244, 266, 287

Figure 5. FY1977 Recipients of Pu-238 [Simmons 1978, PDF p. 35]

With Pinellas denoted as customer 91 during FY1977, Figure 5 shows that it was one of 19 different facilities to receive Pu-238 shipments during that fiscal year.



Plutonium 238 (Pu)

10, 19, 21, 52, 64, 88, 129, 173, 174, 177, 202, 244, 277

Figure 6. FY1978 Recipients of Pu-238 [Burlison and Laidler 1979, PDF p. 40]

With Pinellas denoted as customer 64 during FY1978, Figure 6 shows that it was one of 13 different facilities to receive Pu-238 shipments during that fiscal year.

In reviewing the reference documents in their entirety, no evidence was found to support the assertion that "two unaccounted shipments of Pu-238, totaling 91.4938 kg, were shipped from Mound to Pinellas Plant" [redacted 2026, PDF p. 3].

Additionally, the use of Pu-238 at the Pinellas plant in the manufacture of radioisotope-powered thermoelectric generators (RTGs) is undisputed. It is described in the Pinellas Plant Site Description, ORAUT-TKBS-0029-2 [ORAUT 2011, PDF pp. 21–23] and the SEC-00256 Evaluation Report [NIOSH 2021, PDF pp. 34–35]. The ABRWH Pinellas Plant Work Group concluded they do not consider the potential for personnel internal dose from activities involving plutonium to be credible [NIOSH 2016a, PDF pp. 22–23]. Lacking new information to the contrary, NIOSH concurs with this conclusion.

Pu-238 Assertion 2

Regarding Pu-238 shipments in 5-gallon buckets, [redacted] [2026] states the following:

> *A former worker contends that Mound shipped Pu-238O_2* [plutonium oxide] *in powder form in sealed containers but opened by Pinellas Plant staff and converted to ceramic form. This was his comment obtained during interview: "Some Pu-238 was shipped to Pinellas in powder form and the material was processed into a ceramic form for use in NASA's radioisotope power system. They did like the Cassini Space Project and all these things. So, the secure transport would back up a truck and they would unload these 5 gallon buckets of Pu-238. I [redacted].* [PDF p. 4]

NIOSH Response to Pu-238 Assertion 2

On February 19, 2026, NIOSH requested a copy of the complete interview with the worker who provided this information; however, the document author declined to provide any additional information. Given the information provided, NIOSH is unable to evaluate the former worker's comments in [redacted] [2026]. The Safety Analysis Reports associated with the RTG work [Holliday 1978; GE 1982; Roeder 1982; Burkhart 1988; MMSC 1993a] indicate the heat sources were sealed (i.e., triple encapsulated).

The Health Physics Operating Procedure for the receipt of heat sources describes the survey process performed during receipt and indicates alpha surveys were performed [Holliday 1976, PDF p. 8]. The 1993 *Building 400 Safety Analysis Report* indicated facility surveys detected no radioactive contamination [Pharo 1993, PDF p. 2]. NIOSH evaluated the potential for plutonium exposure in the SEC-00256 SEC Evaluation Report and concluded plutonium was not available in the work area for inhalation or ingestion by workers [NIOSH 2021, PDF p. 63].

PLUTONIUM-239

Pu-239 Assertion 1

Regarding 1976 Mound shipments, [redacted][2026] states the following:

> *In 1976 Mound shipped Pu-239, totaling almost 1 kg, to the Pinellas Plant though Pinellas Plant has no record of this shipment, nor does it identify any project or work for*

which it was used. What was this plutonium used for? Were there other shipments for which we have not yet found records? [PDF p. 4]

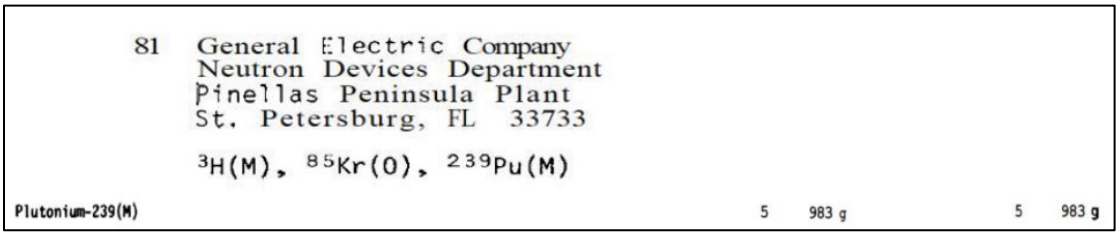
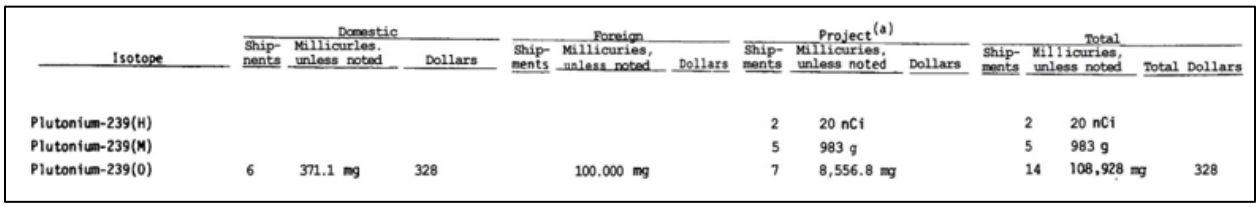


Figure 7. FY1976 Recipients of Pu-239 [Simmons 1977, PDF p. 14, 38 [redacted] 2026 PDF p. 4]

NIOSH Response to Pu-239 Assertion 1

Similarly to the Pu-238 Assertion 1 discussed above, the stated quantity of almost 1 kg represents an erroneous interpretation of the referenced FY1976 radioisotope shipment source document [Simmons 1977]. While the line item representing shipments of Pu-239 for FY1976 is accurate, [redacted] [2026] Figure 7 excludes the table header. The applicable table entries with the header are reproduced below as Figures 8 and 9. With the inclusion of the header, it is apparent these quantities represent the total quantity of Pu-239 shipped from Mound in FY1976 to **all** recipients, not just Pinellas.



Isotope	Domestic			Foreign			Project(a)			Total			
	Shipments	Millicuries, unless noted	Dollars	Shipments	Millicuries, unless noted	Dollars	Shipments	Millicuries, unless noted	Dollars	Shipments	Millicuries, unless noted	Total Dollars	
Plutonium-239(H)							2	20 nCi		2	20 nCi		
Plutonium-239(M)							5	983 g		5	983 g		
Plutonium-239(0)	6	371.1 mg	328		100.000 mg		7	8,556.8 mg		14	108,928 mg		328

Figure 8. FY1976 Shipments of Pu-239 [Simmons 1977, PDF p. 38]

The shipment report includes an alphabetical list of isotopes cross-referenced to customer numbers, thus providing a list of facilities associated with each isotope shipment. The entries for FY1976 are shown in Figure 9 below.

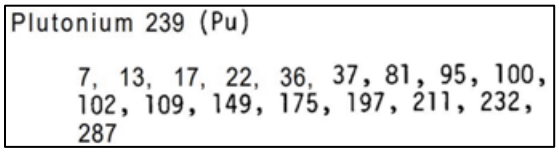


Figure 9. FY1976 Recipients of Pu-239 [Simmons 1977, PDF p. 30]

During FY1976, Pinellas was customer 81. Considering both Figures 8 and 9, the correct interpretation is that five (5) shipments in total containing 983 grams of Pu-239 were sent to as many as 17 facilities in FY1976.

A Pu-239 neutron source is included on a Pinellas Plant Radioactive Source Historical Inventory/Status list with the corresponding date of November 1976. It is noted as sealed with an indicated use of "neutron source" [MMSC 1993b, PDF p. 194]. This list is shown in Figure 14 below.

Pu-239 Assertion 2

Regarding Pu-239 and a plutonium-beryllium (Pu-Be) source, [redacted] [2026] states the following:

> *Further, there is no documentation of a Pu-Be source being used at Pinellas Plant. There is no information on safety protocols used to dispose of the Pu-Be heat source in a safe manner.* [PDF p. 4]

NIOSH Response to Pu-239 Assertion 2

Shipping and disposal records show the presence of Pu-Be neutron sources at the Pinellas Plant [Pinellas Plant 1961–1990, PDF pp. 5–31, 45–48]. See "NIOSH Response to Pu-239 Assertion 3."

Pu-239 Assertion 3

Regarding plutonium bioassay for one individual and a document NIOSH has used as support that has presumed credibility issues, [redacted] [2026] states the following:

> *Interestingly in that same year of the unexplained shipment of Pu-239, [redacted] an individual who worked with [redacted] in [redacted] was found to have a [redacted] about [redacted] times higher than the minimum detectable level (MDL). There is no recorded exposure to Pu-238. That individual only worked at Pinellas Plant according to plant records so the bioassay result could not have resulted from previous employment.[4] According to NIOSH: "The data discussed herein, does not include the Pu bioassay taken in 1975. This bioassay predates the RTG program and were collected during a period when there was no Pu source term present at Pinellas."[5] This assumption is not credible:*
>
> *"According to information provided by personnel of Security & Safeguards, the first receipt of plutonium at the Pinellas Plant was on January 18, 1957, when a 7-gram Pu-239 source was received to calibrate Health Physics monitoring equipment. Based on the available information regarding this source and its use, it was most likely an encapsulated plutonium-beryllium (Pu-Be) neutron source." [First plutonium delivered, no date, PDF]. This document, in and of itself, has multiple credibility issues:*

- *There is no author, identifying marks or date that can be used to determine the authenticity of this document.*
- *There is no additional and/or supporting documentation of the actual shipment to verify its quantity or use.*
- *There is no documentation to support assumption that this heat source was used as a Pu-Be calibration source.*
- *There is no information on safety protocols used to dispose of the Pu-Be heat source in a safe manner.*
- *It is unlikely that an encapsulated Pu-239 calibration source would result in a positive bioassay, there had to be another source of Pu-239 at Pinellas Plant.*
- *A review of shipping transactions from a variety of plutonium producers notes a distinction between a shipment of Pu-238 and a shipment of Pu-238 oxide (encapsulated). The same would apply to shipments of Pu-239. If the entry does not identify the as a mixture or particular source Pu-Be then it is unlikely to be anything other than Pu-239.* [PDF pp. 4-5]

NIOSH Response to Pu-239 Assertion 3

Regarding the authenticity of the documentation of the 7-gram Pu-239 source received on January 18, 1957, the single-page excerpt [First plutonium delivered on-site, no date] is included in a larger document [MMSC 1993b, PDF p. 158]. The source document is a compendium of information submitted to the Department of Energy (DOE) Field Office on November 30, 1993.

The September 1957 *Health Physics Status Report* contains the following statement further supporting the identity of the 1957 Pu-239 shipment:

> *2. A Pu-Be fast neutron source has been received for calibration purposes. In view of the hazardous conditions which could develop if the source container failed, Health Physics will routinely survey the source for leakage.* [Pinellas Plant 1957–1990, PDF p. 7]

Shipping documents identify a Pu-Be (Pu-239) neutron source containing 7.02 grams of plutonium and noted a source sealed date of "about 1958" [Pinellas Plant 1961–1990, PDF pp. 45–48].

Regarding the [redacted] [2026] statement, "an individual who worked with [redacted] in [redacted] was found to have a [redacted] uptake about [redacted] times higher than the minimum detectable level (MDL)," while the sample Pu-239 result is [redacted] minimum detectable activity, this does not indicate there was an uptake of plutonium at the Pinellas Plan. The sample in question was a "preoperational" sample [Pinellas Plant 1957–2004, PDF p. 475] and had a non-detectable Pu-238 result. The plutonium material used at Pinellas would have had a Pu-238/Pu-239 ratio of 822:1, and as such, a positive Pu-239 sample result would be expected to have a corresponding positive Pu-238 result. Since the sample cited in [redacted] [2026] was

both preoperational and did not exhibit the expected Pu-238/Pu-239 isotopic ratio, the sample is not considered indicative of an "uptake" of plutonium at the Pinellas Plant. The use of the Pu-238/Pu-239 ratio and consideration of preoperational samples were discussed at the November 12, 2012, Pinellas Work Group meeting [NIOSH 2012, PDF pp. 61–62].

More generally, through extensive evaluation of available site information, NIOSH concluded plutonium was not available in the work area for inhalation or ingestion by workers. This conclusion is documented in both the SEC-00256 Evaluation Report [NIOSH 2021] and in Pinellas Plant Site Description, ORAUT-TKBS-0029-2 [ORAUT 2011]. The ABRWH Pinellas Plant Work Group concluded there were no credible potential internal worker doses from plutonium activities [NIOSH 2016a, PDF pp. 22–23]. Lacking new information to the contrary, NIOSH concurs with this conclusion.

At the request of the Advisory Board, SC&A recently evaluated the potential for plutonium exposure at the Pinellas Plant. Their evaluation, *Supplemental SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256: Pinellas Plant* [SC&A 2025], was presented at the January 29, 2026, Pinellas Working Group meeting [NIOSH 2026] at which time SC&A presented the following conclusions:

- *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*. [SC&A 2026, PDF p. 9]

Pu-239 Assertion 4

Regarding the Temporary Plant, [redacted] [2026] states the following:

> *According to DOE Scientific and Technical Information (OSTI), the Temporary Plant was originally operated for the Department of Energy (DOE) by a division of GE Aerospace and GE Neutron Devices (GEND). This would account for RTG work being conducted at this facility prior to 1975.*[6] [PDF p. 5]

NIOSH Response to Pu-239 Assertion 4

The Temporary Plant is not a covered facility under the Energy Employee Occupational Illness Compensation Program Act [NIOSH 2021]. Additionally, NIOSH has found no evidence to support that RTG work occurred at the Pinellas Plant prior to 1975.

Pu-239 Assertion 5

Regarding 1976 Pu-239 soil sampling results, [redacted] [2026] states the following:

> *In 1976, Pinellas Plant staff reported positive results of Pu-239 in soil for both on-site and off-site sampling. NIOSH has provided no documentation or data to back up the assertion positive results are attributable to global fallout.* [PDF p. 5]

ENVIRONMENTAL MONITORING DATA FOR RADIOACTIVE MATERIALS

TABLE 5-2 SUMMARY OF SOIL MONITORING FOR PLUTONIUM (E-9 μCi/gm)

YEAR	Pu-238		Pu-239	
	ON-SITE	OFF-SITE	ON-SITE	OFF-SITE
1976	< 2.1	< 1.9	4.0	6.8
1977	< 3.9	< 7.1	< 9.6	<12.4
1978	<12.5	<14.7	<17.9	<31.5
1979		N/A		N/A
1980	4.1	3.8	9.4	9.6
1981	BMDL (1.4 - 6.6)		BMDL (1.8 - 5.4)	
1982	BMDL (0.5 - 1.0)		5.7	4.0
1983	BMDL (0.7 - 2.2)		BMDL (0.7 - 2.2)	
1984	BMDL (1.5 -41)		BMDL (1.5 -41)	
1985	BMDL (0.49- 1.1)		BMDL (0.49- 1.1)	
1986	BMDL (0.38- 5.1)		BMDL (0.38- 5.1)	
1987	BMDL (0.72- 1.2)		BMDL (0.72- 1.2)	
1988	N/A		BMDL (0.24- 2.5)	
1989	N/A		BMDL (0.85- 3.2)	
1990	N/A		BMDL (0.48- 1.9)	
1991	N/A		N/A	
1992	BMDL (0.675-3.72)		BMDL (0.662-4.72)	

Sources: General Electric Company Neutron Devices Department. Pinellas Plant Environmental Monitoring Report, 1976 – 1990.
Martin Marietta Specialty Components, Inc. Pinellas Plant Annual Site Environmental Reports for Calendar Year 1991 – 1992.

Figure 10. Table Captured from Pinellas Plant Feasibility Study [State of Florida 1994, PDF p. 51; [redacted] 2026, PDF p. 6]

NIOSH Response to Pu-239 Assertion 5

NIOSH has evaluated all available environmental monitoring data (including the information provided) in the SEC-00256 Pinellas Evaluation Report and concluded there is no evidence of plutonium releases reported at the Pinellas Plant [NIOSH 2021, PDF p. 58]. The State of Florida was responsible for overseeing the Pinellas Plant and publishing annual reports of its environmental radiological measurements, beginning in the early 1990s. The State of Florida made the following notation regarding plutonium at the Pinellas Plant: "there is no credible source term for plutonium release to the environment" [State of Florida 1992, PDF p. 4].

At the request of the Advisory Board, SC&A recently evaluated the potential for plutonium exposure at the Pinellas Plant. Their evaluation, *Supplemental SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256: Pinellas Plant* [SC&A 2025], was presented at the

January 29, 2026, Pinellas Working Group meeting [NIOSH 2026] at which time SC&A presented the following conclusions:

- *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.* [SC&A 2026, PDF p. 9]

Pu-239 Assertion 6

Regarding 1977 Pu-239 water sample results, [redacted] [2026] states the following:

> *Further, in 1977 Pinellas Plant staff found positive Pu-239 at twice the MDL in water samples. While there was likely still some airborne plutonium remaining from above ground testing, a concentration of 2.9 microcuries per milliliter (μCi/mL) is a high level of radioactivity in water that is highly unlikely to be caused by typical environmental fallout. The maximum concentrations observed in water from extensive fallout events are many orders of magnitude lower.* [PDF p. 6]

TABLE 5-4 SUMMARY OF WATER MONITORING FOR PLUTONIUM (E-11 μCi/ml)

YEAR	Pu-238	Pu-239
1976	ALL BMDL (0.6-9.7)	
1977	BMDL (0.7-1.5)	2.9
1978	BMDL (0.6-0.7)	BMDL(0.49-0.6)

Sources: General Electric Company Neutron Devices Department. Pinellas Plant Environmental Monitoring Report, 1976 -- 1978.

Figure 11. Table captured from *Pinellas Plant Feasibility Study* [State of Florida 1994, PDF p. 55; [redacted] 2026, PDF p. 6]

NIOSH Response to Pu-239 Assertion 6

The summary of water monitoring for plutonium (Figure 11) included in [redacted] [2026] is from *Pinellas Plant Feasibility Study - Final Report* [State of Florida 1994, PDF p. 55]. The 2.9 result, in the context of the scientific notation in the heading of the table, represents 2.9 x $\mathbf{10^{-11}}$ microcuries/ml, not "2.9 microcuries per milliliter" [redacted 2026, PDF p. 6]. See "NIOSH Response to Pu-239 Assertion 5" for additional discussion on the potential for plutonium emissions from the Pinellas Site.

Pu-239 Assertion 7

Regarding DOE Health and Mortality studies, [redacted] [2026] states the following:

> *ORISE in its DOE Health and Mortality Studies, >5 REM Study listed Pinellas Plant as a concern for plutonium. That work is a retrospective cohort mortality and morbidity study of all workers throughout the United States who received at least 5 rem of penetrating ionizing radiation during one calendar year before 1979 while employed at DOE nuclear facilities or the U.S. Navy's Nuclear Reactor Propulsion Plants. The registry of 5 rem workers was assembled between 1979 and 1982 in response to Congressional concern about the long-term health effects on DOE and predecessor agency workers of exceeding the 5 rem occupational radiation standard for external radiation.* [PDF p. 6]

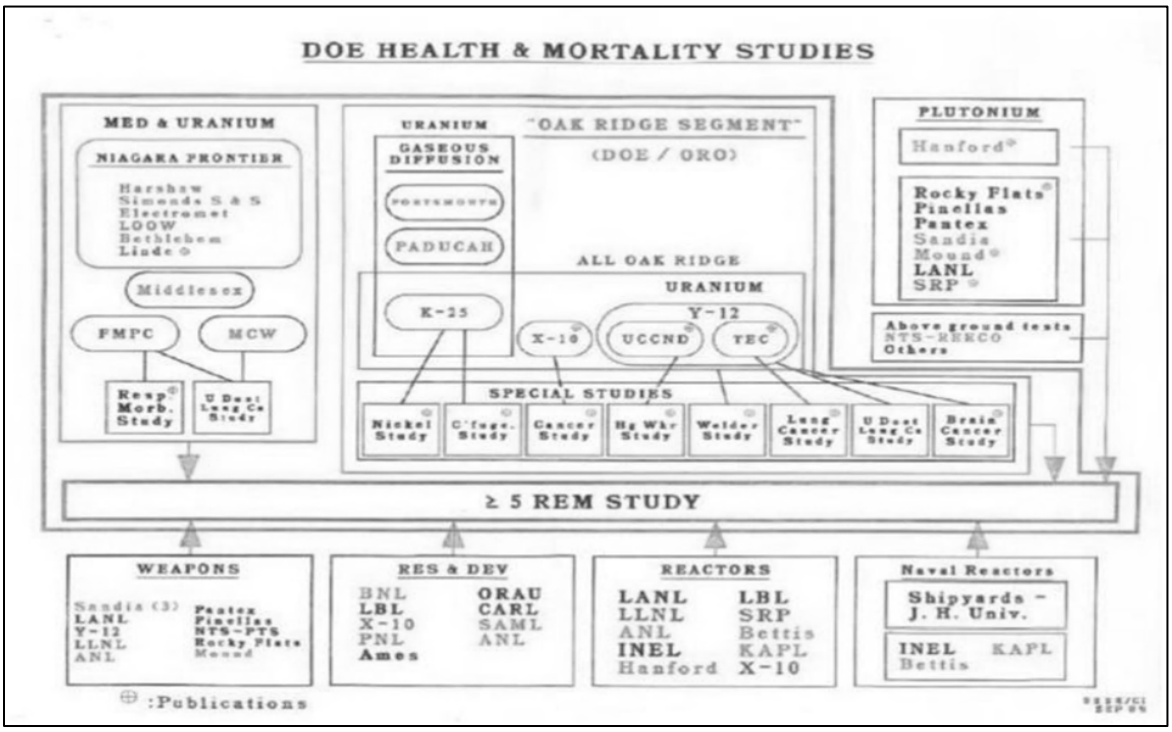


Figure 12. Organizational Overview of DOE Health & Mortality Studies [redacted 2026, PDF p. 7]

NIOSH Response to Pu-239 Assertion 7

[Redacted] [2026] referenced Figure 12 above titled "DOE Health and Mortality Studies." The original version is from a 1982 publication [Lushbaugh 1982, PDF p. 16] and provides an organizational summary for planned DOE epidemiological studies. DOE sites where plutonium was present, including Pinellas, appear to be included in the initial planning stages of a plutonium worker study. However, one year after the publication of the figure above, a study update was published, which included six DOE sites but notably did not include Pinellas. The facilities in the plutonium exposure study included Los Alamos National Laboratory, the Rocky Flats Plant, Mound Laboratories, and the Savannah River Plant. A small number of workers exposed to plutonium at Hanford and Oak Ridge were also included in the study [Voelz et al. 1983, PDF p. 3].

URANIUM/HEATHER PROJECT

HEATHER Project Assertion 1

[Redacted] [2026] provides a history of the HEATHER/HELIX system in Building 300 before stating the following regarding a lack of protective equipment:

> *HEATHER (HELIX) was produced from borosilicate glass doped with triuranium octoxide, U_3O_8 (AKA Yellowcake) according to [redacted], Pinellas Plant Health Physicist. Borosilicate glass was doped with U_3O_8 using special hydrogen blow torches at Pinellas Plant. Once borosilicate glass was doped it was formed into glass tubing and then cut with a lathe to meet length requirements necessary to act as a funnel for tritium discharges for the HEATHER system. Former employees assigned to Building 300 HEATHER/HELIX confirm they did not wear any monitoring devices or PPE* [personal protective equipment]. *Glass blowers clearly stated that they used uranium powder to dope borosilicate glass. They also were responsible for blowing helix.*[9] *The following photo provides evidence of employee doping uranium glass in Building 300 and clearly shows employee not wearing any protective equipment to prevent exposure to U_3O_8.* [PDF p. 8]

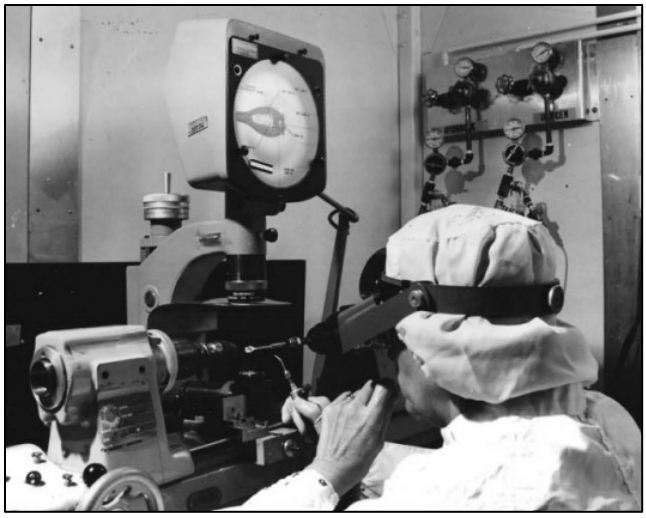


Figure 13. Laboratory Worker Operating Optical Comparator [redacted 2026, PDF p. 9]

NIOSH Response to HEATHER Project Assertion 1

It is not evident how the photo (Figure 13) included in [redacted] [2026] demonstrates the addition of uranium oxide by a glass blower. Additional information about the origin of the photo and a description of what is depicted is necessary to evaluate this assertion. On February 19, 2026, NIOSH requested clarification from the document author; however, the response provided did not identify the original source document or additional information to support this assertion.

NIOSH reviewed Pinellas Plant records and found no evidence of glass being doped with uranium on-site.

HEATHER Project Assertion 2

Regarding U_3O_8 storage, [redacted] [2026] states the following:

> *There is no available data regarding how U_3O_8 was stored. Was it stored as a powder? Why is U_3O_8 not identified as an isotope of concern in Building 100, Area 110 nor HEATHER facilities?*
>
> *[Redacted] provided the following about U_3O_8:*
>
> - *Stated that better monitoring must be implemented for U_3O_8.*
> - *Suggested the implementation of extremity dosimeters including the use of finger rings.*
> - *Stated U_3O_8 was stored in Building 100, Area 110 though there is no available documentation identifying U_3O_8 as being stored in Building 100.*

- *[redacted] reported there were no shipping labels on incoming boxes of U_3O_8.* [PDF p. 9]

NIOSH Response to HEATHER Project Assertion 2

The Pinellas Plant used borosilicate glass doped with natural uranium; however, the uranium would have been encapsulated in the glass at the manufacturer before it arrived at the Pinellas Plant. Therefore, the glass was considered a sealed source on arrival and posed little to no internal radiation dose hazard [NIOSH 2021, PDF p. 37].

Processing uranium-doped borosilicate glass at the Pinellas Plant involved cutting and chemical etching. Pinellas assessed worker exposures during these activities and determined worst-case exposures would result in maximum whole-body doses of 15 mrem/year [Pinellas Plant 1992-1994, PDF p. 2].

HEATHER Project Assertion 3

Regarding monitoring data and dosimetry records for workers assigned to HEATHER, [redacted] [2026] states the following:

> *Monitoring data for uranium is non-existent. Otherwise, why would [redacted]10 advocate the improvement update of inadequate radiation operations at the Pinellas Plant facility? A review of occupational histories and Department of Labor claimant files reveal that former Pinellas Plant workers assigned to HEATHER have no dosimetry records in their claimant files. There is a high level of uncertainty regarding the amount of uranium at the site. There is no information available to estimate the quantity of uranium*. [PDF p. 9]

NIOSH Response to HEATHER Project Assertion 3

NIOSH has evaluated the exposure hazard from borosilicate glass in the SEC-00256 Evaluation Report [NIOSH 2021] and found it presented little to no internal dose hazard. See "NIOSH Response to HEATHER Project Assertion 2" above.

THORIUM

Thorium Assertion 1

Regarding thorium monitoring, [redacted] [2026] states the following:

> *GE X-Ray Division pilot plant in Milwaukee, conducted research and development for the nuclear weapons program. GE X-Ray used X-ray principles and thorium, for nuclear weapons research and associated nuclear systems development. Specifically, the Milwaukee site was involved in developing processes like thoria densification and high-temperature calcination, using X-ray technology. This work occurred until 1966, when*

> *these activities and associated staff moved to Pinellas Plant to Building 100.[11] The DOL Site Exposure Matrix mentions Thorium Nitrate being used in Building 100/Area 155 (chemistry lab including the engineering chemistry lab).*
>
> *…There is no evidence of any type of monitoring of thorium and associated isotopes, nor is there available evidence regarding any incidents associated with thorium at Pinellas Plant. There in insufficient data and documentation to perform dose reconstructions for thorium starting in 1966*. [PDF p. 10]

NIOSH Response to Thorium Assertion 1

The full quote below from the website clarifies that the *tritium* work was relocated to the Pinellas Plant from the Milwaukee facility.

> *A GE spokesman said that in the years following World War II, this facility was part of a national project to develop neutron generators, which included a small, protected capsule of the radioactive element Tritium. When this project was scaled to full production in the mid-1960s, it was transferred from Milwaukee to a facility in Florida. The project was closed down some years later.* [Wall Street Journal 2014]

Low-level standards of thorium were used in some Pinellas laboratory areas [Lawhorn 1997, PDF p. 84]. Thorium nitrate is identified as a chemical used in Area 155A-D [Lockheed Martin 1997, PDF p. 64–65]. This area is identified as follows: "The chemistry laboratory activities included sample preparation (acid digestion/dilution) and analyses. The lab had an Inductive Coupled Plasma (ICP) unit for analyses of metals. Other equipment was used for titrations, gas chromatography, and atomic absorption spectrophotometry" [Lockheed Martin 1997, PDF p. 64]. NIOSH does not consider the use of thorium nitrate in an analytical chemistry laboratory to be a viable internal exposure pathway.

SPECIAL TRITIUM COMPOUNDS

Special Tritium Compounds Assertion 1

Regarding bounding doses, [redacted] [2026] states the following:

> *This report does not agree with the assertion that NIOSH can bound doses to unspecified organically bound tritium compounds and to scandium tritide, erbium tritide and titanium tritide using the assumptions and equations given in ORAUT-TKBS-0029-5 Rev. 03 Section 5.1.8.2. Further, NIOSH totally dismissed any dose from uranium tritide as they assert uranium tritide was enclosed in glass. The report shows how that assertion is questionable. What about dose from OBT compounds?* [PDF p. 11]

NIOSH Response to Special Tritium Compounds Assertion 1

Dose reconstruction methods for both organically bound tritium and metal tritides are contained in Section 5.8.1.1 of ORAUT-TKBS-0029-5 Pinellas Site Profile, *Pinellas Plant – Occupational Internal Dose* [ORAUT 2016]. Concurrence with the method used to reconstruct internal dose was received in August 2016 at the 112th Advisory Board meeting [NIOSH 2016b, PDF pp. 76–82].

Special Tritium Compounds Assertion 2

[Redacted] [2026] states the following:

> *There is also the question of whether all incidents involving special tritium compounds were identified and considered. As an example, this statement was given in the December 1959 Mound Laboratory Health Physics Report (Mound apparently provided some health physics support for PP in 1959):*[12]
>
> *"During this quarter, the salt recovery operation required very close survey. The processing of the titanium tritide materials of the Pinellas Plant has led to several contamination spread incidents. This material is very difficult to contain in the hood system."*
>
> *That statement refutes NIOSH assertions that titanium tritide was easily controlled.*
>
> *This report questions whether all special tritium compounds encountered at Pinellas Plant have been identified, whether each was included in the rationale presented for dose reconstruction but also would like independent verification of that rationale and equations.* [PDF p. 11]

NIOSH Response to Special Tritium Compounds Assertion 2

No credible evidence was provided to support that the cited "difficulty" at the Mound Plant would translate to an inability to reconstruct dose at the Pinellas Plant. NIOSH has access to extensive tritium bioassay and contamination survey data for the site.

AMERICIUM-241

Americium-241 List of TBD Assertions

Regarding a statement from ORAUT-TKBS-0029-6, Rev. 02 of the Pinellas Plant Occupational External Dose Technical Basis Document [ORAUT 2017], [redacted] [2026] states the following:

> *The following statement appears in ORAUT-TKBS-0029-6 Rev. 02 Pinellas Plant - Occupational External Dose: "In approximately 1988, the Pinellas Plant acquired a 10 Ci Am-241 source for unknown reasons." (page 11) However, in the next sentence the*

authors state: "The source was an encapsulated americium-beryllium (Am-Be) neutron source, which was likely used as a calibration source." The aforementioned information is attributed to an unknown author on an unknown date. Therefore, please address the following issues:

- *What is the basis of the authors' assumption that the 10 Ci Am-241 is associated with an encapsulated neutron source of americium and beryllium? If that was the case, then why would they first acknowledge that they did not know the purpose of the acquisition?*
- *There is no evidence to support the assertion that this isotope arrived as an encapsulated source.*
- *Sealed Am-241 sources are considered a risk primarily because their alpha particles, while stopped by the seal if indeed it was encapsulated, are extremely dangerous if inhaled or ingested. While the sealed source itself poses an internal hazard if breached, its alpha emission also presents a risk of lung cancer from inhaling dust, and its gamma emission can contribute to radiation exposure even when the source is intact.*
- *There is no evidence describing the process by which an Am-Be source is disposed, therefore one cannot assume it was safely disposed without supporting documentation.*
- *There is no evidence of any type of monitoring of americium at Pinellas Plant.* [PDF p. 12]

NIOSH Response to Americium-241 List of TBD Assertions

The reference (Figure 14) is an inventory report titled "Pinellas Plant Radioactive Source Historical Inventory/Status" and is part of a collection of information about the Pinellas Plant radionuclide inventory. The entry regarding the 10 Ci Am-241 source is highlighted in yellow in Figure 14, below. The source is listed as sealed "Am-241" with initial activity of "10 Ci," a date of "1988," and a listed use as "AmBe." It should be further noted that the State of Florida used this same inventory report in Appendix 3 of the Final Report of *Pinellas Plant Feasibility Study* [State of Florida 1994].

PINELLAS PLANT RADIOACTIVE SOURCE HISTORICAL INVENTORY/STATUS

Radion-uclide	Initial Activity/Date	Seal/ Unsealed	Uses	Status/Date	
Pu 238	1810 dpm/10/16/75	U	Alpha check source	Active/	10/91
Pu 238	10.26 Ci/08/17/89	S	Sealed heat source standard	Active/	10/91
Pu 238	3.42 Ci/08/17/89	S	Sealed heat source standard	Active/	10/91
Pu 239	1.7 Ci/08/14/62	S	Neutron source	Moved to another DOE site/	1990
Pu 239	0.43 Ci/11/76	S	Neutron source	Moved to another DOE site/	02/79
Am 241	.11 uCi/07/11/77	U	Alpha source	Active/	10/91
Am 241	500 uCi/06/11/68	U	Alpha source	Active/	10/91
Am 241	10 Ci/1988	S	AmBe	Inactive/being excessed	10/91
Am 241	50 mCi/11/71	U	Alpha source	Active/	10/91
Cm 244	4 mCi/02/13/80	S	Check source	Active/	10/91

Figure 14. Pinellas Plant Radioactive Source Historical Inventory/Status [Historical radionuclides and sources inventory, no date, PDF p. 11]

OTHER RADIONUCLIDES

Other Radionuclides Assertion 1

[Redacted] [2026] states the following:

> *The following additional radionuclides were on inventory at Pinellas Plant*[13] [specifies Department of Labor Site Exposure Matrix]. *It is possible some were check sources and sources used for laboratory work but there is no information on form, quantity, activity or monitoring for most.*
>
> - *Cf-252*
> - *C-14*
> - *Co-60*
> - *Cs-137 including irradiator*
> - *Kr-85*
> - *Ni-63*

NIOSH Response to Other Radionuclides Assertion 1

The SEC-00256 Evaluation Report [NIOSH 2021] assesses potential exposure to non-tritium radionuclides and finds no monitoring infeasibility.

CONCLUSION

NIOSH has reviewed the assertions presented in [redacted] [2026] regarding the SEC-00256 petition for the Pinellas Plant. There is no evidence to support the assertion that NIOSH is unable to bound radiation exposure for the listed radionuclides (including Pu-238, Pu-239, uranium (U_3O_8), thorium, americium-241, and special tritium compounds). Specifically:

- The assertions regarding unaccounted shipments of Pu-238 and Pu-239 were based on an erroneous reading of historical shipping documents. Total shipments from the Mound facility to all recipients were inaccurately attributed solely to the Pinellas Plant because table headers were excluded.
- The assertion about Pu-239 in water was based on an erroneous reading of the data. [redacted] [2026] did not account for a factor of 1E-11, listed in the table header, that is to be applied to all the tabulated data.
- NIOSH, along with the Advisory Board's Pinellas Plant Work Group and SC&A, has consistently concluded that the potential for personnel internal dose from plutonium is not credible [NIOSH 2016a, PDF pp. 22–23; SC&A 2026]. The evidence provided in [redacted] [2026] is not sufficient to contradict this conclusion.
- Extensive reviews of environmental sampling, air monitoring, and bioassays have shown no indication of occupational uptake, with environmental levels bounded by global nuclear fallout.
- NIOSH found no credible evidence that borosilicate glass was doped with uranium oxide onsite for the HEATHER project.
- Dose reconstruction methods for special tritium compounds (including organically bound tritium and metal tritides) have already been established and concurred with by the Advisory Board [NIOSH 2016a PDF pp. 113–114; NIOSH 2016b, PDF pp. 78–81.
- The presence of additional radiation sources in the form of calibration/check sources or laboratory analytical standards is not new or unevaluated information. They do not demonstrate an inability to reconstruct dose to Pinellas Plant workers.

NIOSH's review of *Weight of Evidence for SEC-00256, Pinellas Plant Special Exposure Cohort Class* [redacted 2026] is consistent with NIOSH's position that dose reconstruction for Pinellas Plant workers is feasible.

REFERENCES

Burkhart RA [1988]. Proposed increase in radiation dose rates from RTG heat sources. Correspondence (with attachments) to C. Laperle. Pinellas Plant, St. Petersburg, FL: GE Aerospace General Electric Company Neutron Devices. October 4. [SRDB Ref ID: 12185]

Burlison JS, Laidler RI [1979]. List of DOE radioisotope customers with summary of radioisotope shipments FY1978. Richland, WA: Pacific Northwest Laboratory. PNL-2930, May. [SRDB Ref ID: 77783]

[redacted] [2026]. Weight of evidence for special exposure cohort class white paper. Debary, FL. January 14. [SRDB Ref ID: 217257]

First plutonium delivered on-site [no date]. [SRDB Ref ID: 12022]

GE [1982]. Safety analysis report expansion of building 400 RTG facility. Pinellas Plant, St. Petersburg, FL: General Electric Company Neutron Devices Department. May. [SRDB Ref ID: 13264]

Historical radionuclides and sources inventory [no date]. [SRDB Ref ID: 12023]

Holliday JN [1976]. Radiation safety procedures – RTG 1976. Pinellas Plant, St. Petersburg, FL: General Electric Company Neutron Devices Department. May 24. [SRDB Ref ID: 15858]

Holliday JN [1978]. RTG assembly update of the Radioisotopic Thermoelectric Generator Safety Analysis Report December 15, 1975. Correspondence with enclosures. Pinellas Plant, St. Petersburg, FL: General Electric Company Neutron Devices Department. October 31. [SRDB Ref ID: 12793]

Lawhorn [1997]. Verification survey of building 100 Pinellas. Largo, FL. June 11. [SRDB Ref ID: 196286]

Lockheed Martin [1997]. Pinellas Plant environmental baseline report June 1997. Largo, FL: Lockheed Martin Specialty Components, Environmental Safety and Health Division. MMSC-EM-97013, June. [SRDB Ref ID: 48197]

Lushbaugh CC [1982]. The development and present state of the DOE health and mortality studies 1982. In: DOE radiation epidemiology contractors workshop 1982. March 1. [SRDB Ref ID: 198634]

MMSC [1993a]. Building 400 safety analysis report – request to cancel. Pinellas Plant, Largo, FL: Martin Marietta Specialty Components. July 21. [SRDB Ref ID: 133481]

MMSC [1993b]. Support of HRS epidemiology feasibility study. Pinellas Plant, Largo, FL: Martin Marietta Specialty Components. November 30. [SRDB Ref ID: 122999]

NIOSH [2012]. U.S. Department of Health and Human Services Centers for Disease Control National Institute for Occupational Safety and Health Advisory Board on Radiation and Worker Health Work Group on Pinellas Monday, November 19, 2012. Transcript. Washington, DC: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Advisory Board on Radiation and Worker Health. [SRDB Ref ID: 183138]

NIOSH [2016a]. U.S. Department of Health and Human Services Centers for Disease Control National Institute for Occupational Safety and Health Advisory Board on Radiation and Worker Health Pinellas Plant Work Group Thursday, February 11, 2016. Transcript. Washington, DC: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Advisory Board on Radiation and Worker Health. [SRDB Ref ID: 187124]

NIOSH [2016b]. U.S. Centers for Disease Control National Institute for Occupational Safety and Health Advisory Board on Radiation and Worker Health 112th meeting Tuesday, August 9, 2016. Transcript. Washington, DC: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Advisory Board on Radiation and Worker Health. [SRDB Ref ID: 198486]

NIOSH [2021]. Special exposure cohort petition evaluation report Petition SEC-00256 rev. 0 Pinellas Plant qualified October 20, 2020. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health. Petition SEC-00256, October 13. [SRDB Ref ID: 190456]

NIOSH [2026]. U.S. Department of Health and Human Services Centers for Disease Control National Institute for Occupational Safety and Health Advisory Board on Radiation and Worker Health Pinellas Plant Work Group Thursday, January 29, 2026. Transcript. Washington, DC: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Advisory Board on Radiation and Worker Health. [SRDB Ref ID: TBD-When Transcript is included on NIOSH website]

ORAUT [2011]. Pinellas Plant – site description. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0029 Rev. 02, April 1. [SRDB Ref ID: 99874]

ORAUT [2016]. Pinellas Plant – occupational internal dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0029-5, Rev. 03, July 18. [SRDB Ref ID: 158070]

ORAUT [2017]. Pinellas Plant – occupational external dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0029-6, Rev. 02, December 11. [SRDB Ref ID: 168436]

Pharo T [1993]. Building 400 safety analysis report – request to cancel. Pinellas Plant, Largo, FL: Martin Marietta Specialty Components. July 21. [SRDB Ref ID: 186417]

Pinellas Plant [1957–1990]. Health physics summary reports 1957–1973. Largo, FL: Pinellas Plant. [SRDB Ref ID: 27095]

Pinellas Plant [1957–2004]. Dose records. Largo, FL: Pinellas Plant. [SRDB Ref ID: 183498]

Pinellas Plant [1961–1990]. Pu-238Be neutron source information. Pinellas Plant, Largo, FL: Department of Energy. [SRDB Ref ID: 12799]

Pinellas Plant [1992–1994]. Natural uranium glass concerns and related material. [SRDB Ref ID: 13204]

Roeder JR [1982]. Expansion and recirculation of Building 400 air. Washington, DC: U.S. Department of Energy. September 21. [SRDB Ref ID: 195430]

SC&A [2025]. Supplemental SC&A review of the SEC petition evaluation report for petition SEC-00256: Pinellas Plant. Arlington, VA: SC&A. SCA-TR-2025-SEC001 Rev. 0, April 17. [SRDB Ref ID: 206777]

SC&A [2026]. SC&A supplemental review of SEC-00256 petition evaluation report for Pinellas Plant. Presentation. In: Advisory Board on Radiation and Worker Health Pinellas Work Group meeting held on January 29. January. [SRDB Ref. ID: 217459]

Simmons JL [1977]. List of ERDA radioisotope customers with summary of radioisotope shipments FY1976. Richland, WA: Pacific Northwest Laboratory. BNWL-2147, March. [SRDB Ref ID: 87579]

Simmons JL [1978]. List of ERDA radioisotope customers with summary of radioisotope shipments FY1977 plus the transition quarter. Richland, WA: Pacific Northwest Laboratory. PNL-2572, July. [SRDB Ref ID: 87578]

State of Florida [1992]. Department of Energy oversight program Pinellas Plant environmental radiological measurements January 1992 - December 1992. Department of Health and Rehabilitative Services State of Florida. [SRDB Ref ID: 191137]

State of Florida [1994]. Pinellas Plant feasibility study - final report. Department of Health and Rehabilitative Services State of Florida. September. [SRDB Ref ID: 6501]

Voelz GL, Wilkinson GS, Acquavella JF, Tietjen GL, Grackbill RN, Reyes M, and Wiggs LD [1983]. An update of epidemiologic studies of plutonium workers 1983. Health Phys 44(1):493–503. [SRDB Ref ID: 197311]

Wall Street Journal [2014]. New media report – waste lands: America's forgotten nuclear legacy General Electric X-ray Division Plant. Web Page. March 14. [SRDB Ref ID: 217458]