# Response to “Interim SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256: Pinellas Plant”

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# Overview

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- NIOSH Conclusion

# Introduction

# Evaluation Report (ER) Timeline

- October 13, 2021 – NIOSH published Pinellas Plant Special Exposure Cohort (SEC) Petition Evaluation Report (SEC-00256 ER) [NIOSH 2021a]
- December 8, 2021 – ABRWH tasked SC&A with review of the SEC-00256 ER [NIOSH 2021b]
- June 16, 2023 – NIOSH received Interim SC&A Review of the SEC Petition Evaluation Report for Petition SEC-00256: Pinellas Plant [SC&A 2023]

# SC&A Interim Review Executive Summary

- New issues raised by the petitioners may impact SEC.
- SC&A has not yet reviewed documents found in recent data captures.

However, SC&A is releasing interim review.

- Review had no findings and 13 observations.

# SC&A 13 Observations

- Observations 1 – 5 and 11 – 13 based on review of the SEC-00256 ER [NIOSH 2021a]

- Observations 6 – 10 based on review of the 1990 Tiger Team Report [DOE 1990]

# SC&A Observation Issues (1 of 2)

- Four Observations required no response (1, 6, 11, 12)
- Six core issues were the basis for remaining Observations (2-5, 7-10, 13)

# SC&A Observation Core Issues (2 of 2)

| Issue Raised by SC&A | Observation |
|---|---|
| Bioassay data completeness relating to: (1) the ability to do a co-exposure study and (2) use in assessing SMT exposure | 2, 5, 7, and 9 |
| Reference OTIB-0066 in Occupational Internal Dose TBD | 3 |
| Review of monitoring frequency for NOCTS claimants suggests bioassay data for 1988-1990 is missing | 4 |
| Contamination controls not always followed | 8 |
| Tiger Team found management focused more on production than adherence to radiological controls | 10 |
| Doses are not accounted for given lack of records (4) and bioassay compliance (2, 5, 7, and 9) | 13 |

# NIOSH Response to SC&A Observation 1

Neutron generator production was fairly steady

# Observation 1: SC&A Key Points

“SC&A’s review of neutron generator production from 1974 through 1993 showed that it was fairly steady, with a peak in the early 1980s and a few notable dips in the late 1970s into 1980.”

# Observation 1: NIOSH Response

NIOSH concurs with this Observation.

# NIOSH Response to SC&A Observation 2

Potential for tritium contamination is adequately addressed

# Observation 2: SC&A Key Points

"…stable metal tritide exposures would only be applied if the energy employee were also monitored via urinalysis. However, given the deficiencies noted by the Tiger Team ...relying on bioassay completeness to establish exposure potential is likely inappropriate."

# Observation 2: NIOSH Response

NIOSH will update Pinellas Plant – Occupational Internal Dose, ORAUT-TKBS-0029-5 [ORAUT 2016] to include the guidance:

> "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 Response to SC&A Observation 3

The ER does not reference recent special tritium compound document

# Observation 3: SC&A Key Points

"…NIOSH should commit to reference and discuss guidance from OTIB-0066 in the next revision of the occupational internal dose TBD and evaluate whether it has any consequential effect on the SEC evaluation report conclusions."

"…sitewide air monitoring data or contamination survey data should be preferentially used over other modeling in dose reconstructions for stable metal tritides whenever available."

# Observation 3: NIOSH Response

- OTIB-0066 [ORAUT 2020] provides guidance on using urine bioassay to calculate best estimates of the annual organ doses for intakes of tritium in a metal matrix. This does not affect SEC ER conclusions.
- The Pinellas method for assessing dose from stable metal tritides uses sitewide contamination surveys. It does not rely on urine bioassay. This received the concurrence of both the ABRWH and SC&A at the August 2016 Board meeting [NIOSH 2016b, PDF p. 83].
- NIOSH will revise TBD Pinellas Plant – Occupational Internal Dose [ORAUT 2016] to include a reference to OTIB-0066 [ORAUT 2020].

# NIOSH Response to SC&A Observation 4

Lack of bioassay records for 1988–1990

# Observation 4: SC&A Key Points

“Despite between 129 and 201 employees reportedly monitored by bioassays from 1988 to 1990, NIOSH only has monitoring records for 3–10 claimants per year. According to the 1990 DOE Tiger Team report, approximately 1,750 people were employed in 1989, suggesting that monitoring records are missing.”

# Observation 4: NIOSH Response (1 of 1)

- Information cited by SC&A was from the ER [NIOSH 2021a] and based on internal monitoring data compiled prior to dose reconstruction.
- A more complete data set is available and used for dose reconstruction.
- NIOSH has updated the 1988-1990 records information with all bioassay data used in each dose reconstruction as well as data received since dose reconstruction was performed. (see next slide)

# Observation 4: NIOSH Response (2 of 2)

- The monitoring frequency for Pinellas claimants is consistent with that for total site personnel.

Table 1. Tritium bioassay data for Pinellas employees, 1988 to 1990.

| Year | Total Site Personnel[a] | Employees (#) Monitored by Bioassay[b] | Employees (%) Monitored by Bioassay | Pinellas Claimants in NOCTS[c] | Pinellas Claimants (#) Monitored by Bioassay[d] | Pinellas Claimants (%) Monitored by Bioassay[d] |
|---|---|---|---|---|---|---|
| 1988 | 1720 | 129 | 7.5% | 310 | 22 | 7.1% |
| 1989 | 1700 | 201 | 11.8% | 299 | 35 | 11.7% |
| 1990 | 1650 | 177 | 10.7% | 288 | 23 | 8.0% |

[a] Sources: 1988 [GE 1989], 1989 [GE 1990], and 1990 [DOE 1991]
[b] [Weaver 1992, PDF p. 12]
[c] As of the *SEC-00256 ER* [NIOSH 2021a] (through NOCTS Claim #53368)
[d] Data derived from [Tritium Bioassay Results 1988], [Bioassays and Recounts 1989], [Personnel Bioassay Results 1990]. NOCTS update [ORAUT 2023].

# NIOSH Response to SC&A Observation 5

Bioassay schedule noncompliance by the plant

# Observation 5: SC&A Key Points

"…NIOSH should demonstrate that an appropriate co-exposure model can be constructed to address apparent incompleteness in the tritium bioassay program."

"... Bounding co-exposure values would certainly appear warranted during this latter period (1991–1997)."

# Observation 5: NIOSH Response

- NIOSH does not believe demonstrating of a co-exposure model is needed.
- The Tiger Team's report was a basis for the SEC-00256 ER. [NIOSH 2021a]
- SEC-00256 ER evaluated and affirmed NIOSH's ability to accomplish dose reconstruction even with non-compliance issues (see next slide).

# Observation 5: ER Dose Reconstruction Evaluation Summary (1 of 3)

- Improved bioassay compliance in response to the Tiger Team findings did not result in increased measured doses, suggesting no large exposures went unmonitored.
- NIOSH reviewed NOCTS claims and confirmed that Pinellas monitored workers expected to have potential for internal tritium exposure.

# Observation 5: ER Dose Reconstruction Evaluation Summary (2 of 3)

- All interviewees stated they did not know of a non-compliance issue and offered a range of possible reasons.
  - Leave, not removing workers from the bioassay list after reassignment, placing workers who entered production areas on a non-routine basis on the routine bioassay schedule.
  - Implies that non-compliance was not a systemic problem or widespread among workers.

# Observation 5: ER Dose Reconstruction Evaluation Summary (3 of 3)

- Tiger Team found workers with higher exposure potential were more compliant with the sampling program than those with less potential. Any unmonitored approach based on monitored workers would be biased high.
- NIOSH currently applies the 95$^{th}$ percentile whole body dose (100 mrem) to unmonitored workers as a claimant-favorable approach. This received the concurrence of both the ABRWH and SC&A at the February 2016 Work Group meeting [NIOSH 2016a, PDF p. 24].

NOTE: NIOSH will update Pinellas Plant – Occupational Internal Dose, ORAUT-TKBS-0029-5, to explain the approaches for determining internal tritium dose when needed for unmonitored personnel.

# NIOSH Response to SC&A Observation 6

Radiological protection program commended by Tiger Team

# Observation 6: SC&A Key Points

“On a positive note, commending the radiological protection program, section 4.4.11.1 (p. 4-90) of the 1990 DOE Tiger Team report states, ‘The overall assessment is that all levels of the GEND [General Electric Neutron Devices, another name for the Pinellas Plant] organization are receiving adequate radiological protection. This is primarily due to a GEND staff that appears willing to accept line responsibility for radiological safety along with a technically strong health physics staff providing direction.’”

# Observation 6: NIOSH Response

NIOSH concurs with this Observation.

# NIOSH Response to SC&A Observation 7

Bioassay sampling frequency requirements not followed as noted by Tiger Team

# Observation 7: SC&A Key Points

"…the 1990 DOE Tiger Team report compliments the plant for maintaining low overall internal dose exposures but also makes an important finding on noncompliance issues related to the plant not following bioassay sampling frequency requirements."

# Observation 7: NIOSH Response

- NIOSH concurs with this Observation.
- Response to Observation 5 details the bioassay compliance issue reported by the Tiger Team [DOE 1990] and evaluated in the SEC-00256 ER [NIOSH 2021a].

# NIOSH Response to SC&A Observation 8

Contamination controls found generally good by Tiger Team

# Observation 8: SC&A Key Points

"…the 1990 DOE Tiger Team report discusses the effectiveness of contamination controls at Pinellas and notes that while it is generally good, there are instances when it is not…"

# Observation 8: NIOSH Response

- Tiger Team assessment of ‘generally good’ seems to speak to the overall working conditions within the Pinellas Plant.
- The negative Tiger Team examples relate to a transient condition. Transient conditions do not present a challenge to reconstructing internal dose for claimants (i.e., plant contamination control limits are low, minimizing potential dose).
- The average internal dose for all monitored workers between 1986 and 1991 ranged between 1.04 and 4.38 mrem/yr [Weaver 1992, PDF p. 11] and would include any exposure from plant-wide surface contamination.

# NIOSH Response to SC&A Observation 9

Bioassay sampling program implementation inadequacies noted by the Tiger Team

# Observation 9: SC&A Key Point

"…the 1990 DOE Tiger Team report contains several radiological protection findings and concerns related to internal dosimetry that are relevant here. […] NIOSH cited these Tiger Team findings as sufficient to qualify the SEC petition for further evaluation."

# Observation 9: NIOSH Response

- NIOSH concurs with this Observation.
- As noted by SC&A, the cited Tiger Team finding was the basis for the qualification of the Pinellas SEC Petition [NIOSH 2020].
- Response to Observation 5 details the bioassay compliance issue reported by the Tiger Team [DOE 1990] and evaluated in the SEC-00256 ER [NIOSH 2021a].

# NIOSH Response to SC&A Observation 10

Tiger Team assessment of deficiency root causes: emphasis on production and mindset that Pinellas poses no unusual radiological risks

# Observation 10: SC&A Key Point

"…probable root causes of some of [the Tiger Team's] deficiency findings:

- emphasis on production has traditionally overshadowed interest in fully complying with environment, safety and health requirements;
- mindset that the Plant poses no unusual or unique risks."

# Observation 10: NIOSH Response

- The cited issues relate to Management Assessment findings. These are not Pinellas Radiation Protection Program issues.
- There is no implied deficiency in the ability to accurately monitor personnel radiation exposure or determine potential dose.

# NIOSH Response to SC&A Observation 11

Transition Year of 1990 after Tiger Team assessment led to overall reduced exposures

# Observation 11: SC&A Key Points

“While data indicate a significant decrease for external doses from 1990 to 1991, there was an increase in internal doses from tritium from 1990 to 1991, then a gradual decreasing trend during the years 1992–1995. The number of workers bioassayed for tritium remained reasonably consistent during the period 1986–1995, and the number of workers monitored for external exposure gradually decreased during the period 1985–1995. […] To date, SC&A has not found indications that there are issues with exposure records that would prevent DR feasibility for the SEC period 1957–1990, nor for the period 1991–1997.”

# Observation 11: NIOSH Response

NIOSH concurs with this Observation.

# NIOSH Response to SC&A Observation 12

ER is consistent with interview records

# Observation 12: SC&A Key Point

“SC&A reviewed all available documented communication (i.e., interview) records. The interviews reflect the full date range of work at Pinellas and encompass a broad range of professions. From the interviews, it is clear that site employees had a different experience with the health and safety policies at the site based on their role and job function. In general, the interviewed workers in physics, engineering, chemistry, and lab-related professions had experience with the site internal and external monitoring program. The recollections reported in the interviews, in general, are consistent with the NIOSH SEC evaluation report.”

# Observation 12: NIOSH Response

NIOSH concurs with this Observation.

# NIOSH Response to SC&A Observation 13

Pinellas plant diligent in following up on contamination-related incidents and personnel exposures

# Observation 13: SC&A Key Points

"…Pinellas Plant was diligent about following up on contamination-related incidents and personnel exposures. The reports show investigations into the causes of various incidents, and most (1) indicate that follow up monitoring was performed for employees involved in the incidents and (2) provide recommendations to prevent the incidents from reoccurring."

"… given the lack of bioassay records for the years 1988–1990 … it is possible that the program may not have captured all the internal exposures related to contamination incidents."

# Observation 13: NIOSH Response

- Bioassay data is not missing (Observation 4).
- NIOSH has addressed the issue with bioassay compliance (Observations 5, 7, and 9), and there is no impact to feasibility to reconstruct internal dose.

# Conclusion

# NIOSH Conclusion

NIOSH concludes that it is feasible to estimate the radiation dose that the evaluated class of Pinellas workers received. None of the observations in the SC&A Interim Review contradict the conclusions presented in the SEC-00256 ER.

# References (1 of 3)

Bioassays and Recounts 1989 Pinellas [1989]. Pinellas Plant, Largo, FL. January 3 through December 29. [SRDB Ref ID 197484]

DOE [1990]. Tiger Team assessment of the Pinellas Plant. Washington, DC: U.S. Department of Energy, Assistant Secretary for Environment, Safety and Health. DOE/EH-0126, May. [SRDB Ref ID: 46090]

DOE [1991]. Pinellas plant environmental monitoring report 1990. Pinellas Plant, Largo, FL: Department of Energy, Environmental Health and Safety Programs. NDPP-OSP-0053, August 9. [SRDB Ref ID: 12007]

GE [1989]. Pinellas plant environmental monitoring report 1988. Pinellas Plant, Largo, FL: General Electric Neutron Devices. GEPP-EV-1193, June 1. [SRDB Ref ID: 13252]

GE [1990]. Pinellas plant environmental monitoring report 1989. Pinellas Plant, Largo, FL: General Electric Neutron Devices. GEPP-EV-1061, June. [SRDB Ref ID: 13257]

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: 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]

# References (2 of 3)

NIOSH [2016b]. United States of America 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: 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 [2021a]. 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 for Occupational Safety and Health. October 13. [SRDB Ref ID: 190456]

NIOSH [2021b]. 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 143rd Meeting Wednesday, December 8, 2021. Transcript. Washington DC: 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. December 8. [SRDB Ref ID: 198487]

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]

# References (3 of 3)

ORAUT [2020]. Calculation of dose from intakes of special tritium compounds. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-OTIB-0066 Rev. 01, October 15. [SRDB Ref ID: 183483]

ORAUT [2023]. Pinellas bioassay data compiled to respond to SC&A observation 4 on the Pinellas ER 2023 ORAU team project spreadsheets. Oak Ridge, TN: Oak Ridge Associated Universities Team. August 11. [SRDB Ref ID: 197977]

Personnel bioassay results 1990 [1990]. Pinellas Plant: Largo, FL. January 2 through December 7. [SRDB Ref ID: 133535]

SC&A [2023]. Interim SC&A review of the SEC petition evaluation report for petition SEC-00256: Pinellas Plant 2023 - draft. Arlington, VA: SC&A. SCA-TR-2023-SEC001 Rev. 0, June 16. [SRDB Ref ID: 198062]

Tritium Bioassay Results 1988 [1988]. Pinellas Plant: Largo, FL. January 4 through December 27. [SRDB Ref ID: 133433]

Weaver AS [1992]. ALARA program report for CY1991. Pinellas Plant, Largo, FL: General Electric Neutron Devices. April 13. [SRDB Ref ID: 182933]

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