



# Summary of Recent SC&A Work Products for SEC-00235 and SEC-00246 Evaluations

Bob Barton, CHP

Milton Gorden

To the Advisory Board Work Group on Area  
IV of the Santa Susana Field Laboratory

Cincinnati, OH

October 15, 2020



# Topics to Be Covered

Evaluation of TRUMP-S Program and 2012 EPA Characterization Study (memorandum dated July 25, 2019)

Summary of Worker Interviews Conducted in 2018 and 2019 In Support of the SEC-00246 Evaluation (memorandum dated July 14, 2020)

Review of Documentation Provided by CORE Advocacy Related to SEC-00235 (white paper dated November 25, 2019)

Review and Characterization of Boeing Incident Database (memorandum dated June 10, 2019)



# Evaluation of TRUMP-S Program and 2012 EPA Characterization Study

(memorandum, “Evaluation of Petitioner-Specific Concerns Regarding SEC-00235,” dated July 25, 2019)

# Background for TRUMP-S and 2012 EPA HSA

- ◆ 2012 EPA Historical Site Assessment (HSA) indicates work on the Transuranic Management by Pyropartitioning – Separation (TRUMP-S) for a 2-year period beginning in July 1988
  - Primary separation activities to occur in the Hot Lab (Building 4020)
  - Support operations to occur in Building 4023
- ◆ 50 total buildings identified in HSA list americium/thorium as a radionuclide of concern

# SC&A review approach

- ◆ Review underlying references used in the EPA 2012 HSA to indicate TRUMP-S research
- ◆ Review additional references available as appropriate to the proposed TRUMP-S program

# Timeline of key documentation (October 1988–July 1989)

- ◆ October 1988: internal letter proposing revisions to usage application for TRUMP-S material
- ◆ July 1989: planning meeting to obtain documentation to operate TRUMP-S glove box
- ◆ Mid-1989: planning document describing how TRUMP-S waste “to be generated” is to be handled in late 1989 or early 1990

# Timeline of key documentation (October 1989–February 1990)

- ◆ October 1989: internal letter describing an upcoming “test readiness review”
- ◆ October 1989: internal letter describing necessary actions prior to beginning the radioactive portion of the TRUMP-S program
- ◆ February 1990: letter to NRC concerning a license amendment to allow the TRUMP-S program “to be conducted”
- ◆ February 1990: technical progress report
  - indicates Rockwell International was still awaiting DOE permission to “start up the test”
  - indicates it would be impractical to continue TRUMP-S activities at SSFL, search for an alternate facility is under way

# Timeline of key documentation (February 1990–September 1993)

- ◆ February 1990: Local newspaper article indicating public opposition to the “planned TRUMP-S project”
- ◆ May 1990: local newspaper article indicating the TRUMP-S project “originally scheduled to take place” at SSFL was relocated to the University of Missouri
- ◆ September 1993: D&D operations for Building 4023 completed, specific isotopic analysis not located

# Timeline of key documentation (October 1994–February 1998)

- ◆ October 1994: confirmatory survey of Building 4023 performed for DOE
  - Building cleared for unrestricted release
  - Soil samples taken for uranium and cesium only
- ◆ February 1998: State of California Health and Welfare Agency, Department of Health Services, concurs that Building 4023 can be released without radiological restriction

# Additional buildings identified in 2012 EPA HSA

- ◆ Purpose of HSA:
  - Identify “potential” contaminants that could be present
  - Aid in future sampling and remediation activities
- ◆ 50 buildings identified americium and/or thorium as a radionuclide of concern
- ◆ SC&A reviewed information for the buildings identified for potential americium/thorium contamination

# SC&A review conclusions

- ◆ Attachment A of SC&A memo, “Evaluation of Petitioner-Specific Concerns Regarding SEC-00235,” discusses each building
- ◆ SC&A did not identify evidence of operational activities involving americium and/or thorium
- ◆ Residual contamination to be expected based on site history
- ◆ NIOSH to develop methods for reconstructing exposures during D&D and other remediation activities



# Summary of Worker Interviews Conducted in 2018 and 2019 In Support of the SEC-00246 Evaluation

(memorandum dated July 14, 2020)

# Background for worker interviews

- ◆ 6 former energy employees interviewed in November 2018 and May 2019 (5 summaries confirmed)
- ◆ Focus was to obtain further insight on campaigns and radiological activities related to americium and thorium at De Soto
- ◆ Includes information on coordination with, or work in, Area IV

# Worker 1

- ◆ Relevant employment from 1965 to 1978
- ◆ Thorium testing occurred at De Soto but did not recall thorium fuel fabrication
- ◆ Work with spent fuel only occurred at Area IV Hot Lab (Building 4020)
- ◆ Does not believe americium sources were opened or breached

## Worker 2

- ◆ Relevant employment from 1965 to 1967
- ◆ Believes some thorium work occurred at De Soto (not directly involved)
- ◆ Spent fuel was handled at the Area IV Hot Lab (Building 4020)
- ◆ Only fresh fuel handled at De Soto
- ◆ No knowledge of americium source fabrication

# Worker 3

- ◆ Relevant employment from 1981 to 2006
- ◆ No thorium fuel at De Soto but natural thorium contained in ceramic material located in the laboratories
- ◆ Only recalls remediation activities (no fuel fabrication)
- ◆ Americium at De Soto was in the form of sealed sources (leak checked once per quarter)

# Worker 4

- ◆ Relevant employment from 1972 to 1987
- ◆ No recollection of spent fuel work
- ◆ Stated no transuranic material was ever transported to De Soto
- ◆ No recollection of americium work
  - May have had a solution containing americium, not clear how it would have been used
  - Did not recall any americium work except as an encapsulated source

# Worker 6

- ◆ Relevant employment began in 1983 (last year of employment not specified)
- ◆ Does not recall finding bags of thorium in Building 4
- ◆ Does not recall large quantities of radioactive material (removed prior to remediation)
- ◆ No knowledge of fuel decladding occurring at De Soto

# Summary of interviews

- ◆ Interviews suggest decladding of spent fuel did not occur at De Soto
- ◆ Interviews suggest that exposure to unencapsulated Am at De Soto is not probable
  - Documentation suggests presence of contaminated material used in cleaning decladded fuel
  - Am contamination in Mass Spec Lab suggests unencapsulated Am may have been handled at least on bench-scale basis



# Review of Documentation Provided by CORE Advocacy Related to SEC-00235

(white paper dated November 25, 2019)

# Background of records review

- ◆ Evaluation of SEC-00235 identified two primary issues:
  - Possible presence of thorium and americium and indications for dose reconstruction feasibility
  - Are operational conditions sufficiently bounding of residual conditions (required analysis of available air sampling data)?
- ◆ SC&A November 2017 report
  - Did not identify evidence of internal exposure due to thorium or americium that precludes dose reconstruction feasibility
  - found no evidence that radiological conditions during residual period would not be bound by operational co-exposure models

# Additional records found

- ◆ Petitioner notified NIOSH on Jan. 28, 2019, that about 1,463 boxes of DOE records found
- ◆ SEC petitioner conclusions:
  - the documents confirm operations with americium and thorium at Area IV until 2008, and possibly to 2010
  - New evidence of insufficient monitoring
  - TRUMP-S operations occurred at Area IV 1993–1998
  - TRU waste generation and processing 2002–2008, with storage up to 20 years

# SC&A review – monitoring of site remediation workers

- ◆ Reviewed 1,276 pages of program descriptions, procedures, incident reports, and other documents
- ◆ No information identified suggesting workers not monitored (with exception of invalid bioassay results August 1991–June 1993)
- ◆ Alpha contamination found in the RMHF
  - Large particle
  - Described as “not readily respirable”
- ◆ A 1994 radiation protection activity report noted presence of lab containers of uranium and thorium in Rocketdyne labs, but no followup information found
- ◆ SC&A did not find any additional information about thorium operations

# Monitoring of site remediation workers – dosimetry program

- ◆ 1995 activity report shows a plutonium inventory in the RMDF that is consistent with D&D activities
- ◆ No documentation found suggesting inadequate internal dosimetry program – a 1998 DOE letter stated program in compliance
- ◆ A 1995 Rockwell letter shows radiation worker training programs met DOE Rad Worker II training requirements

# TRUMP-S program

- ◆ Process demonstrated at the Missouri University Research Reactor (MURR) with Boeing personnel present with other tests performed in Japan
- ◆ Public pressure kept SSFL tests from occurring
- ◆ TRU waste generated at MURR, but its disposition pathway is unknown
- ◆ Appears only computer simulation work, glovebox and instrumentation development performed at SSFL (radiological portion at MURR)

# TRU waste management

- ◆ No evidence TRU waste was generated by operations after 1988
- ◆ TRU waste managed at SSFL after 1988 due to legacy (pre-1989) operations and post-1988 D&D activities
- ◆ Because TRU waste contains plutonium, there would be americium buildup in the waste packages
- ◆ Dose reconstruction methods for americium and thorium under development by NIOSH using breathing zone data for D&D workers



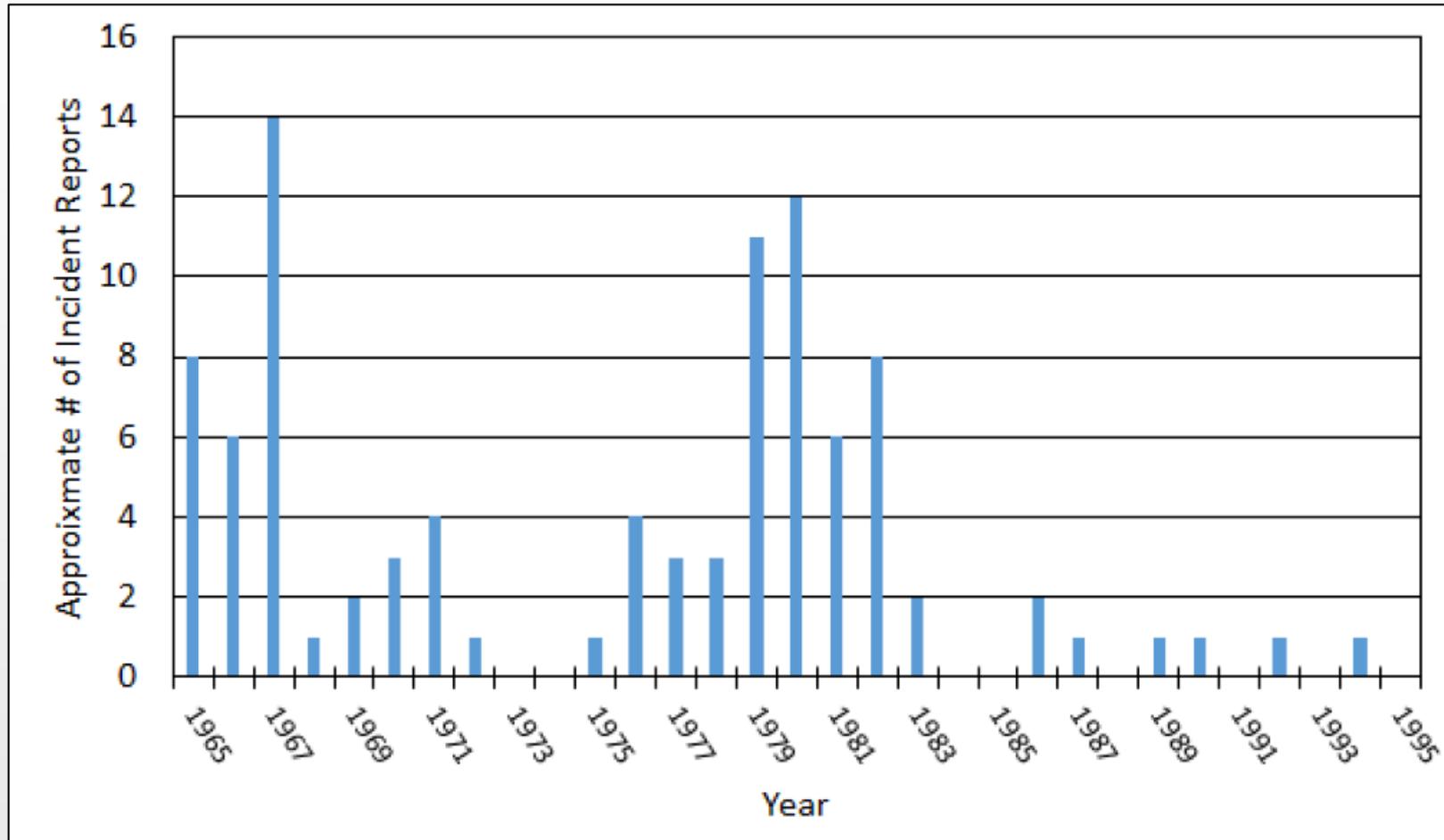
# Review and Characterization of Boeing Incident Database

(memorandum dated June 10, 2019)

# Background of incident database

- ◆ CORE Advocacy provided thumb drives containing incident files on Dec. 13, 2018
- ◆ SC&A asked to review the files in context of SEC-00246 and De Soto
- ◆ Files consist of 784 radiological incident reports and 486 unusual occurrence reports
- ◆ 95 reports, or 12%, are related to De Soto. 3 other De Soto-related reports were missing but included here

# Number of De Soto radiological incident reports by year



# Incident reports put in 6 categories

Category	Number of reports	Internal monitoring requested	No internal monitoring requested	Unknown	Internal monitoring not applicable
1. U cont.	43	26 (60.5%)	10 (23.3%)	7 (16.3%)	0 (0.0%)
2. U – No cont. spread	9	2 (22.2%)	3 (33.3%)	2 (22.2%)	2 (22.2%)
3. Other cont. incident	6	2 (33.3%)	3 (50.0%)	1 (16.7%)	0 (0.0%)
4. No cont.	30	0 (0.0%)	0 (0.0%)	0 (0.0%)	30 (100.0%)
5. Other unidentified cont.	8	1 (12.5%)	3 (37.5%)	4 (50.0%)	0 (0.0%)
6. Decladding	2	1 (50%)	1 (50.0%)	0 (0.0%)	0 (0.0%)

Cont. = contamination

# Category 5 incidents

- ◆ Represent contamination events in which the primary contaminant is not identified
- ◆ Upon review, SC&A did not identify evidence that the incidents were likely to involve americium or thorium

# Category 6 decladding incidents

## ◆ Report Identifier a-0492

- 1965: EE was cutting and grinding an irradiated fuel element in a clean lab area
- EE submitted bioassay sample with results of no detectable activity

## ◆ Report Identifier a-0654

- November 1975: fuel element with xenon tag gas was inadvertently included in a batch of elements for destructive inspection and stripped of its cladding
- Exposure to krypton-85, not clear if fuel element had been irradiated

# Conclusion from review of incident reports

- ◆ SC&A did not find any direct references to internal exposure to americium or thorium
- ◆ Most incidents involved uranium operations
- ◆ 1965 decladding incident involved cutting and grinding
  - Was it reported only because it occurred in a clean lab?
  - Did this activity also occur in the De Soto hot lab or other De Soto facilities?
- ◆ Unclear whether the 1975 decladding incident involved an irradiated fuel element



# Questions?