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National Institute for Occupational Safety and Health

SC&A's Review of NIOSH SEC-00253 Petition Evaluation Report for the Reduction Pilot Plant, Huntington, WV

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Prepared by

Ron Buchanan, PhD, CHP
Milton Gorden

SC&A, Inc.
2200 Wilson Blvd., Suite 300
Arlington, VA 22201-3324

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Abbreviations and Acronyms

ABRWH	Advisory Board on Radiation and Worker Health
admin	administrative
Am	americium
CATI	computer-assisted telephone interview
Ci	curie
cm	centimeter
D&D	decontamination and decommissioning
DCAS	Division of Compensation Analysis and Support
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
dpm	disintegrations per minute
DR	dose reconstruction
EE	energy employee
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
ER	evaluation report
HPP	Huntington Pilot Plant
hr	hour
ICRP	International Commission on Radiological Protection
INCO	International Nickel Company
keV	kiloelectron volt
m	meter
m ²	square meter
m ³	cubic meter
mg	milligram
μR	microroentgen
mR	milliroentgen
mrad	millirad
mrem	millirem
mrem/hr	millirem per hour
Ni	nickel
NIOSH	National Institute for Occupational Safety and Health

NOCTS	NIOSH DCAS Claims Tracking System
Np	neptunium
OCAS	Office of Compensation Analysis and Support
ORAUT	Oak Ridge Associated Universities Team
pCi/d	picocurie per day
pCi/yr	picocurie per year
PER	program evaluation report
Pu	plutonium
RPP	Reduction Pilot Plant
SCDRR	Subcommittee for Dose Reconstruction Reviews
SEC	Special Exposure Cohort
SRDB	Site Research Database
TBD	technical basis document
Tc	technetium
Th	thorium
U	uranium
yr	year

1 Introduction and Background

The National Institute for Occupational Safety and Health (NIOSH) issued the Special Exposure Cohort (SEC) petition evaluation report (ER) for petition SEC-00253 for the Reduction Pilot Plant (RPP), also referred to as the Huntington Pilot Plant (HPP), Huntington, WV, on April 24, 2020 (NIOSH, 2020; hereafter referred to as the “SEC ER”). NIOSH evaluated the following class: “all INCO security personnel who worked at any location within the Reduction Pilot Plant during the period from June 7, 1976 through November 26, 1978” (NIOSH, 2020, p. 3).

On September 2, 2020, SC&A was tasked with a review of NIOSH’s ER for SEC-00253 for this focused group of workers and time period.

The following is a list of documents applicable to this review:

- ORAUT-TKBS-0004, revision 00, October 31, 2003 (NIOSH, 2003)
- ORAUT-TKBS-0004, revision 01, January 16, 2004 (NIOSH, 2004)
- OCAS-PER-025, revision 0, September 28, 2007 (NIOSH, 2007)
- OCAS-TKBS-0004, revision 00, August 13, 2008 (NIOSH, 2008)
- DCAS-PER-033, revision 0, December 9, 2011 (NIOSH, 2011)
- SCA-TR-SP2013-0043, June 4, 2013, review of the revised HPP site profile (SC&A, 2013a)
- DCAS-TKBS-0004, revision 01, December 12, 2013 (NIOSH, 2013)
- OCAS-PER-066, revision 0, November 30, 2015 (NIOSH, 2015)
- DCAS-TKBS-0004, revision 02, November 5, 2018 (NIOSH, 2018)
- NIOSH ER for SEC-00253, revision 0, April 24, 2020 (NIOSH, 2020)

The following sections of this report summarize SC&A’s review of NIOSH’s ER for SEC-00253 and previous RPP-related documents used in the development and evaluation of the ER. Section 2 provides an overview of the claimant population for the RPP; additional details concerning claimants are found in attachment A. Similarly, section 3 provides an overview of the available captured documents related to the RPP, with additional details provided in attachment B. Sections 4 and 5 discuss the past relevant document reviews performed by SC&A related to the RPP including previous program evaluation reports (PERs) and the technical basis document (TBD). Sections 6 and 7 specifically discuss the SEC ER proposed methods for internal and external dose reconstruction (DR), respectively. Finally, section 8 provides SC&A’s conclusions regarding DR feasibility for the class evaluated in SEC-00253.

2 SC&A’s Review of RPP Claimants in NOCTS

As a part of the review of NIOSH’s SEC ER for the RPP, SC&A reviewed the 77 claimant records contained in the NIOSH DCAS Claims Tracking System (NOCTS) files associated with the RPP to identify any information relevant to DR feasibility for security personnel during the period from June 7, 1976, to November 26, 1978. SC&A found that a total of 44 claimants

worked a portion or all of 1976 through 1978 at RPP, and that [REDACTED] consisted of security guards. Notably, one security guard indicated they checked the building on all 7 floors to see if the building was secure and walked the perimeter of the fence around the RPP building (page 7 of the computer-assisted telephone interview (CATI) for Claimant A¹). However, that security guard did not indicate an actual exposure time (refer to statements about Security Guard [REDACTED] (Claimant A) in attachment A). For one of the other security guards, the CATI indicated that the patrol time took 30 minutes (refer to attachment A on Security Guard [REDACTED] (Claimant H)).

Details of SC&A's review of the RPP claimants is present in attachment A of this report. Based on this evaluation, SC&A did not identify any information that would impact the feasibility of DR during the SEC-00253 period for security guards. However, given that a key facet of the proposed DR process includes the exposure time (i.e., time spent inside the facility where residual contamination is present), it is important to assure that estimates of time spent during relevant activities are properly characterized and bounded. This type of information would likely only be obtained by documented interviews with former workers who performed such activities (i.e., the security guards), or who have indirect knowledge of these activities. Although outside the scope of the class evaluated under SEC-00253, examples of other types of workers who may have such indirect knowledge are indicated in a document titled: "Listing of Data on Plant and Equipment in Stand-By" (INCO, 1963). This document lists the equipment and status of the plant going into the shutdown projected for 1963. The document states:

Following completion of the shutdown and placing of the plant in stand-by condition, fulltime guards will no longer be necessary at the plant, and thereafter daily checks will be made of the compressor room and process building by contractor's guards.

Weekly checks will be made by a Maintenance Mechanic and Helper to see that the dry air system and the emergency inert system are functional. They will also check the heating system and air conditioning and for general outward condition of the equipment.

Monthly a Maintenance Mechanic and Helper, assisted by other craftsmen and under the supervision of a foreman, will perform the necessary maintenance duties from a checklist to be approved by the Commission to insure against omission of important steps. [INCO, 1963, PDF p. 4]

Table 5-1 of the SEC ER reiterated the scheduled maintenance described above, along with other administrative categories. The SEC ER notes that maintenance activities described above were discontinued in 1975 and inspection activities only consisted of entry for non-security personnel no "more than two days per year" (NIOSH, 2020, p. 18). However, these maintenance crafts and inspection workers may still have knowledge of the typical security activities. Table 1 provides a list of potential interview candidates from the NOCTS population that NIOSH might consider

¹ To facilitate discussion of this report, SC&A has assigned all claimant numbers an arbitrary letter. Table C1 in attachment C provides a cross-reference for the arbitrary claimant label used in the text and the NOCTS claimant number.

and includes the arbitrary claimant label, work period, and NOCTS-based job title.² Table C1 in attachment C provides a cross-reference for the arbitrary claimant label used in table 1 and the NOCTS claimant number. Refer to section 6 for further discussion of the SEC ER development of the currently proposed exposure time.

Observation 1: Suggest further refinement of exposure time

A key facet of the proposed DR process includes estimates of the exposure time inside the RPP facilities during the SEC period. Therefore, it may be beneficial that NIOSH attempt to contact and interview security guards or other workers with specific knowledge of the surveillance activities to assure an accurate, or in the absence of specific information, a bounding estimate of the assigned dose. However, SC&A stresses that assumptions regarding exposure time should not preclude DR feasibility and can be considered site profile issues.

Table 1. List of possible claimant interviewees

Claimant label	[Redacted]	NOCTS occupation
A	[redacted]	Security Guard
B	[redacted]	Maintenance Checker
C	[redacted]	Maintenance
D	[redacted]	Electrician
E	[redacted]	Pipefitter, Welder
F	[redacted]	Millwright, Mechanic

3 SC&A’s Review of RPP-Relevant Documents in the Site Research Database

SC&A reviewed the Site Research Database (SRDB) to identify information about the facility and worker activities during the time period 1976 through 1978 that would impact DR feasibility or the proposed methodology in the SEC ER. The RPP site profile (NIOSH, 2018) summarizes the buildings used and operations that occurred during the production period. The site profile only briefly addresses post-production activities in section 7.0 of that report, as follows:

The RPP ceased production in 1962 and was placed in a standby status in 1963. Procedures were developed in 1962 to remove material and chemicals, and to purge all systems and place the plant in an acceptable standby condition. The residue areas were also required to be completely cleaned. The plant was never restarted. It was demolished from 1978 through 1979. There are no available records of radiation monitoring during the demolition period. Survey results are available for the area after the plant was demolished. The only remaining structure was a Compressor Building that was located adjacent to the plant. [NIOSH, 2018, pp. 15–16]

² The SEC ER notes that NIOSH has attempted to contact former RPP employees and that only a single interview was possible at that time and was conducted with a non-security employee (NIOSH, 2020, PDF p. 12). This interview is discussed in attachment A.

In developing the proposed DR methods, NIOSH reviewed available documents to determine the underlying assumptions of the proposed DR methods. NIOSH's DR approach is described in its response to SEC-00253 (NIOSH, 2020). SC&A's SRDB document review sought to determine if any information was missed that would impact NIOSH's underlying assumptions. Attachment B summarizes SC&A's document search results and tabulates relevant documents. Based on this analysis, SC&A did not locate any information that would indicate a DR infeasibility nor impact NIOSH's proposed DR methodology.

4 SC&A's Evaluation of Program Evaluation Reports Relevant to the RPP SEC ER

Three PERs were issued for the RPP (OCAS-PER-025, DCAS-PER-033, and DCAS-PER-066) and are described in the three subsections below.

4.1 OCAS-PER-025

OCAS-PER-025, revision 0, was issued on September 28, 2007 (NIOSH, 2007). The purpose of the PER was as follows:

The revision to the Huntington Pilot Plant TBD provides an estimate of shallow dose (electron dose) that did not appear in the original version. This dose is used primarily for skin dose estimates but also for breast and testes. Claims in which the external target organ is skin, breast, or testes may be affected if they were completed prior to revision 1 of the TBD. [NIOSH, 2007, p. 1]

Previously, SC&A reviewed OCAS-PER-025 and issued a report in September 2013 (SC&A, 2013b). In its review, SC&A found that the method for assigning shallow dose recommended in OCAS-PER-025 was incorporated into the revised TBD in table 6 (NIOSH, 2018, p. 18). The results of this PER review do not impact the ability to reconstruct doses during the SEC-00253 period of interest.

4.2 DCAS-PER-033

DCAS-PER-033, revision 0, was issued on December 9, 2011 (NIOSH, 2011). The purpose of the PER was as follows:

Several changes in the Dose Reconstruction methodology occurred in this revision to the TBD. Most changes reflect a decrease in the estimated dose. However, the estimate of internal dose increased from 1956 through 1963 and for 1978 and 1979. The inhalation estimate for operators went from approximately 3.83 pCi/day (1400 pCi/yr) to 44 pCi/day. The original intake was the geometric mean of a lognormal distribution with a geometric standard deviation of 4.3. The new estimate is a single bounding value.

While the internal dose estimate increased, other exposure pathways decreased. Due to the nature of some of the changes, the magnitude of the effect on individual dose estimates will vary from claim to claim. [NIOSH, 2011, p. 1]

Previously, SC&A reviewed DCAS-PER-033 and issued a report in January 2014 (SC&A, 2014). SC&A’s review found that the revised method of assigning internal intakes recommended in DCAS-PER-033 was incorporated into the revised TBD in table 5 (NIOSH, 2018, p. 17). The results of this PER review do not impact the ability to reconstruct doses during the SEC-00253 period of interest.

4.3 DCAS-PER-066

DCAS-PER-066, revision 0, was issued on November 30, 2015 (NIOSH, 2015). The purpose of the PER was as follows:

Revision 1 of DCAS-TKBS-0004 added intakes for Am-241, Th-230 and Tc-99. That results in an increased internal dose estimate for all claims that were completed using an earlier version. Therefore, it was not necessary to itemize any other increases in dose or further breakdown the time periods affected. [NIOSH, 2015, p. 1]

Previously, SC&A reviewed DCAS-PER-066 and issued a report in October 2016 (SC&A, 2016). In its review, SC&A found that the method of assigning americium-241 (Am-241), thorium-230 (Th-230), and technetium-99 (Tc-99) intakes as recommended in DCAS-PER-066 was incorporated into the revised TBD in table 5 (NIOSH, 2018, p. 17). The results of this PER review do not impact the ability to reconstruct doses during the SEC-00253 period of interest.

5 Summary of SC&A’s RPP TBD Review in the SEC-00253 Context

SC&A reviewed the revised HPP site profile (NIOSH, 2008) and issued a report in June 2013 (SC&A, 2013a). The six findings derived from that review, and their status as of November 14, 2013 (SC&A, 2013c), are summarized in table 2. This information is provided for completeness, and as noted below, SC&A does not find that the open findings from the RPP TBD review impact the proposed DR methods during the SEC-00253 period of interest.

Table 2. SC&A RPP TBD matrix (as of November 14, 2013)

Finding number	Summary of finding	NIOSH response	SC&A response	SC&A suggested action
1	Since the three diffusion plants (the source of the HPP nickel) had additional isotopes of concern, NIOSH should clearly provide the basis for only specifying Pu-239 and Np-237 as isotopes of concern for recycled uranium.*	As of November 14, 2013, none provided.	—	—

Finding number	Summary of finding	NIOSH response	SC&A response	SC&A suggested action
2	NIOSH should clearly state which uranium-specific activity was used in the analysis and ensure that it was used consistently throughout the analysis.	As of November 14, 2013, none provided.	—	—
3	There is a unit conversion error in going from table A2, column 3 (Photons per decay U-238) to column 4 (Photons per second per Ci U-238).	As of November 14, 2013, none provided.	—	—
4	The dose breakdown between 0–250 keV and >250 keV varies from 50/50 to about 70/30, depending on the gamma spectrum.	As of November 14, 2013, none provided.	—	—
5	Provide justification for including modern airborne nickel concentrations in the concentration distribution, when Enterline and Marsh (1982) indicate that the historical concentrations were (in most cases) of greater magnitude. At the beginning of their report, Enterline and Marsh state that the concentration of airborne nickel was estimated to range from 20 to 350 mg Ni/m ³ in areas where the matte was crushed, ground, and handled, and from 5 to 15 mg Ni/m ³ around the calciners. These concentrations are significantly larger than any of the values given in Enterline and Marsh (1982), table 8, and no explanation is provided as to why they have not been included.	Presented during the August 7, 2013, SCDRR meeting.	During the August 7, 2013, SCDRR meeting, SC&A agreed with the NIOSH response.	Close this issue, per the discussion during the August 7, 2013, SCDRR meeting (ABRWH, 2013, pp. 40–112).

Finding number	Summary of finding	NIOSH response	SC&A response	SC&A suggested action
6	Provide justification for excluding from the concentration distribution the airborne nickel concentration in the crushing, grinding, and handling areas and the area around the calciners reported by Enterline and Marsh (1982).	Presented during the August 7, 2013, SCDRR meeting.	During the August 7, 2013, SCDRR meeting, SC&A agreed with the NIOSH response.	Close this issue, per the discussion during the August 7, 2013, SCDRR meeting (ABRWH, 2013, pp. 40–112).

* It should be noted that additional recycled/reprocessed uranium components (Pu-239, Np-237, Am-241, Th-230, and Tc-99) have been added to the most recent RPP site profile (NIOSH, 2018) and are included in the estimation of internal dose in the SEC ER. These additional contaminants are discussed in section 6 of this report.

SC&A reviewed this list of findings to determine if the findings that could impact the RPP SEC had been resolved or addressed in the revised TBD (NIOSH, 2018). SC&A found that:

- Finding 1 concerning additional radionuclide intakes was addressed by table 5 of the revised TBD and has been correctly incorporated into the SEC ER.
- Finding 2 concerning uranium-specific activity was addressed on page 12 of the revised TBD.
- Finding 3 concerning unit conversion was not applicable to intake calculations.
- Finding 4 concerning gamma-ray energy spectrum is not an SEC issue.
- Finding 5 concerning airborne nickel concentrations has been resolved and closed.
- Finding 6 concerning certain nickel operations has been resolved and closed.

6 SC&A’s Evaluation of SEC ER Internal Intakes

According to the ER, NIOSH derived bounding internal intakes using the result of an RPP radiological survey of January 15–16, 1975 (DOE, 1979a). In that survey, the highest removable alpha result, 19 disintegrations per minute per 100 centimeter squared (dpm/100 cm²), was assumed to be uranium and assumed to apply uniformly to the entire floor area walked by security guards. Air concentrations were estimated using a resuspension factor of 10⁻⁶ per meter (m⁻¹), which is generally applied to “quiescent conditions” (NIOSH, 2012, p. 7), and a breathing rate of 1.2 m³ per hour, which corresponds to the reference breathing rate for a male performing light work (ICRP, 1994, PDF p. 34).

In developing the exposure time, NIOSH assumed the following:

Security guards performed a walk-through of the RPP Process Building once per shift. Using a typical walking speed of 3 miles per hour or 4.4 feet per second, a person could walk the length of the Process Building in about 34 seconds. Allowing for deviations and stops, NIOSH assumed that no single walk-through would take more than five minutes. For estimating the length of time at the RPP, a

factor of three is applied, giving fifteen minutes as the time that any security guard was in the RPP Process Building, the Compressor Building, and the grounds during their walk-through. [NIOSH, 2020, PDF p. 29]

As stated in section 2, one CATI with a former security guard (refer to Security Guard █ in attachment A) indicated that a typical patrol involved checking all seven floors of the process building, as well as patrolling the perimeter areas. However, no exact patrol time was provided. In another CATI with a former security guard, the energy employee (EE) indicated that the regular patrol of the RPP took 30 minutes (refer to Security Guard █ in attachment A). SC&A finds that the assumption in the SEC ER that it takes 15 minutes to patrol the process areas *on the main floor* and immediate area appears to be a reasonable estimate considering that the security guards also patrolled the perimeter fence line (which would logically take a considerable amount of time associated with the 30-minute patrol time). However, if the security guards had to ascend to and inspect multiple floors, then the estimate of exposure time may underestimate the actual exposure conditions. This underscores the importance of establishing an accurate exposure time via interview (refer to observation 1) or assuring that assumed exposure times are truly bounded. SC&A reiterates that assumptions regarding exposure time do not preclude DR feasibility and can be considered site profile issues.

As currently proposed, NIOSH has assumed that the time in the Process Building for any individual security guard was 0.25 hr/day (hours per day), or 91.3 hours per year. This provides an upper bound on the annual inhalation of total uranium as:

$$19 \text{ dpm}/100 \text{ cm}^2 \times 10,000 \text{ cm}^2/\text{m}^2 \times 10^{-6} \text{ m}^{-1} \times 1.2 \text{ m}^3/\text{hr} \times 91.3 \text{ hr}/\text{yr} = 0.208 \text{ dpm}/\text{yr}$$

The total uranium intake value of 0.208 dpm/yr was then multiplied by the activity ratios as summarized in table 5-3 of the ER (reproduced as table 3 in this report) for plutonium-239 (Pu-239), Am-241, neptunium-237 (Np-237), Th-230, and Tc-99 to obtain the recommended annual bounding inhalation intakes (in units of dpm/year) as summarized in table 7-1 of the ER, and reproduced in this report as table 4.

Table 3. Activity ratios for alpha-emitting contaminants from reprocessed fuel (table 5-3 of ER)

Radionuclide	Activity relative to total enriched uranium activity
Pu-239	0.0623
Am-241	0.0623
Np-237	0.00498
Th-230	0.0174
Tc-99	0.00011

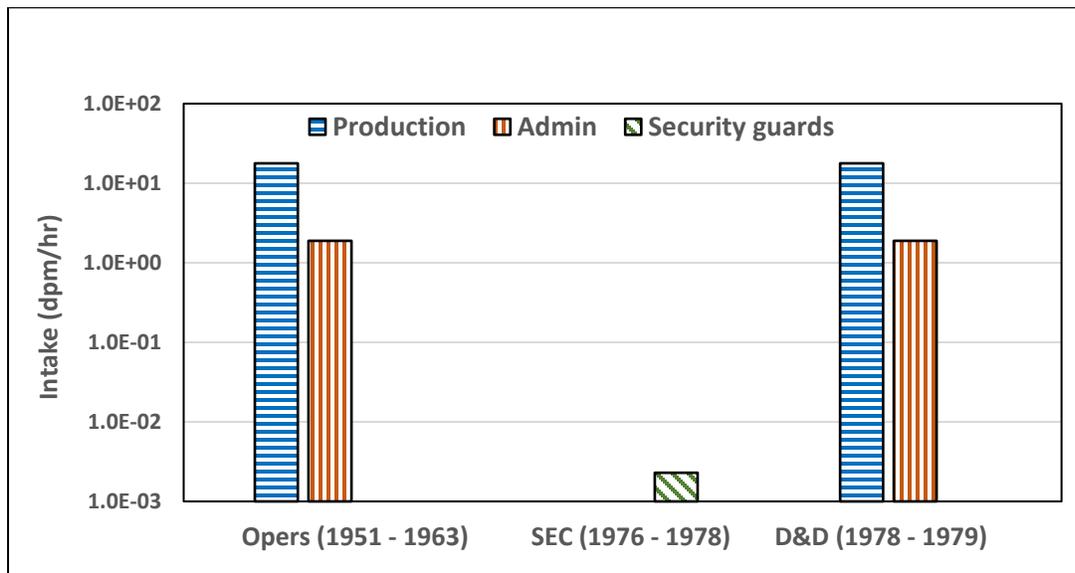
Table 4. Annual inhalation rates of uranium and reprocessed fuel contaminants (table 7-1 of ER)

Radionuclide	Annual inhalation (dpm/year)
Uranium	0.209*
Pu-239	0.0130
Am-241	0.0130
Np-237	0.00104
Th-230	0.00363
Tc-99	0.000023

*NIOSH rounded the previous derived value of 0.208 up to 0.209 dpm/year in this table.

Figure 1 provides a comparison of the recommended values for uranium intakes (in units of dpm/hour) as a function of time period and worker category.

Figure 1. NIOSH-recommended uranium intake rates as a function of time



NIOSH's recommended intake rates during the operation and decontamination and decommissioning (D&D) periods are 17.8 dpm/hour for production workers, 1.89 dpm/hour for administrative personnel, and 2.28E-3 dpm/hour for the security guards during the SEC period.

SC&A's evaluation of the potential internal intakes of radioactive material indicated that the concentrations should be substantially greater during operations and D&D compared to the SEC period when no significant activity was being conducted. Hence, the recommended intake value for the operation and D&D periods (17.8 dpm/hr) should be much greater than for the SEC period (2.28E-3 dpm/hr). SC&A found the recommended intake rates to be reasonable and in line with prevailing conditions during the SEC period. However, SC&A does have one observation concerning documentation of internal dose methods presented in the SEC ER.

Observation 2: Ingestion intake not addressed for SEC period

Tables 3 and 4 of the revised TBD provide ingestion intake values for production workers and administrative personnel during the operation and D&D periods (NIOSH, 2018, pp. 13–14). However, the ER does not address potential ingestion intakes for the SEC period. The annual ingestion intake is a fraction of the annual inhalation intake, resulting, in this case, in a very small ingestion value of much less than one dpm per year. Though not a measurable dose contributor, the ER should have addressed this for completeness.

7 SC&A's Evaluation of SEC ER External Doses

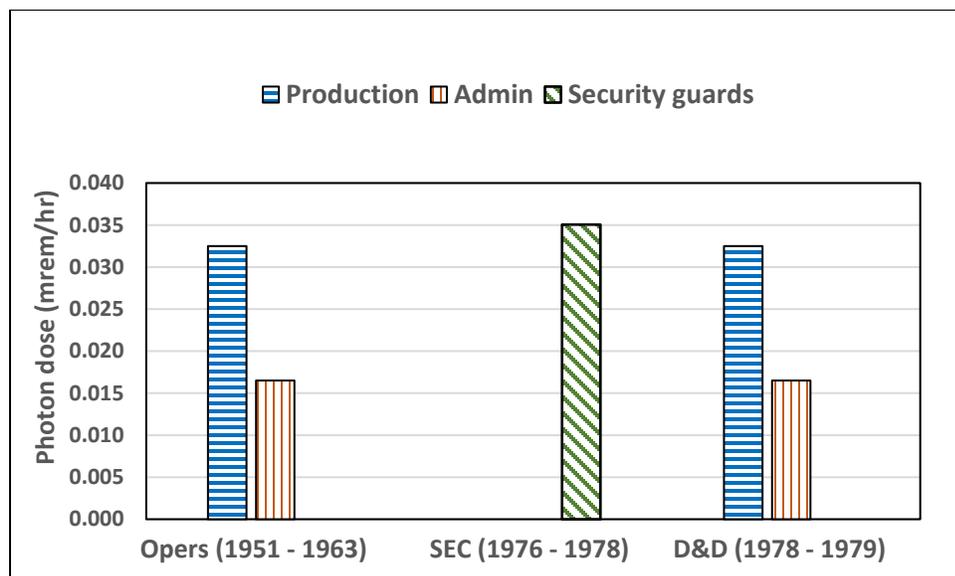
7.1 Photon dose

To derive the external photon dose during the SEC period, NIOSH assumed that the external photon exposure may be bound using the highest gamma results, 35 microrentgen (μR) per hour, from measurements made using a scintillation detector at 3 feet above the surface at the RPP. This was measured in the post-demolition survey of the Compressor Building by Oak Ridge Associated Universities (ORAU) (DOE, 1981), and although it included photons from natural radioactivity, the measurement encompasses all photon doses that may have come from the uranium and enriched fuel contaminants. The recommended annual external photon dose for the SEC period was derived as follows:

$$35 \mu\text{R/hr} \times 0.001 \text{ mrem}/\mu\text{R} \times 91.3 \text{ hr/yr} = 3.2 \text{ mrem/yr}$$

Figure 2 provides a comparison of the recommended external photon dose rate as a function time period and worker category.

Figure 2. NIOSH-recommended photon dose rate as a function of time period



As shown in figure 2, the recommended photon dose rate (0.035 millirem per hour (mrem/hr)) for security guards during the SEC period is approximately the same as that for the production workers (0.032 mrem/hr) during the operation period and also for the workers during the D&D period, and approximately twice that recommended for admin (administrative) workers (0.017 mrem/hr). The recommended photon dose rates for the operation and D&D periods

compared to the SEC period were derived using different methods but resulted in approximately the same dose rates.

SC&A found the recommended photon exposure rate for the SEC period to be reasonable (and likely bounding) as well as in line with the derived external dose rate for other periods as recommended by NIOSH for the RPP (NIOSH, 2018).

7.2 Beta dose

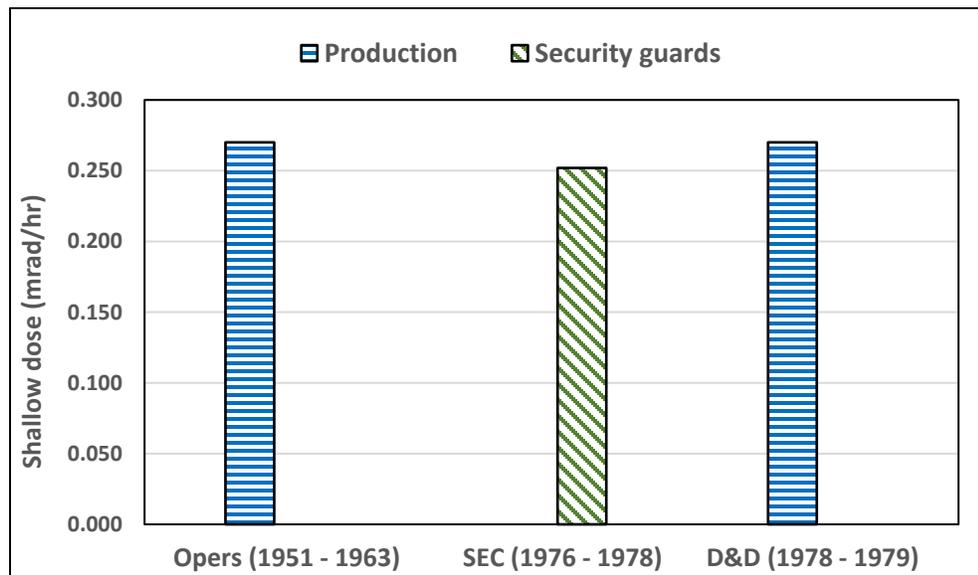
To derive the external beta dose rate during the SEC period, NIOSH assumed that the external beta exposure may be bound using the highest beta-gamma result from the January 15–16, 1975, survey during the standby period, 0.25 milliroentgen (mR) per hour (DOE, 1979a, PDF p. 16). Because the measurement includes exposure from both low-energy gamma and beta, it is bounding for beta exposure.

The recommended annual external beta dose for the SEC period was derived as follows:

$$0.25 \text{ mR/hr} \times 1 \text{ mrad/mR} \times 91.3 \text{ hr/yr} = 23 \text{ mrad/yr}$$

Figure 3 shows NIOSH's recommended annual external shallow dose rate (as >15 kiloelectron volt (keV) electrons) as a function of time period and worker category.

Figure 3. NIOSH-recommended shallow dose rate as a function of time period



As shown in figure 3, the recommended shallow dose rate (0.25 mrad/hr) for the security guards during the SEC period is approximately the same as that for the production workers during the operation period and workers during the D&D period (0.27 mrad/hr). The RPP TBD recommended that no shallow dose be assigned to administrative workers. The shallow dose rates recommended for the operation and D&D periods compared to the SEC period were derived using different methods but resulted in approximately the same dose rates. SC&A did note that the January 15 and 16, 1975, survey lists “Thayac Beta-Gamma mr/hr” results of three readings of residue material as 0.25 mr/hr and a “CO filter” from reactor housing of 0.5 mr/hr

(DOE, 1979a, PDF p. 16). SC&A assumes that NIOSH did not consider the 0.5 mr/hr reading as the highest reading because it was not likely a plausible exposure potential for security guards and therefore not included.

SC&A found the NIOSH-recommended shallow dose rate for the SEC period to be reasonable (and likely bounding) as well as in line with the derived shallow dose rate for other periods at the RPP (NIOSH, 2018).

7.3 Neutron dose

Most of the material of radiological concern at the RPP originated at the K-25 site and was low-enriched uranium. It was described as “minute quantities of [reprocessed contaminants including] Pu-239, Pu-240, Pu-241, U-236, Th-232, Np-237, and U-237” (NIOSH, 2020, PDF p. 21).

Therefore, there would not likely have been a significant potential for neutron exposure. SC&A concurs with the ER that the neutron exposure potential for the security guards for the SEC period would not present a significant dose as outlined in section 5.2.2.3, page 22, of the SEC ER.

It is worth noting that neutron dose was also evaluated for the K-25 site in which the source material originated. The TBD for K-25 determined:

While neutrons occur in some areas at K-25, the measured levels are low. Several studies have evaluated neutron fields at gaseous diffusion plants . . . ; these studies have shown neutron dose to be minimal in all areas. . . . These studies identified the storage cylinders, which contained either depleted UF₆ (tails) or enriched UF₆ (product), as areas where neutron fields might represent an exposure hazard. [NIOSH, 2006, p.14]

Such an exposure scenario would not likely be relatable to residual contamination exposures during standby mode at the RPP. Furthermore, the K-25 evaluation of neutron exposure potential identified an approximate 20% neutron-to-photon dose equivalent ratio. Even a photon dose of 3.2 mrem/yr at the RPP, an extremely conservative (and generally unrealistic) ratio for the RPP, would result in an annual neutron dose of less than 1 mrem/yr.

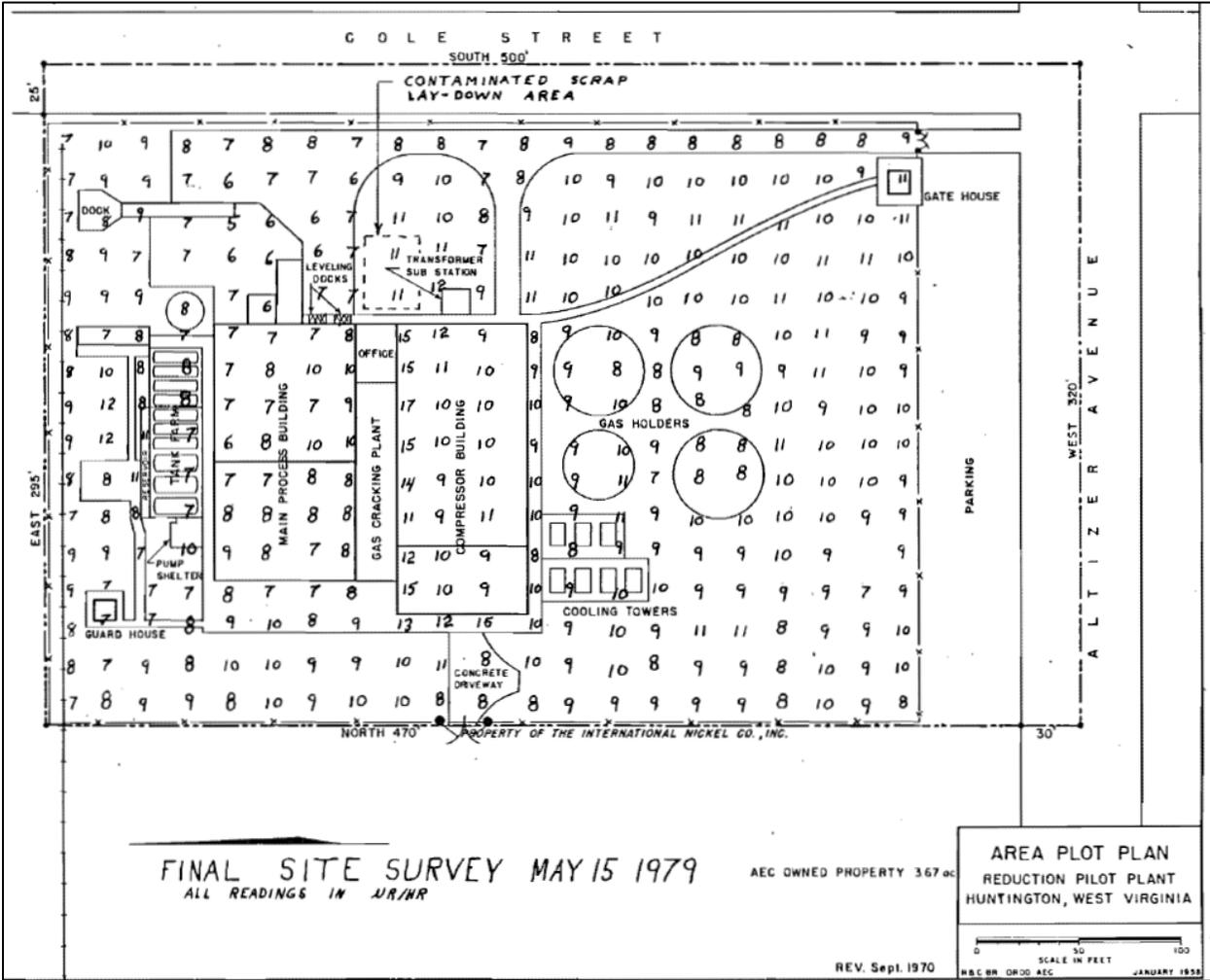
7.4 Ambient dose

While time spent along the perimeter of the buildings and along the fence line could be considered a logical ambient dose exposure scenario, a 1979 survey of the property post-demolition showed no elevated radiation levels above background (approximately 7 to 13 μ R/hr) at the outside areas of the plant footprint, as shown in figure 4, below (DOE, 1979a, PDF p. 50). Unfortunately, no surveys of the outside areas of the RPP were available for the January 1975 survey (just prior to the SEC ER period) due to the existence of snow on the ground (DOE, 1979a, PDF p. 5). SC&A concurs with the SEC ER that ambient external dose would likely be accounted for in the bounding external dose assignments based on the interior measurements recommended in the ER, assuming the appropriate exposure time is confirmed or appropriately modified.

A later survey performed in 1981 stated the following concerning outdoor gamma surveys:

Systemic measurements of exposure rates at 1 meter above the surface were not performed, since a previous survey had shown these levels to range between 6 and 11 $\mu\text{R/hr}$ – not significantly different from the normally expected background levels. Several random measurements confirmed these previous findings. [DOE, 1981, PDF p. 10]

Figure 4. 1979 external dose survey of the RPP (DOE, 1979a, PDF p. 50)



In addition, during the 1979 survey, a composite sample of soil was taken from four locations where contaminated material and equipment had been stored during demolition, revealing no levels significantly different than background. At that time, the U.S. Department of Energy (DOE) determined that the entire site could be released for unrestricted use.

A subsequent survey in 1981 (DOE, 1981) found that, while the uranium levels of most onsite soil samples were comparable to those found in offsite locations, a few elevated soil samples were obtained near a concrete pad. However, the 1981 survey concluded that these elevated

NOTICE: This document has been reviewed to identify and redact any information that is protected by the Privacy Act 5 U.S.C. § 552a and has been cleared for distribution.

samples likely resulted from contaminated equipment stored on the pad during the demolition activities. Therefore, SC&A believes any potential for ambient internal dose would be negligible.

7.5 Occupational medical dose

SC&A concurs with the SEC ER that the assignment of dose from occupational medical x-ray examinations as recommended in the RPP TBD, section 9, would apply for the SEC period and can be reconstructed with significant accuracy.

8 Summary and Conclusions

SC&A reviewed the NIOSH RPP SEC ER, taking into consideration previous PERs, TBD, and related captured documents for the RPP, and found the following concerning DR feasibility:

- **Interviews** – SC&A did not identify information that would preclude DR in the available claimant records and interview files. SC&A did note that there are potential interview candidates that may provide information for the SEC period, in particular an experienced-based exposure time to be used in DR. However, assumptions regarding exposure time would not affect DR feasibility and can be considered a site profile issue.
- **Internal intakes** – The ER method for assigning internal intakes is reasonable, however further discussion of the exposure time appears warranted. The concentration of radioactive material in the air should be substantially less during the SEC period (2.28E-3 dpm/hr) when no significant activity was being conducted, as compared to the operation and D&D periods (17.8 dpm/hr). However, SC&A did have an observation concerning ignored potential ingestion intakes (although very small) during the SEC period in the ER. This observation is relevant to the completeness of the SEC ER and does not affect DR feasibility.
- **External doses** – The recommended SEC period photon dose rate (0.035 mrem/hr) and the shallow dose rate (0.25 mrad/hr) are reasonable and in line with the derived external dose rate for other periods as recommended by NIOSH for the RPP in which operations or D&D activities occurred (NIOSH, 2018). Similar to the assignment of internal dose, assignment of external dose depends on the assumed exposure time and warrants further discussion.

In summary, SC&A finds that DR for security workers evaluated under SEC-00253 for the period from June 7, 1976, through November 26, 1978, is feasible.

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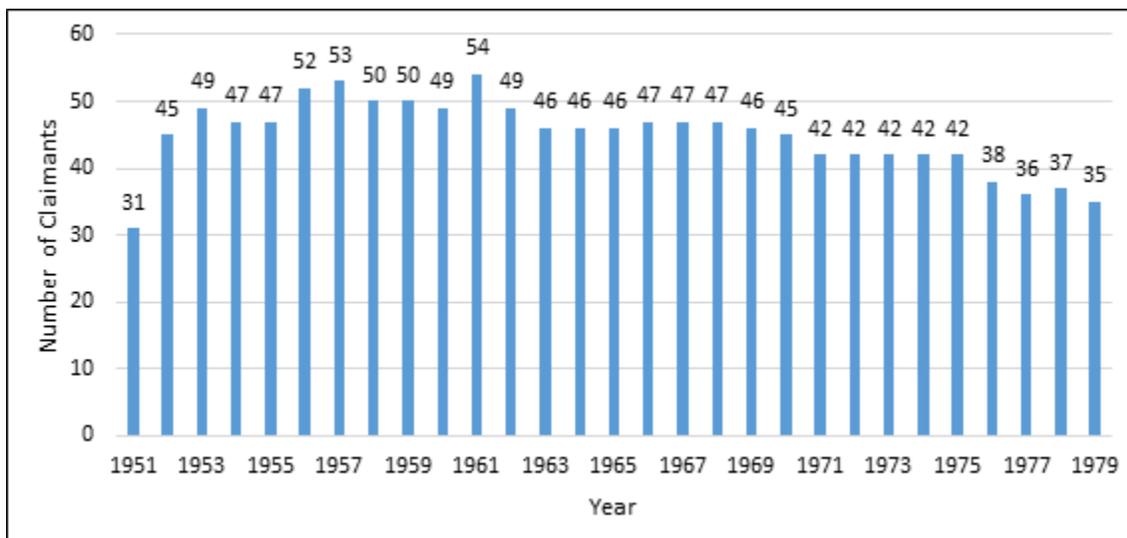
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Attachment A: Analysis of NOCTS RPP Claimants

As a part of the review of NIOSH's ER for the RPP SEC, SC&A reviewed the 77 claimant files in NOCTS associated with the RPP to determine if additional relevant information regarding the SEC period of June 7, 1976, to November 26, 1978, was available. During this period, the RPP was being maintained in a cold standby mode and regularly patrolled by security guards. Demolition of the RPP began on November 29, 1978, and ended on May 18, 1979.

SC&A examined the work periods of the claimants. The smallest number of claimants who worked in a given year was 31 claimants in 1951. The largest number of claimants who worked in a given year was 54 claimants in 1961. Thirty-eight claimants worked in 1976; 36 worked in 1977, and 37 worked in 1978. Figure A1 shows the number of claimants employed for each year from 1951 through 1979. Despite RPP operations ending in 1963, there is not a significant dropoff in the number of claimants in subsequent years. Note that it is probable that during 1976–1978, the claimants present during this period may not have necessarily entered the RPP, only that they were employed by International Nickel Company (INCO), which has a facility adjacent to the RPP and whose employees (namely security personnel) supported activities at the RPP as assigned.

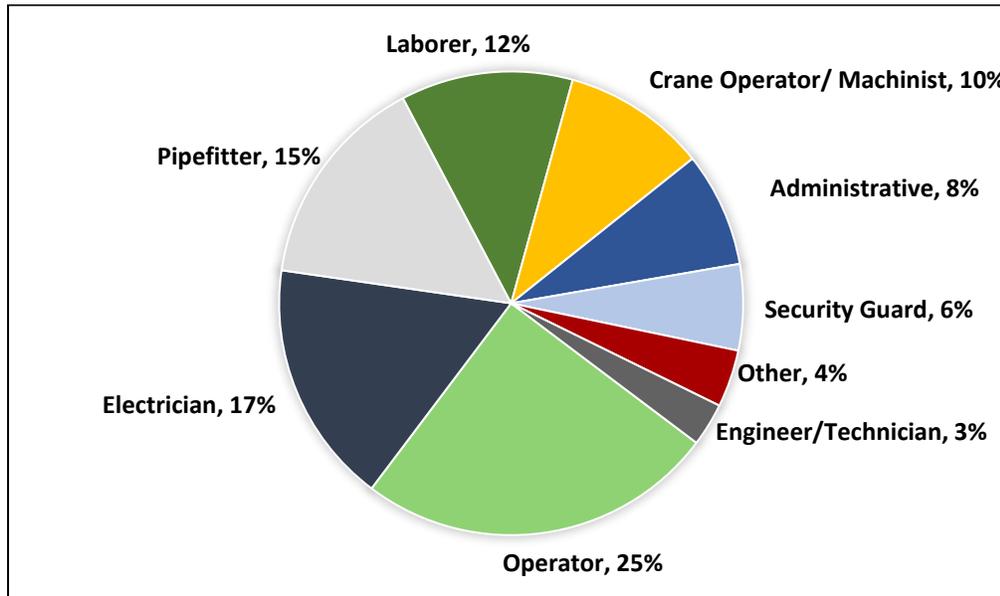
Figure A1. Number of claimants by year



SC&A assigned a job category title for each of the claimants based on information in the CATIs, taking into account the job categories identified by the claimants and when the claimants worked in each of these categories,³ if known. Figure A2 shows the percentage of claimants in the following job categories: crane operator/machinist, laborer, other, pipefitter, administrative, electrician, operator, security guard, and engineer/technician. The major job categories for the 77 claimants are operator (25 percent), electrician (17 percent), and pipefitter (15 percent). Five of the claimants (6 percent) are categorized as security guards.

³ Some claimants worked in multiple job categories during their employment.

Figure A2. Percentage of claimants working in SC&A-determined job categories at the RPP



A total of 44 claimants worked a portion or all of 1976 through 1978. Figure A3 shows the percentage of claimants who worked in each job category. Pipefitters (23 percent) and electricians (23 percent) comprised the largest labor categories during this time period.

Figure A3. [Redacted]

[Figure A3 is withheld in its entirety to prevent disclosure of Privacy Act-protected information.]

A job title of security guard was assigned to [REDACTED] that spanned a portion or all of 1976 through 1978. Information from the CATIs for [REDACTED] security guards is as follows:

1. [REDACTED]

██████████ “checked IDs and admitted people into the plant, patrolled the RPP on foot inside and outside, and inspected vehicles for theft and/or contamination.” No other pertinent information related to activities being conducted at the RPP during 1976 through 1978 was provided.

2. ██████████
description of duties was given as “plant protection services, checking & monitoring, inspecting and control of personnel movements. Classes in Emergency Medical Tech. In many areas to make sure things were locked up.” ██████████
██████████ “it took 1/2 hour to inspect the pilot plant every day.”
3. ██████████
██████████ “checked the building on all 7 floors to see if building was secure. Walked the perimeter of the fence around the RPP building.”
██████████ “The RPP building was shut down at the time [name redacted] was patrolling the building. [The EE] says it was supposed to be cleaned up, but the building still had all pipes and fixtures that were there when the building was in operation. [The EE] does not know what materials [the EE] may have been exposed to.”

In addition to reviewing the claimant records, SC&A also reviewed the only interview on record with an RPP employee that was not part of the CATI process. However, the single interview (conducted on March 20, 2020) did not provide any additional relevant information specific to the activities conducted in 1976 to 1978 or SEC-00253 generally.

Taking all of the above security guard activities into account, SC&A finds that the assumption in the SEC ER that it takes 15 minutes to patrol the process areas *on the main floor* and immediate area appears to be a reasonable estimate considering that the security guards also patrolled the perimeter fence line (which would logically take a considerable amount of time associated with the 30-minute patrol time). However, if the security guards had to ascend to and inspect multiple floors, then the estimate of exposure time may underestimate the actual exposure conditions.

Attachment B: Analysis of RPP Relevant SRDB Documents

The SRDB contains 290 documents relevant to the RPP (listed in table B2). These documents range from memorandums, reports, employee interviews, and NIOSH documentation related to DR development or work group activities. SC&A focused on reviewing documents with no preparation year identified that could potentially provide information concerning RPP operations for the 1970s or later and were not related to NIOSH DR development or the work group activities. Table B1 presents several documents that SC&A reviewed that had information that describes activities or events that would be associated with the period 1976 through 1978 and that may be pertinent to security guard activities. In the last column of the table, SC&A evaluated the information in each document in relation to the ER for SEC-00253 (NIOSH, 2020). Based on the information in table B1, SC&A did not find any new information that would preclude DR feasibility.

Table B1. SRDB documents containing information pertinent to the years 1976 through 1978

SRDB Ref. ID	Title	SC&A notes	Relationship to SEC-00253 ER
14801 (DOE, 1973)	<i>Decontamination and Decommissioning of Facilities</i>	Document from 1973 that indicates that “at most” 10 percent of the areas at the RPP were contaminated. Indicates no survey data to date.	Section 5.2.1 of the ER addresses internal radiological exposure sources, while section 5.2.2 addresses external radiological exposure sources. NIOSH used a radiological survey conducted in 1975 to address exposures related to residual contamination during the relevant standby period (NIOSH, 2020, PDF p. 20).
19654 (INCO, 1963)	<i>Listing of Data on Plant and Equipment in Stand-By</i>	Lists data and equipment in the RPP. States that full-time guards will no longer be necessary, and that daily checks will be made of the compressor room and process building by contractor’s guards. Weekly checks will be made by a maintenance mechanic and helper to see that the dry air system and emergency inert system are functional and check the heating system and air conditioning and general outward condition of the plant. Monthly a mechanic and helper will perform maintenance duties. Twice per year an inspection will be made of painting. Yearly an inspection will be made by a supervisor to assess deterioration.	In table 5-1 of the PER, security guards were assumed to conduct security inspections once per shift, which exceeds the daily frequency given in this reference. However, it is unlikely that EEs would have worked multiple shifts per day (and hence entered the RPP for multiple patrols per day).

SRDB Ref. ID	Title	SC&A notes	Relationship to SEC-00253 ER
85877 (DOE, 1979b, PDF p. 2)	<i>Reduction Pilot Plant (RPP) Contamination Clearance Report</i>	“In addition to the process equipment, the residue unloading system and the building walls, floors and structural members surrounding it were slightly contaminated and contained classified material; also, the CO holding tanks were slightly contaminated and were all scheduled for burial at Portsmouth.”	Section 5.2.1 of the SEC ER addresses internal radiological exposure sources, while section 5.2.2 addresses external radiological exposure sources. NIOSH used a radiological survey conducted in 1975 to address exposures related to contamination (page 19 of the SEC ER).
179771 (Huntington Alloys, 1978a, PDF p. 2)	<i>RPP Demolition Staffing</i>	Identifies five individuals as possible security guards during facility demolition. The five individuals are listed in attachment D of this report.	No direct relationship to the SEC ER, but these are potential interviews for followup.
179786 (Huntington Alloys, 1978b, PDF p. 8)	<i>Cleveland Wrecking Company Bid Proposal and Personnel Clearances</i>	Contains names of current and retired security guards as part of a security clearance request. See previous row above.	No direct relationship to the SEC ER, but these are potential interviews for followup.
179792 (DOE, 1979c)	<i>Inquiry About Health of ██████████</i>	Involves information about D&D activities. Of note is that ORNL oversight indicates D&D workers (Cleveland Wrecking Company) received pre- and post-uranium urinalysis sampling.	NIOSH has not been able to recover any exposure records; however, D&D activities are outside the current scope of this SEC evaluation.

Table B2. 290 SRDB documents relevant to RPP

SRDB Ref. ID	Title
9018	Radiological Assessments of the Former Reduction Pilot Plant, Huntington Alloys, Inc., Huntington, West Virginia and Biological Effects of Nickel Contamination
9033	Huntington Pilot Plant.xls Spreadsheets
14801	Decontamination and Decommissioning of Facilities
18809	General Layout Map of Huntington Pilot Plant
18810	Radioactive Contamination Limits
18811	Uranium Urinalysis for Huntington Plant, International Nickel Company
18812	Final Report of Annual Fire Survey of Reduction Pilot Plant Huntington, West Virginia, July 2–3, 1957
18862	Radiation Hazard Possibilities at the Reduction Pilot Plant
18863	Study of INCO Radiation Problem
18864	Comments on INCO Radiation Problem
18865	Shipment of Special Samples

SRDB Ref. ID	Title
18866	Visit to International Nickel Company, Huntington, West Virginia
18867	Xenon Type Gamma Probes INCO Order 13042
18868	Health and Safety Requirements Associated with Uranium Content of the Starting Material
18869	Appendix "C", Contract AT(40-1)-1092 February 1958
18870	Visit to International Nickel Company, Huntington, West Virginia on February 26, 1958
18871	Report of Annual Fire Protection Survey of Reduction Pilot Plant Huntington, West Virginia
18872	Meeting with INCO Personnel at Huntington, West Virginia
18873	International Nickel Company's Response to the Annual Fire Survey of the Reduction Pilot Plant
18874	Appendix "C", Contract AT(40-1)-1092 May 1958
18875	Excerpts from OROO Accounting Manual
18876	Request for Nickel Carbonyl Detection Equipment
18877	Authorized Request to Purchase Nickel Carbonyl Detection Equipment
19510	Basis for Development of an Exposure Matrix for Huntington Pilot Plant
19511	Technical Basis Document: Basis for Development of an Exposure Matrix for Huntington Pilot Plant SUPERSEDED
19654	Listing of Data on Plant and Equipment in Stand-By
19655	Nickel Powder
19656	Disposition of Massive Nickel
19657	Licensing Requirements with Regard to Property which May Be Slightly Contaminated with Special Nuclear Material
19658	Determination of Nickel in Urine
19659	Directive for Modifications to Reduction Pilot Plant, Huntington, West Virginia-Subproject 224-57n-INC2
19708	Fabrication of Xenon Probes
19709	Xenon Probe Procurement
19710	INCO Reduction Pilot Plant Modifications
19711	Authorization to Purchase and Install Voltage Stabilization Transformers in Certain Motor Control Circuits of the Reduction Pilot Plant
19712	Photographs Showing Construction Progress of the Reduction Pilot Plant at Huntington, West Virginia Since January 1953
19713	Report of Conference with International Nickel Company Relative to the Huntington, W. Va. Project
19714	Available Ambulance and Maximum Allowable Concentration of Nickel Carbonyl
19715	USAEC Oak Ridge Directing Statement for Release to the Press Announcing the Completion of Construction in the Project at Huntington, West Virginia
19716	Report on Delay in Start of Operation on Reduction Pilot Plant
19717	Temporary Duty for Huntington Project Employees
19718	Modifications of the North Charmo Furnace
19719	Proposed Expansion of International Nickel Company Facilities at Huntington, West Virginia
19720	Approval for Modifications to the South Charmo Furnace
19721	Request for Formal Approval for the Procurement of a CO Converter for the Chemico Gas Reforming Portion of the Gas Plant
19722	Request for Formal Approval for Modifications of the Inert Gas Purge System for Containers

SRDB Ref. ID	Title
19723	Security Safeguards Necessary in Connection with the Proposed Expansion of the Reduction Pilot Plant
19724	Increased Number of Operating Personnel Due to the Current Expansion of the Reduction Pilot Plant
19725	Conversion of the Huntington Plant for Processing of Scrap Barrier
19726	Processing of Scrap Barrier Material at the INCO Plant, Huntington, West Virginia
19727	Request for Approval of Gasholder Membrane Replacement
19728	Gasholder Membrane Replacement Costs
21998	International Nickel Company's 1956 Agreement to Process Government-Owned Nickel Scrap
21999	Various Letters Describing Materials and Processes 1956, 1960 and 1962
22000	Directive for Modifications to Reduction Pilot Plant, Huntington, West Virginia Subproject 224-57n-INC2 February 1957
22104	Oak Ridge Gaseous Diffusion Plant Detail of Nickel Ingot Transactions Supplemental Information Requested for FY1959–FY1961 Budget
22105	Specifications for Starting Material
22106	U.S. AEC to International Nickel Company Confirming Understanding of Metallic Nickel Specifications June 13, 1957
22125	Security of Nickel Powder Shipments to K-25 Plant
22126	Facility Data Report Changing Classification of Material from Secret to Unclassified
22128	Physical and Security Review of International Nickel Company Facility
23562	Cooling Water System - Reduction Pilot Plant
23563	Installation of Additional Fire Hydrant
23564	Residue from Starting Material
23565	Estimates for Gamma Alarm System to Make Huntington Plant Compliant with Amendment to 10CFR70 in the Federal Register
23566	Replacement of Stripper Condenser
23567	Replacement of Re concentrator
27489	Logbook 73 Health Physics and Hygiene Inspection Reports July 1959 - January 1961
28116	Personal Communication Between ██████████ and ██████████
28117	E-mail Between ██████████ and ██████████
31605	Audit of Case ██████████ from the Huntington Pilot Plant
33489	Companies and Research Sites Where Radioactive and Toxic Material Might Have Been Processed Secretly
42321	Companies and Research Sites Where Radioactive and Toxic Materials Might Have Been Processed Secretly
43959	Status of Actions FUSRAP Site List
44825	The Traveler's Guide to Nuclear Weapons a Journey Through America's Cold War Battlefields
47431	Technical Basis Document for the Huntington Pilot Plant, Huntington, West Virginia, rev. 00
63426	List of Manhattan Engineering District Facilities (Around the Country) with Reference to Their Contracts
79849	Data Collection, Processing, Validation, and Verification

SRDB Ref. ID	Title
80278	Minutes of DOL Site Exposure Matrices Roundtable Meetings Huntington Pilot Plant
80285	Nickel Plant at Huntington
80286	Huntington Process Data (Redacted)
80287	Preparation (Redacted)
80288	Cupping Test as an Indication of Ductility
80289	Sheet (Redacted)
80290	Meeting at Huntington with INCO April 19, 1956 (Redacted)
80291	Additional Nickel Powder Capacity (Redacted)
80292	Expansion of Reduction Pilot Plant (Redacted)
80293	Notes on Meeting with INCO in New York City (Redacted)
80294	Notes on Meeting with INCO at Oak Ridge (Redacted)
80295	Guard Force at Huntington Facility
80296	Security Visit, Huntington Plant, International Nickel Company, Huntington, West Virginia (Redacted)
80297	Security Interest of RPP (Redacted)
80299	Meeting in Huntington on September 9 on Over-All Question of Huntington Plant Disposal (Redacted)
80301	Nickel Powder Plant at Huntington (Redacted), June 15, 1951
80302	Nickel Powder Plant at Huntington (Redacted), June 1, 1951
80303	Nickel Powder Plant at Huntington (Redacted) May 9, 1951
80304	Estimate of Maximum Damage Arising Out of RPP Activities at Huntington, West Virginia (Redacted)
85875	Elimination of Reduction Pilot Plant (Huntington Pilot Plant) From FUSRAP
85876	Site Description and Plot of Plant
85877	Reduction Pilot Plant (RPP) Contamination Clearance Report
85880	Radiation Contamination Clearance Report - Former Reduction Pilot Plant (RPP), Huntington, West Virginia March 6, 1980
85882	Comments on the Reduction Pilot Plant Radiation Survey and Contamination Clearance Report
85883	Radiation Contamination Clearance Report - Former Reduction Pilot Plant (RPP), Huntington, West Virginia April 4, 1980
85886	Comments on Site Radiation Contamination Clearance Report
85888	Preliminary Radiological Survey of the Former Reduction Pilot Plant, Huntington, West Virginia
85894	Comments on the Report Entitled "Radiological Assessment of the Former Reduction Pilot Plant, Huntington Alloys, Inc., Huntington, West Virginia" April 7, 1981
85896	RASCA - Results of Nickel Analysis on Soil Samples from the Former RPP Site, Huntington, West Virginia
85898	Meeting Minutes Huntington Alloys Nickel Contamination
89425	Federal Register Volume 74 No. 119 June 23, 2009 Notice of Revision of Listing of Covered Department of Energy Facilities
90130	Worker Outreach Meeting January 5, 2006 1:00 PM Meeting Confirmation Letter

SRDB Ref. ID	Title
90131	Worker Outreach Meeting January 5, 2006 Presentation Development of the Huntington Pilot Plant Site Profile
90136	Worker Outreach Meeting January 5, 2006 1:00 PM - Final Meeting Minutes Rollout Meeting for the Huntington Pilot Plant Site Profile
90137	Worker Outreach Meeting January 5, 2006 1:00 PM Sign-In Sheet for Huntington Pilot Plant, USW Local 40
90138	Worker Outreach Meeting January 5, 2006 Draft Meeting Minutes Transmittal Letter to United Steelworkers of America Local 40
90979	Worker Outreach Meeting March 23, 2010 11:00 AM
92102	Worker Outreach Meeting March 23, 2010 11:00 AM Sign-In Sheet
93386	Search Procedures for Records Request to Records Holding Area 1916T-2 Oak Ridge, Tennessee
99920	Oak Ridge Gaseous Diffusion Plant Quarterly Report Second Quarter FY1960, October 1, 1959 Through December 31, 1959
101547	NucNews September 21, 2000
101815	Petitioners' Motion to Transfer Proceedings to District Court, Rulemaking Proceeding
105655	Reduction Pilot Plant TBD Revision
113045	Former Worker Medical Screening Program 2010 Annual Report
118511	Documented Communication Worker Outreach Meeting for Huntington Pilot Plant March 23, 2010 11:00 AM Redacted Draft Minutes
118531	SEC Training Class Sites and Name and Contact Information April 29–30, 2008
118535	NIOSH Dose Reconstruction and SEC Workshop Contact Information April 2–21, 2010
120457	DOE Former Worker/Energy Compensation CAIRS Central Worker Data Tracking
120461	Radiation Bulletin RADBULL January 12, 2001
124195	EEOICPA Bulletin 08-24 Chapman Valve, ANL-West, General Steel Industries and the Huntington Pilot Plant Program Evaluation Reports
126870	Mortality Among Workers in a Nickel Refinery and Alloy Manufacturing Plant in West Virginia
129282	Department of Energy Facilities Covered Under the Energy Employees Occupational Illness Compensation Program Act of 2000, as Amended
130785	Technical Basis Document for the Huntington Pilot Plant, Huntington, West Virginia
135747	Federal Register Volume 77 No. 44 March 6, 2012 DOE Energy Employees Occupational Illness Compensation Program Act of 2000; Office of Workers' Compensation Programs
135767	Annual Report to Congress of the Atomic Energy Commission for 1970
135769	Annual Report to Congress of the Atomic Energy Commission for 1971
137320	Nuclear Weapons Production in the U.S. 1941–2011
143446	Meeting Between Representatives of NIOSH and SCA January 12–13, 2005
143939	EEOICPA Updated Listing for Huntington Pilot Plant
146254	Federal Register Volume 80 No. 12 January 20, 2015 Energy Employees Occupational Illness Compensation Program Act of 2000, as Amended
146512	Work Sites That Are/Were DOE Facilities Exclusively and Also Another Type of EEOICPA Covered Facility
149064	Site Profile for Atomic Weapons Employers That Worked Uranium Metals Appendix BL - Jessop Steel Company

SRDB Ref. ID	Title
149234	Huntington Pilot Plant
166967	Guidance on Assigning Occupational X-Ray Dose Under EEOICPA for X-Rays Administered Off Site
167816	NRC's Final Response to a Freedom of Information Act Request on Spencer Chemical Company's Jayhawk Works Plant Allegation RIV-2000-A-0161 FOIA/PA-2016-0067-Resp 1-Final, Part 1 of 8
175109	Technical Basis Document for the Huntington Pilot Plant, Huntington, West Virginia
177572	Preliminary Review of the Revised Site Profile for the Huntington Pilot Plant - Draft
177576	Review of the Revised Huntington Pilot Plant Site Profile - Draft
177579	The Portsmouth Gaseous Diffusion Plant Documents Exposé
178463	Radiation Bulletin (RadBull) Vol. 9.107
178464	Report of the International Committee on Nickel Carcinogenesis in Man - Excerpted Pages
178471	U.S. Department of Health and Human Services Centers for Disease Control National Subcommittee on Dose Reconstruction Reviews Wednesday August 7, 2013
178472	U.S. Department of Health and Human Services Centers for Disease Control Advisory Board on Radiation and Worker Health Subcommittee on Dose Reconstruction Reviews Monday, November 8, 2010
178473	Specifications for Demolition for the Removal of the Reduction Pilot Plant
178474	Site Exposure Matrix Review A Comparison Between Site Processes and Labor Categories
178475	Denial of DOE Request for Exemption to Permit Salvaging Contaminated Smelt Alloys
178480	Huntington News: Over Five Million Dollars Paid to Former Huntington Pilot Plant Workers
178482	Huntington News: After Demolition of Huntington Pilot Plant
178484	NAAV Newsletter October 2013
178500	Report to the Advisory Board Audit of Case #PIID* from the Huntington Pilot Plant Contract 200-2004-03805 Task Order 4
178501	A Review of NIOSH's Program Evaluation Reports OCAS-PER-025 and OCAS-PER-033, "Huntington Pilot Plant TBD Revision" - Draft
178504	Review of Impacted Cases Reworked for the Evaluation of Internal Intakes from the Huntington Pilot Plant DCAS-PER 066, Subtask 4 - Draft
178505	Status of Actions - FUSRAP Site List
178675	Vale Limited
178676	INCO Limited History
178866	Petitions for Special Redress
178878	Advisory Board on Radiation and Worker Health 130th Meeting Wednesday August 21, 2019
179278	Huntington or Reduction Pilot Plant Nickel Powder - Extracted from ORGDP Report K-1907
179327	Change in Classification Level of RPP Shipments to K-25
179328	Directive for Expansion of Reduction Pilot Plant - Huntington Project E-2-24X-3080
179329	Security Measures Involved in the Construction of the Huntington Plant
179410	Nickel Powder
179411	Uranium Contained in Nickel Scrap Transferred to INCO at Huntington, West Virginia
179605	Analysis of Sample HP-6 Collected at the INCO Plant, Huntington, West Virginia

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179606	Analysis of Samples Collected at the INCO Plant, Huntington, West Virginia
179607	Disposal of Personal Property at RPP
179608	Disposal of the Reduction Pilot Plant - Huntington, West Virginia
179609	Supplemental Agreement 23 to Contract AT-(40-1)-1092 - Draft
179610	Preliminary Proposal for Disposal of Huntington Facility
179611	Discussion of Removal Problems and Poor Condition of Property
179612	RPP Disposal Planning Outline - Draft
179690	Cleveland Wrecking Company Contract EY-76-C-05-1092 September 26, 1977
179691	Status of RPP Demolition June 30, 1979
179692	Status of RPP Demolition May 31, 1979
179693	Status of RPP Demolition July 31, 1979
179694	Status of RPP Demolition February 28, 1979
179695	Status of RPP Demolition January 31, 1979
179696	Appraisal of Portion Atomic Energy Commission Property Huntington, Cabel County, West Virginia
179697	Supplemental Agreement 23 to Contract AT-(40-1)-1092 With ERDA and Huntington Alloys
179698	Supply Division's Need for Understanding Type and Condition of Personal and Real Property
179699	Photographs Taken at RPP Powder Plant at INCO
179700	Disposal of Huntington Facility Closing Statement Cost
179701	Contamination (Uranium and Carbonyl) Problems Incident to Disposal of INCO Plant
179702	Plans for Disposal of INCO Plant, Huntington, West Virginia
179703	Comments of Proposed Disposal of Reduction Pilot Plant - Draft
179704	Dismantling RPP - Estimate
179705	Description of Shutdown and Placement in Stand-By of Reduction Pilot Plant
179706	Economic Evaluation of Disposal of Plant and Equipment
179707	General Provisions for Fixed Price Dismantlement Contract
179708	Transfer of Former Reduction Pilot Plant Site to Huntington Alloys, Inc.
179709	Guidelines for Dismantling RPP
179710	Nickel Contamination at the Former Reduction Pilot Plant in Huntington, West Virginia - Draft
179711	Final Report Radiological Assessment of the Former Reduction Pilot Plant, Huntington, West Virginia
179712	Transfer of RPP Site to Huntington Alloys, Inc.
179713	Nickel Concentrations in Soils from the Former Reduction Pilot Plant Huntington, West Virginia
179714	Transfer of the Former Reduction Pilot Plant Site to Huntington Alloys, Inc.
179715	Skeletal Plan for Disposal of RPP
179716	Former Reduction Pilot Plant Huntington, West Virginia, Soil Samples
179717	Disposal of Contaminated Equipment
179718	Limiting Conditions and Assumptions

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179719	Planned Excess Disposal of Reduction Pilot Plant, Huntington, West Virginia
179720	Plan for Decontamination and Disposal of Nickel Powder Plant
179721	Disposal of the RPP Facility
179722	Transfer of the Former Reduction Pilot Plant Site, Huntington, West Virginia
179723	Preliminary Proposal for Disposal of Huntington Facility
179724	Disposal of the Reduction Pilot Plant, Huntington, West Virginia
179725	Radiological Assessment of the Former Reduction Pilot Plant
179726	Disposal of Huntington Facility
179727	Inventory of the Personal Property Located at the RPP
179728	Dismantling of the Reduction Pilot Plant and Cleanup of the Site
179729	RPP Disposal Meeting July 13, 1977
179730	Disposal of Reduction Pilot Plant
179731	RPP Processing Component Sketches
179732	Reduction Pilot Plant (RPP) Contamination Clearance Report
179733	Status of RPP Demolition August 31, 1979
179734	Closeout of the Cleveland Wrecking Contract
179735	Status of RPP Demolition April 30, 1979
179736	Status of RPP Demolition March 31, 1979
179740	Further Utilization Screening Unwarranted Due to Age and Condition of RPP Property and Security and Safety Considerations
179741	Answers to Questions and Comments on Health Safety and Security
179742	Comments on Draft Specifications for Demolition RPP
179743	Health Protection Requirements for the RPP Dismantling
179744	Answers to Questions Raised by INCO
179745	Proposed Corrections to Invitation to Bid for Disposal of the RPP
179746	Demolition of the RPP
179747	Cumulative Costs for Demolition of the RPP Through December 31, 1978
179748	RPP Release Letter for Documents Captured February 20, 2020
179749	Radiological Assessment of the Former Reduction Pilot Plant
179750	Draft Specifications for Demolition RPP - Draft 7
179751	Shipments of Rubble from RPP to GAT
179752	Invitation to Bid for Dismantling and Removal of RPP
179753	Fixed Price Dismantlement Contract for RPP
179754	Cleveland Wrecking Declines to Provide Cost and Pricing Data
179755	Midyear Budget Review Assumptions FY1955
179756	ORNL Flash Estimates FY1950 and FY1951
179757	U.S. Atomic Energy Commission Schedules
179758	Disposal Scheme for the Reduction Pilot Plant

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179759	Request to Perform Sample Analysis
179760	Commitment of Funds - INCO
179761	Disposition of Land and Easements - Draft
179762	Developing a Disposal Plan for Government Owned Reduction Pilot Plant
179763	Appraisal of Certain Lands Located at Cole Street and Altizer Avenue, Huntington, West Virginia (RPP)
179764	Approval to Proceed with Fair Market Value Appraisal of Cole Street and Altizer Avenue
179765	Langley Diary GSA Contemplated Making a Survey of the Property and Disposal of RPP Plans
179766	Disposal Plan - Reduction Pilot Plant
179767	Demolition of a Five-Story Steel Reduction Pilot Plant Located at INCO Company Plant - Huntington, West Virginia
179768	Proposal to Demolish and Remove Process Building and Shed and Remove Equipment from Compressor Building
179769	Wrecking Corporation of America Submits Firm Proposal
179770	Langley Diary INCO Representatives in Oak Ridge to Discuss Disposal of the Huntington Plant
179771	RPP Demolition Staffing
179772	Notification of Demolition Activities Involving Asbestos
179773	Langley Diary Injury and Status of Demolition Contract
179774	Allowable Overhead for RPP Demolition
179775	RPP Demolition Cost Estimate and Planned Outline of Cost Control
179776	Radiological Contamination Conditions
179777	Notification of Demolition Activities Involving Asbestos
179778	Revised Language for the RPP Dismantling Contract and Draft Specifications for Demolition - Drafts 6 & 7
179779	Reimbursement for Costs and Expenses Incurred November - December 1980
179780	Progress Report Burial Scrap, Portsmouth Site, from Demolition (Demolition) of INCO Nickel Powder Plant
179781	Requirements for The RPP Dismantling and Disposal
179782	Transfer and Disposal of RPP Site
179783	Radiological Surveys and Radioactive Contamination Clearance Reports
179784	Draft Deed for RPP Property
179785	Radiological Contamination Clearance and Post Demolition of RPP
179786	Cleveland Wrecking Company Bid Proposal and Personnel Clearances
179787	Final Report Radiological Assessments of the Former Reduction Pilot Plant, Huntington Alloys Inc., Huntington, West Virginia
179788	Dismantling Plan and Appraisal of RPP
179789	Lease Renewal, Appraisal and Dismantling of RPP
179790	Cost Directive for Disposal of the Huntington Facility

SRDB Ref. ID	Title
179791	Radiological Assessments of the Former Reduction Pilot Plant, Huntington Alloys Inc., Huntington, West Virginia
179792	Inquiry About Health of [REDACTED]
179799	Shutdown, Standby Maintenance and Startup of Reduction Pilot Plant Recommendations
179905	Documented Communication SEC-00253 With Victor Dailey on RPP February 18, 2020
179907	Special Exposure Cohort Petition-Form B for SEC-00253 Reduction Pilot Plant
179908	RPP Maintenance
180218	Specifications for Demolition
180250	UCNI - Gaseous Diffusion Plant Upgrade Specifications
180375	DOL Modification of Covered Dates for RPP Site
180654	Special Exposure Cohort Petition Evaluation Report Petition SEC-00253 Reduction Pilot Plant April 24, 2020
181387	RPP AWE Environmental Dose Workbook Version 1.0
181591	Development of the Huntington Pilot Plant Site Profile
182915	NIOSH/DCAS: SEC-00253 – Reduction Pilot Plant

Attachment C: Table of Claim Numbers

Table C1 provides a cross-reference for the arbitrary claimant label used in the main text of this report and the NOCTS claimant number.

Table C1. [Redacted]

[Table C1 is redacted in its entirety to prevent disclosure of Privacy Act-protected information.]

Attachment D: List of Five Potential Followups

The following is a list of the five individuals who may have been security guards during the RPP facility demolition. They have no direct relationship to the SEC ER, but they are potential interviewees for followup.

- [List of names is redacted in its entirety to prevent disclosure of Privacy Act-protected information.]