Draft White Paper

SC&A REVIEW OF TABLE 5-1 OF *INTERNAL DOSIMETRY DATA FOR THE SAVANNAH RIVER SITE*, ORAUT-OTIB-0081, REV. 2

Contract No. 211-2014-58081

Prepared by

Bob Barton

S. Cohen & Associates
1608 Spring Hill Road, Suite 400
Vienna, Virginia 22182

Saliant, Inc.
5579 Catholic Church Road
Jefferson, Maryland 21755

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Project Manager: _____ Date: John Stiver, MS, CHP	Reviewers: Joseph Fitzgerald Harry Chmelynski John Stiver

Record of Revisions

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0 (Draft)	07/22/2014	Initial issue

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ACRONYMS AND ABBREVIATIONS

ABRWH	Advisory Board on Radiation and Worker Health
CATI	Computer-Assisted Telephone Interview
CMX	Code Designation for a Facility
DOE	U.S. Department of Energy
ETF	Effluent Treatment Facility
HANM	Code Designation for a Facility
HAOM	Code Designation for a Facility
HP	Health Physics
HPRED	Health Protection Radiation Exposure Database
mR	milli-Roentgen
mrad	milliradian
NIOSH	National Institute for Occupational Safety and Health
NOCTS	NIOSH/OCAS Claimant Tracking System
ORAUT	Oak Ridge Associated Universities Team
PSF	Plutonium Storage Facility
RBOF	Receiving Basin for Off-Site Fuel
RRF	Resin Regeneration Facility
SC&A	S. Cohen and Associates
SEC	Special Exposure Cohort
SRDB	Site Research Database
SRTC	Savannah River Technology Center
SWDF	Solid Waste Disposal Facility
TBD	Technical Basis Document
TNX	Code Designation for a Facility

EXECUTIVE SUMMARY

Internal Dosimetry Data for the Savannah River Site, ORAUT-OTIB-0081, Rev. 2 (ORAUT 2013), provides the framework for administering the various coworker intake models at the Savannah River Site (SRS). Contaminants of concern provided in that document are americium, californium, curium, fission products, tritium, neptunium, plutonium, thorium and uranium. Table 5-1 of that document (recreated as Attachment 1 of this report) presents a methodology for applying the appropriate contaminant mixture based on the work location of the individual at the site. To accomplish this, Table 5-1 utilizes "dosimeter area codes" (also referred to as "HP Area" codes in this report) to place the worker in a specific location that has a unique mix of the aforementioned coworker intakes.

This report presents SC&A's review of the proposed method of administering the multiple contaminant intakes at SRS. The review mainly focuses on the portion of the Special Exposure Cohort (SEC) evaluation period, which extends from October 1, 1972, up through the 1980s, where significant temporal completeness concerns had previously been identified (see Section 1 for prior discussions). Note that many of the overall findings and observations also pertain to earlier and later periods where noted. The review has three main facets:

1. An evaluation of the availability and completeness of dosimeter area code information that can be utilized to assign individual workers to a specific work location (see Sections 2 and 3).

2. A review of the accuracy and underlying references used to relate specific dosimeter codes with different areas of the SRS plant (see Section 4).

3. An analysis of the practical implementation of such a model as it relates to a sample of 20 individual claimants. The evaluation includes temporal considerations (see Section 5) as well as a comparison of how well HP Area codes comport with alternate work location information when available (see Section 6).

To facilitate this review, NIOSH provided SC&A with a list of references underlying the formulation of Table 5-1. In particular, references were provided to demonstrate the relationship between the HP Area codes and specific site locations (SRS Various Dates), but also supplementary dosimeter logbooks that could be used to fill in any temporal gaps identified in an individual claimant's monitoring record. These latter references are listed in Attachment 3 for convenience.

SC&A has developed three main findings as a result of this review and one overarching finding, which are presented below. Additionally, SC&A made a number of "observations," which are presented after the findings.

SC&A FINDINGS

Finding 1: Based on information contained in the claimant file and supplemental dosimetry logbooks available on the SRDB, dosimeter area codes are generally only available on a

quarterly basis for the period beginning in October 1972 and extending up to the early 1980s. From this period to approximately 1988, dosimeter area codes are available on a monthly basis if the claimant had a recorded dose during the cycle. Beginning in July of 1989, dosimeter area codes are available on a monthly basis regardless of whether or not dose was actually accrued. Finally, the listing of multiple dosimeter codes during the same badging period (indicating multiple work locations) was observed beginning in approximately 1990. (See Sections 3 and 5.)

Finding 2: The technical basis underlying the relationship between dosimeter area codes and their associated locations shown in Table 5-1 of OTIB-0081 is incomplete. Additionally, SC&A observed apparent discrepancies between the dosimeter code/location combinations presented in Table 5-1 and the codes/locations listed in the underlying references provided by NIOSH. (See Section 4.)

Finding 3: A review of 20 claimant files and associated logbook data demonstrated that discrepancies exist between the location indicated by the dosimeter area code and other location information, such as bioassay sampling, in-vivo counts and other investigative documents (missing exposure reports, decontamination forms, etc.). In some observed cases, the application of coworker intakes based on the dosimeter code would underestimate the internal exposure potential experienced by the claimant. (See Section 6 and Attachment 2.)

Overarching Finding: Given the noted deficiencies in completeness and accuracy of relating dosimeter area codes with specific areas, significant temporal considerations in available dosimeter codes for claimants during some periods, and observed discrepancies between dosimeter area codes and other available location information within a claimant file, SC&A does not feel that the use of such codes forms a sufficiently accurate and robust basis for the assignment of specific contaminant coworker intakes. This is particularly true in the earlier period (1972 into the early 1980s) when dosimeter area code assignment is generally restricted to a quarterly basis. However, discrepancies between claimant dosimeter codes and alternate work location information were also observed as late as 1993, when area codes are frequently available on a monthly basis. SC&A recommends that NIOSH should only consider limiting what contaminant intakes are assigned in cases of clear and documented evidence that a worker could not have been exposed to the specific radionuclides present at SRS. Examples would include irrevocable statements made by the claimant during the Computer-Assisted Telephone Interview (CATI) process or a complete record of bioassays in a specific location (such as daily tritium monitoring in a reactor area).

SC&A OBSERVATIONS

Observation 1: Table 5-1 dosimeter area assignment begins in 1961; however, SC&A notes that the use of dosimeter area codes extends as far back as 1958. SC&A observed at least 22 distinct area codes used prior to 1961, and the compilation of SRS Health Physics reports provided by NIOSH (SRS Various Dates) is dated 1959.

Observation 2: SC&A noted that the codes “2F” and “5G” were in use in 1972, although Table 5-1 does not acknowledge them until the 1973–1990 timeframe. This is evidence that there is likely some overlap in the use of codes that is not discussed in ORAUT-OTIB-0081.

Observation 3: SC&A observed the use of the codes "6E" and "12J" in 1960 that are not included in Table 5-1.

Observation 4: 735-A and 735-11A apply to "environmental radionuclides" and neptunium in 1962; however, starting in 2004, Table 5-1 instructs dose reconstructors to apply 773-A intakes. It is unclear if there is any reason for the change other than that the dosimeter area code was changed to SRTC (Savannah River Technology Center).

Observation 5: It is unclear why the 235-F Vaults assign thorium intakes, but "F Area Unknown Location" does not assign a thorium intake.

1.0 BACKGROUND AND PRIOR DISCUSSIONS REGARDING TABLE 5-1

ORAUT-OTIB-0081 Rev. 2 was first released on December 16, 2013, with the main addition being the inclusion of Table 5-1, which instructs the dose reconstructor on how to apply the multiple coworker intakes to a specific individual. The revision documentation specifically states:

> *Revision initiated to add dose reconstruction guidance for radionuclide assignment in response to the ABRWH request. Text added in Section 5.0 and a new Table 5-1 added. Intake rates for Cm and Cf added for the pre-1995 time period.* (ORAUT 2013)

A preliminary review of Table 5-1 was performed by SC&A to aid in discussions during the February 26, 2014, Savannah River Site (SRS) Work Group meeting. During that meeting, SC&A raised the following concerns:

- SC&A was unable to review the accuracy of the dosimeter code-facility relationship, because Table 5-1 was not sufficiently referenced and/or annotated.
- SC&A had observed large temporal gaps in a handful of available claimant files (on the order of multiple years) in which no HP Area codes were listed.
- SC&A had identified additional HP Area codes not included in Table 5-1, and it was unknown to what facilities those codes might refer.

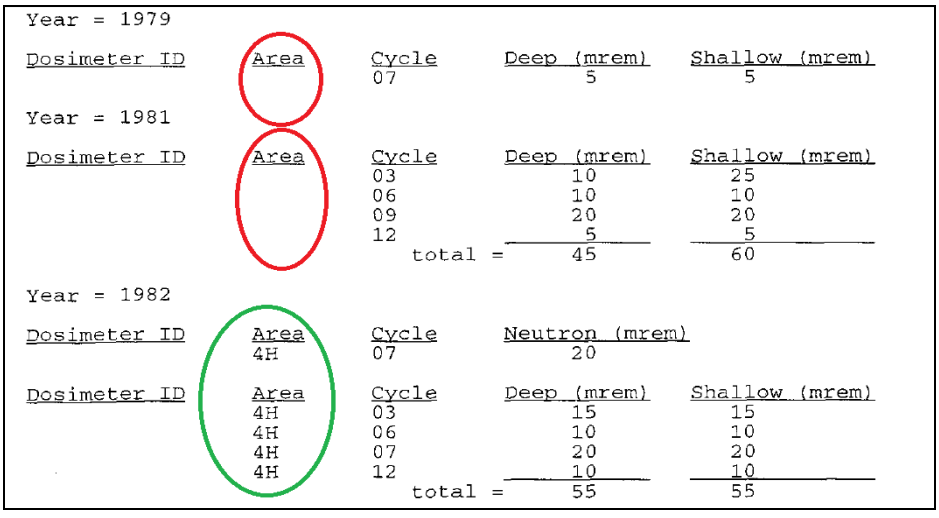
In response to these concerns, NIOSH provided direct references to validate the HP Area code-to-facility relationship, as well as additional references to fill in the observed temporal gaps. These references were provided in an email dated March 4, 2014 (see Attachment 4). Based on the provided references and other information contained in the Site Research Database (SRDB) and NIOSH/OCAS Claims Tracking System (NOCTS), SC&A performed the review detailed in this report. Section 2 provides an overview of the characteristics of available area-based dosimetry information both in the individual claimant files and supplementary material located on the SRDB. Sections 3–6 provide the main body of the analysis approach as outlined in the Executive Summary. Finally, Section 7 provides SC&A's overarching conclusions regarding the feasibility of utilizing Table 5-1 of ORAUT-OTIB-0081 Rev. 2 to administer the proposed coworker models.

2.0 CHARACTERIZATION OF DOSIMETER-BASED LOCATION INFORMATION CONTAINED IN CLAIMANT FILES AND ADDITIONAL SRDB LOGBOOKS

The use of dosimeter area codes (alternately known as "HP Area" codes) was found in several forms, both in the individual claimant files located on NOCTS and in the external dosimetry logbooks available on the SRDB. Available dosimeter-based information fell into the following categories and is described in this section:

- HPRED database entries
- Cycle dosimetry logbooks
- Quarterly summary dosimetry logbooks
- Neutron monitoring logbooks
- Monthly, quarterly, and annual statistics reports

The most common form found in individual claimant files comes from the electronic "HPRED" database, an example of which is shown in Figure 1. As can be seen in the example, dosimetry data for 3 years are presented (1979, 1981 and 1982). The areas circled in red for 1979 and 1981 are an example where the HP Area code was not entered into the database; this was a characteristic of the database from 1972 through 1981 for all claims examined. Beginning in 1982, HP Area codes were generally included in the HPRED entries. However, note that only select months/dosimeter cycles are presented in Figure 1. It is believed that only entries with positive recorded doses were included in the HPRED database, and that the missing months are not reflective of actual badging frequency. Note that there is no entry at all for 1980, shown in the example, although in this particular case, the claimant was badged and even submitted urinalysis samples during that year. Additionally, it can be observed that in 1982, a positive recorded neutron dose was noted during cycle 7 (July badging period) that also included an HP Area code.



Year = 1979

Dosimeter ID	Area	Cycle	Deep (mrem)	Shallow (mrem)
		07	5	5

Year = 1981

Dosimeter ID	Area	Cycle	Deep (mrem)	Shallow (mrem)
		03	10	25
		06	10	10
		09	20	20
		12	5	5
		total =	45	60

Year = 1982

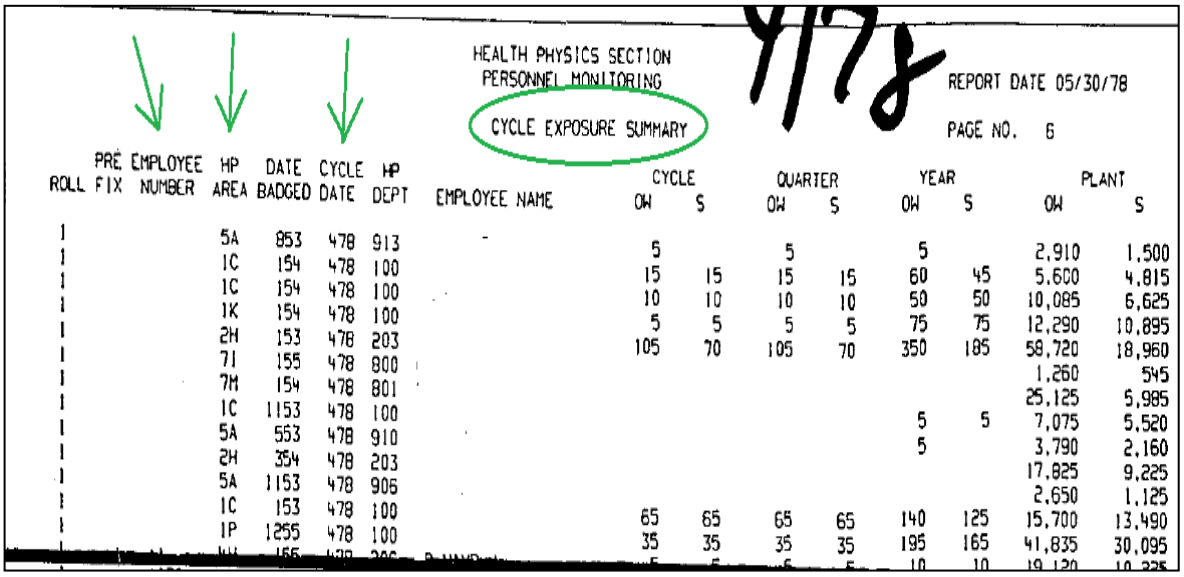
Dosimeter ID	Area	Cycle	Neutron (mrem)	
	4H	07	20	

Dosimeter ID	Area	Cycle	Deep (mrem)	Shallow (mrem)
	4H	03	15	15
	4H	06	10	10
	4H	07	20	20
	4H	12	10	10
		total =	55	55

Figure 1: Example of HPRED Entry in Individual Claimant File

Some claimant files also provided cycle (or monthly) dosimetry logbooks as well as quarterly summary logbooks, examples of which are shown in Figures 2 and 3, respectively. Whereas the HPRED data only displayed the cycles where a positive dose was accrued, it is clear from Figure 2 that even when monitored workers did not accrue any external dose during a badging period, they were included in the logbook with an associated area code. This is similarly true for the quarterly summary reports; in both formats, the entries simply appear as "blank" if there was no recorded exposure. As can be seen in Figures 2 and 3, these logbook-style reports show an employee number, cycle exposure date, HP Area code and employee name.[1] In the quarterly exposure summaries, the cycle exposure dates would always correspond to the last month in the given quarter. In the case of Figure 3, this quarterly report would represent the 3rd quarter of 1978 (cycle date given as "9" or "September").

In general, these types of reports were only sporadically included in the claimant files provided by the Department of Energy (DOE). SC&A could not determine any discernible pattern as to why they were sometimes included in a given claimant's file for individual months/quarters and sometimes were omitted completely. Cycle exposure summaries were not available in the SRDB; however, quarterly exposure summaries are available from 1972 through the beginning of 1989. A discussion of the completeness/legibility of quarterly exposure summaries available in the SRDB is contained in the next section.

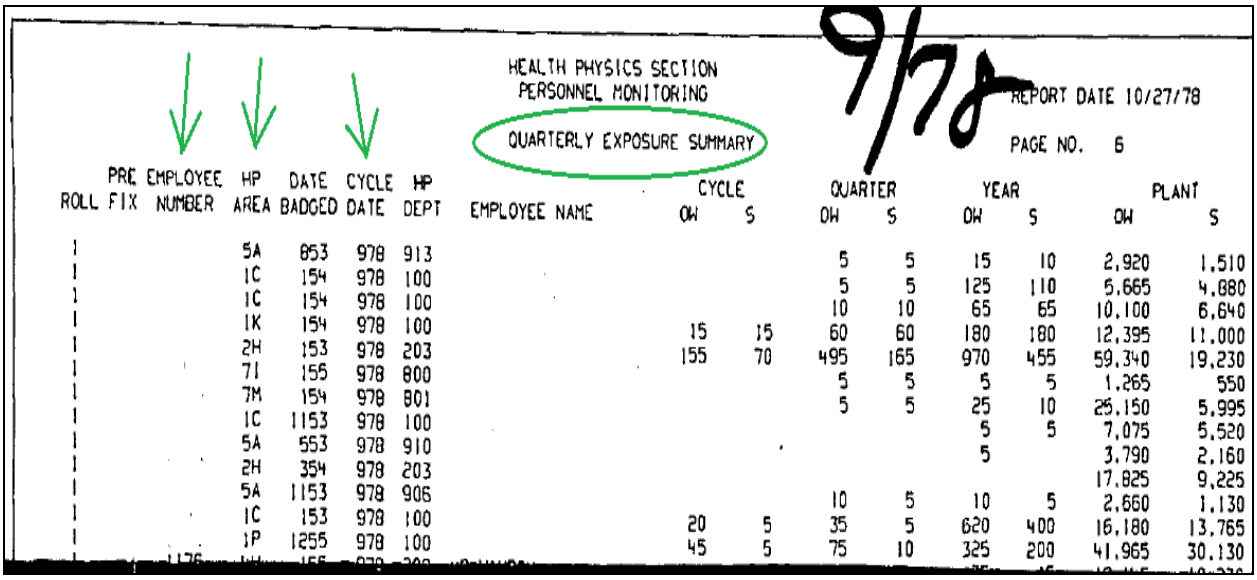


HEALTH PHYSICS SECTION
PERSONNEL MONITORING
CYCLE EXPOSURE SUMMARY
4/78
REPORT DATE 05/30/78
PAGE NO. 6

ROLL	PRE FIX	EMPLOYEE NUMBER	HP AREA	DATE BADGED	CYCLE DATE	HP DEPT	EMPLOYEE NAME	CYCLE OW	CYCLE S	QUARTER OW	QUARTER S	YEAR OW	YEAR S	PLANT OW	PLANT S
1			5A	853	478	913		5		5		5		2,910	1,500
1			1C	154	478	100		15	15	15	15	60	45	5,600	4,815
1			1C	154	478	100		10	10	10	10	50	50	10,085	6,625
1			1K	154	478	100		5	5	5	5	75	75	12,290	10,895
1			2H	153	478	203		105	70	105	70	350	185	58,720	18,960
1			7I	155	478	800								1,260	545
1			7M	154	478	801								25,125	5,985
1			1C	1153	478	100						5	5	7,075	5,520
1			5A	553	478	910						5		3,790	2,160
1			2H	354	478	203								17,825	9,225
1			5A	1153	478	906								2,650	1,125
1			1C	153	478	100		65	65	65	65	140	125	15,700	13,490
1			1P	1255	478	100		35	35	35	35	195	165	41,835	30,095

Figure 2: Example of a Cycle Exposure Summary Logbook Contained in an Individual Claimant File

[1] The employee names and employee numbers have been removed from the examples in this report for Privacy Act concerns.

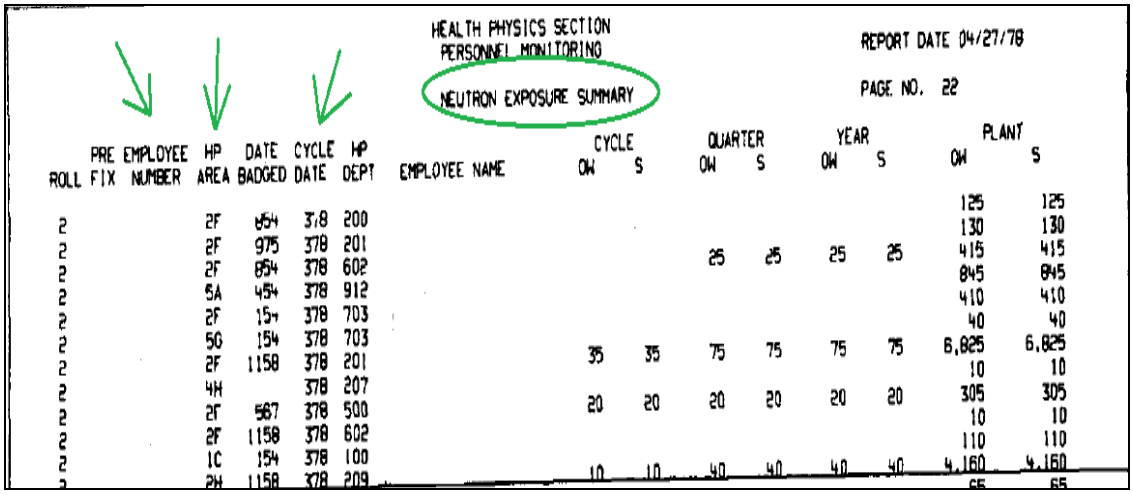


HEALTH PHYSICS SECTION
PERSONNEL MONITORING
QUARTERLY EXPOSURE SUMMARY
9/78
REPORT DATE 10/27/78
PAGE NO. 6

ROLL	PRE FIX	EMPLOYEE NUMBER	HP AREA	DATE BADGED	CYCLE DATE	HP DEPT	EMPLOYEE NAME	CYCLE OW	CYCLE S	QUARTER OW	QUARTER S	YEAR OW	YEAR S	PLANT OW	PLANT S
1			5A	853	978	913				5	5	15	10	2,920	1,510
1			1C	154	978	100				5	5	125	110	5,665	4,880
1			1C	154	978	100				10	10	65	65	10,100	6,640
1			1K	154	978	100		15	15	60	60	180	180	12,395	11,000
1			2H	153	978	203		155	70	495	165	970	455	59,340	19,230
1			7I	155	978	800				5	5	5	5	1,265	550
1			7M	154	978	801				5	5	25	10	26,150	5,995
1			1C	1153	978	100						5	5	7,075	5,520
1			5A	553	978	910						5		3,790	2,160
1			2H	354	978	203								17,825	9,225
1			5A	1153	978	906				10	5	10	5	2,660	1,130
1			1C	153	978	100		20	5	35	5	620	400	16,180	13,765
1			1P	1255	978	100		45	5	75	10	325	200	41,965	30,130

Figure 3: Example of a Quarterly Exposure Summary Logbook Contained in an Individual Claimant File

Neutron logbooks were also sometimes included in individual claimant files; they follow the same format as the cycle and quarterly summary logbooks described above. An example of a neutron exposure logbook is shown in Figure 4. Observed neutron logbooks always appear to be on a monthly/cycle basis, although they also contained tabulations for the quarter, year, and total employment (this last category is shown as the "Plant" column seen in Figure 4).



HEALTH PHYSICS SECTION
PERSONNEL MONITORING
NEUTRON EXPOSURE SUMMARY
REPORT DATE 04/27/78
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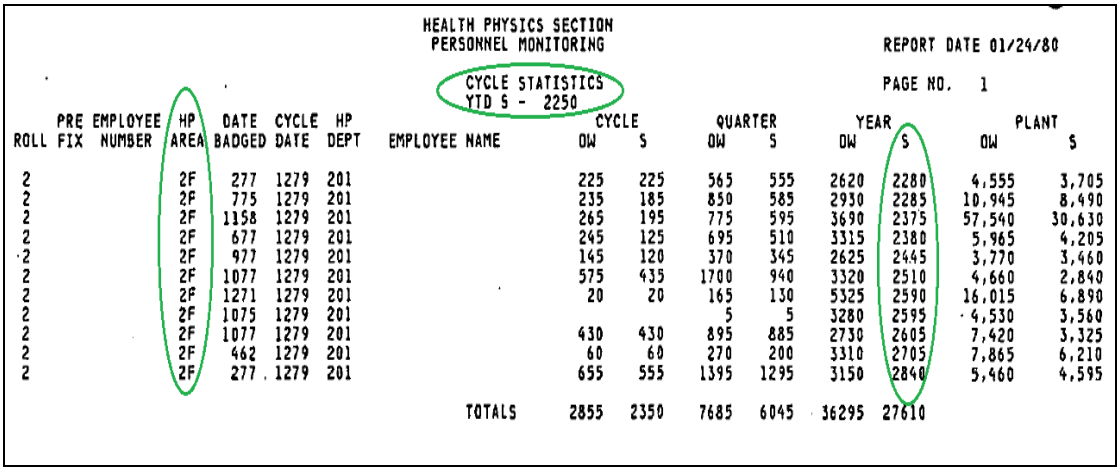
ROLL	PRE FIX	EMPLOYEE NUMBER	HP AREA	DATE BADGED	CYCLE DATE	HP DEPT	EMPLOYEE NAME	CYCLE OW	CYCLE S	QUARTER OW	QUARTER S	YEAR OW	YEAR S	PLANT OW	PLANT S
2			2F	854	378	200								125	125
2			2F	975	378	201								130	130
2			2F	854	378	602				25	25	25	25	415	415
2			5A	454	378	912								845	845
2			2F	154	378	703								410	410
2			5G	154	378	703								40	40
2			2F	1158	378	201		35	35	75	75	75	75	6,825	6,825
2			4H		378	207								10	10
2			2F	567	378	500		20	20	20	20	20	20	305	305
2			2F	1158	378	602								10	10
2			1C	154	378	100								110	110
2			2H	1158	378	209		10	10	40	40	40	40	4,160	4,160

Figure 4: Example of a Neutron Exposure Summary Logbook Contained in an Individual Claimant File

Also contained solely in the SRDB are "exposure statistics" reports; these are very similar in format to the other exposure summary reports, such as the examples shown in Figures 2–4. However, the statistics reports only contain lists of workers who have reached a certain external

exposure threshold. An example of such a report is shown in Figure 5, which shows a list of workers with HP Area code "2F" who had reached a shielded threshold dose of 2,250 mR for the year. Other observed threshold values contained in the statistical reports are shown in Table 1.



HEALTH PHYSICS SECTION
PERSONNEL MONITORING

REPORT DATE 01/24/80

CYCLE STATISTICS
YTD S - 2250

PAGE NO. 1

PRE ROLL	FIX	EMPLOYEE NUMBER	HP AREA	DATE BADGED	CYCLE DATE	HP DEPT	EMPLOYEE NAME	CYCLE OW	CYCLE S	QUARTER OW	QUARTER S	YEAR OW	YEAR S	PLANT OW	PLANT S
2			2F	277	1279	201		225	225	565	555	2620	2280	4,555	3,705
2			2F	775	1279	201		235	185	850	585	2930	2285	10,945	8,490
2			2F	1158	1279	201		265	195	775	595	3690	2375	57,540	30,630
2			2F	677	1279	201		245	125	695	510	3315	2380	5,965	4,205
2			2F	977	1279	201		145	120	370	345	2625	2445	3,770	3,460
2			2F	1077	1279	201		575	435	1700	940	3320	2510	4,660	2,840
2			2F	1271	1279	201		20	20	165	130	5325	2590	16,015	6,890
2			2F	1075	1279	201				5	5	3280	2595	4,530	3,560
2			2F	1077	1279	201		430	430	895	885	2730	2605	7,420	3,325
2			2F	462	1279	201		60	60	270	200	3310	2705	7,865	6,210
2			2F	277	1279	201		655	555	1395	1295	3150	2840	5,460	4,595
							TOTALS	2855	2350	7685	6045	36295	27610		

Figure 5: Example of a Cycle Statistic Logbook Contained in the Site Research Database

Table 1: Examples of Dose Threshold Requirements for Inclusion in Cycle Statistical Reports

Statistical Duration	Dosimeter Measurement	Threshold	Example Reference
Individual Cycle	Open Window	1800 mrad	SRS 1979 , pg 40
Individual Cycle	Shielded	300 mR	SRS 1979, pg 39
Plant to Date	Shielded	20 Highest	SRS 1979, pg 43
Quarter	Open Window	3600 mrad	SRS 1979, pg 299
Quarter	Shielded	600 mR	SRS 1979, pg 98
Year to Date	Neutron	20 Highest	SRS 1979, pg 45
Year to Date	Open Window	13,500 mrad	SRS 1974, pg 78
Year to Date	Open Window	20 Highest	SRS 1979, pg 42
Year to Date	Shielded	20 Highest	SRS 1979, pg 41
Year to Date	Shielded	2250 mR	SRS 1979, pg 30
Year to Date	Tritium	20 Highest	SRS 1979, pg 44

Table 1 is meant to be illustrative and not an exhaustive listing of the threshold values employed in the statistical reports. For example, other thresholds might be "Year to Date, shielded, 500 mR" but evaluated at the end of January, or "Year to Date, open window, 3,000 mrad" evaluated at the end of February. Because a worker must reach a certain dose threshold in the given period to be included in the statistical reports, the reports contain only a small fraction of the actual monitored worker population. As an example, the 3rd quarter of 1979 contains over 8,000 individually monitored workers; the monthly statistical reports over the same time period contain just over 200 workers.

Additionally, it should be noted that the "statistics" reports are organized either by area code or by magnitude of the dose accrued and not by employee name or number. This, combined with

the noted legibility issues in Section 3, would make searching for an individual claimant significantly more cumbersome in the statistical reports than the standard quarterly dosimetry reports, which are organized by a roll code and specific employee number. This, in addition to the already small pool of workers included in these types of statistical reports, makes them of negligible use in establishing a worker's HP Area code.

3.0 AVAILABILITY, LEGIBILITY AND COMPLETENESS OF AVAILABLE LOGBOOK DATA IN THE SRDB

As noted previously, individual claimant files do not have a complete set of bioassay logbooks from which to establish dosimeter codes for each badging period during a worker's employment. However, NIOSH has identified a number of external dosimetry logbooks on the SRDB that could be used to fill in some of the temporal gaps observed in the claimant files. A full listing of these SRDB references provided by NIOSH and relevant to the SEC period can be found in Attachment 3. SC&A examined these logbooks for completeness and legibility. Since legibility is somewhat of a subjective judgment, SC&A developed three categories with which to evaluate the records; "minor issues," "significant issues," and "illegible." Illustrative examples of what each category represents are provided in Figures 6–8. A summary of the availability and legibility of the SRDB logbooks is found in Tables 2 and 3 for "quarterly" and "summary statistical" reports, respectively.

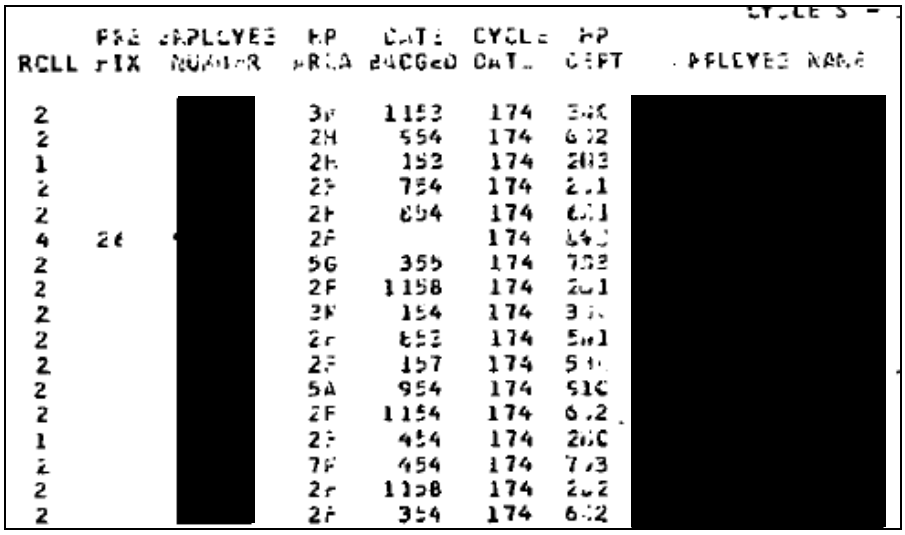


Figure 6: Example of a Dosimetry Logbook with "Minor" Legibility Issues

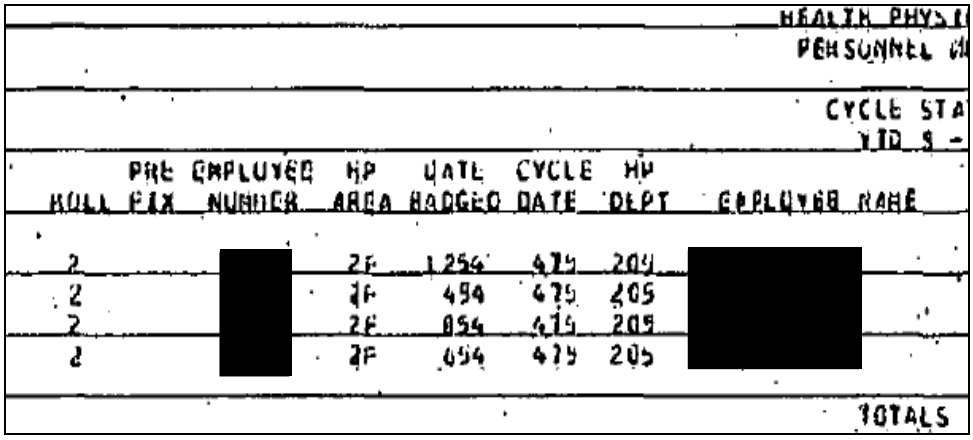


Figure 7: Example of a Dosimetry Logbook with "Significant" Legibility Issues

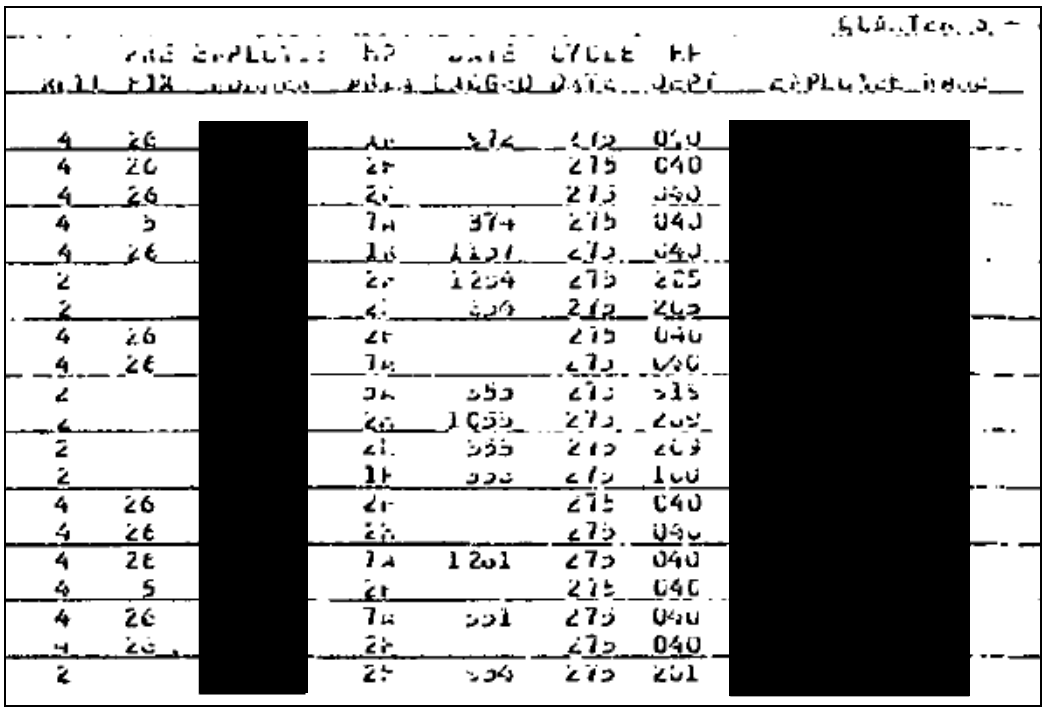


Figure 8: Example of a Logbook File Deemed "Illegible"

As can be seen in Table 2, quarterly reports are available for all quarters from the fourth quarter of 1972 through the first quarter of 1989. Although some minor legibility issues were identified, they were generally very limited in scope and do not represent a significant hindrance to the ability to use quarterly logbooks to identify claimants with a specific dosimeter code in a given quarter. The cycle or monthly statistical reports had more significant legibility issues, with about half of the available reports showing at least some legibility issues. Additionally, statistical reports are not available for the year 1973 and any time after 1979. As noted in the previous section, "statistical" reports available on the SRDB are of negligible use in establishing dosimeter codes for claimants.

Table 2: Completeness and Legibility of Quarterly Exposure Summary Reports

Year(s)	Quarterly Reports Available*	Legibility Determination	Additional Comments
1972	Q4	No issues	There is also a full cycle report (not statistical) for the month of October.
1973–1974	Q1–Q4	No issues	
1975	Q1–Q4	Minor Issues (Q2, Q4)	Q2: Most of the content can be figured out by zooming directly on specific values.
			Q4: Many area codes have only one visible character.
1976	Q1–Q4	No Issues	
1977	Q1–Q4	Minor Issues (Q3)	First 30 pages have a few legibility issues in the HP Area column on some entries; sporadically elsewhere in document.
1978	Q –Q4	No Issues	
1979	Q1–Q4	Minor Issues (Q1)	Q1: Most of the content can be figured out by zooming directly on specific values.
1980–1988	Q1–Q4	No Issues	
1989	Q1	No Issues	No quarterly dosimetry records could be located after the first quarter of 1989.

* "Q" values represent quarters. For example, Q1 = the First Quarter.

Table 3: Completeness and Legibility of Cycle Exposure Statistical Reports

Year	# Available Monthly Statistical Reports	Legibility*	Additional Comments
1972	1	No Issues	October report that was not a statistical report, but rather a normal cycle report; no statistical reports were available for the 4th quarter of 1972.
1973	0	N/A	No statistical summary reports were found for this year.
1974	12	2 Minor Issues (Jan, Mar)	Illegible report is assumed to be November based on its place in the document.
		1 Significant Issue (Sep)	
		1 Illegible (Nov)	
1975	12	1 Minor Issue (Aug)	Names, employee numbers, and area codes in February report are illegible; other portions of February report can be read.
		2 Significant Issues (Apr, Sep)	
		1 Illegible (Feb)	
1976	12	6 Minor Issues (Jan–Mar, May, Nov–Dec)	
		2 Illegible (Apr, Sep)	
1977	12	2 Significant Issues (Jun, Jul)	Illegible record due to one of the two HP Area code characters cut off.
		1 Illegible (Sep)	
1978	12	5 Minor Issues (Feb–Mar, Jun–Jul)	October through December reports are actually contained in the 1979 monthly statistical summaries.
		1 Significant Issue (May)	
1979	12	5 Minor Issues (Jan–Mar, May, Nov)	
		1 Significant Issue (May)	

* Legibility issues apply to the entire month(s) listed.

4.0 COMPLETENESS AND ACCURACY OF AREA DOSIMETER CODES FORMING THE BASIS TO ASSIGN WORKERS TO A SPECIFIC WORK LOCATION

Part of SC&A's investigation was to review the underlying references that associate certain dosimeter "HP Area" codes with specific facilities and areas at SRS. NIOSH provided SC&A with several reports from SRS that document dosimeter codes and their associated areas; these reports were consolidated into a single document titled, *SRS HP Area and Department Codes 1959–1992* (SRS Various Dates). SC&A examined this document and found that many of the dosimeter codes listed in Table 5-1 could not be traced to the original HP documents. Table 4 displays the dosimeter codes that could not be verified given the documents supplied by NIOSH. For example, in the 1973–1990 portion of Table 5-1, 10 of the 76 dosimeter codes could not be traced back to the original reference. No documentation or references concerning the codes assigned for the period "2004–present" were provided. As discussed during the February Work Group meetings, NIOSH indicated that some of the information provided in Table 5-1 is a result of programmatic experience gained. SC&A cannot affirm or refute this statement, but acknowledges that a rigorous quality assurance process, additional explanation, and annotation provided by NIOSH may alleviate these apparent discrepancies.

In addition to the codes in Table 5-1 that could not be verified via the SRS Health Physics reports provided by NIOSH, SC&A also identified apparent discrepancies between the codes and locations in Table 5-1 and what is presented in the SRS HP reports; these discrepancies are described in Table 5.

Table 4. Description of Dosimeter Codes Contained in Table 5-1 that could Not be Verified via Supplied References

Period	# of Dosimeter Codes Not Listed in Source References/ Total Number in Period	List of Dosimeter Codes Not Identified in References	Additional Comments
1961–1972	0/24	N/A	Note: The use of dosimeter codes extended prior to 1961. The earliest use of such codes SC&A observed was in 1958. The earliest listing of dosimetry codes with specific locations is 1959 (SRS, Various Dates).
1973–1990	10/76	12B, 15A, 1D, 1N, 1S, 1U, 1W, 2S, 6E, 8J,	
1991–2004	33/97	A05, B12, D, D01, E06, F, F04, F07, H, H09, J04, J07, J13, J15, J16, J19, J22, J23, J27, J28, J29, J32, J33, J34, J35, J36, J37, J38, J39, S01, T, U, U01	The majority of unreferenced dosimeter codes during this period referred to the central shops in Table 5-1 (J Series). Many other "J Series" dosimeters referred directly to a type of trade worker (such as a Laborer or a Carpenter) and not to an actual location at SRS. However, this is not necessarily always the case; other "J Series" results in this period refer to jobs such as "Operations Escort" "Not designated."
2004–Present	See comments	See comments	No references were provided to assess the completeness of dosimetry codes post-2004.

Table 5. Discrepancies Between SRS HP Reports Provided by NIOSH and Table 5-1 Locations

Effective Date Range from Table 5-1	Code	Location from SRS HP Reports (SRS Various Dates)	Table 5-1 Location(s)	Additional Comments
1961–1972	12A	618-G	E-Area Solid Waste Disposal Facility	SRS at 50, pp. 539–540: "E Area which is situated between the two separations areas, is the locus of most of the Site's disposal and storage facilities. Waste generated from site operations is stored or treated at: the Solid Waste Management Facility (E Area)... The Solid Waste Management Facility ... because operational in the 1990s, some after extensive planning that occurred in the previous decade."
1961–1972	6C	720-A	Central Shops & Maintenance, Pittsburgh Testing Laboratory	It is not clear why this area was assumed to be "Central Shops & Maintenance, Pittsburgh Testing Laboratory."
1961–1972	6H	725-A	Central Shops & Maintenance, Pittsburgh Testing Laboratory	It is not clear why this area was assumed to be "Central Shops & Maintenance, Pittsburgh Testing Laboratory."
1961–1972	6I	722-A	Central Shops & Maintenance, Pittsburgh Testing Laboratory	It is not clear why this area was assumed to be "Central Shops & Maintenance, Pittsburgh Testing Laboratory."
1961–1972	6M	724-A	Central Shops & Maintenance, Pittsburgh Testing Laboratory	It is not clear why this area was assumed to be "Central Shops & Maintenance, Pittsburgh Testing Laboratory."
1961–1972	6R	717-A	Central Shops & Maintenance, Pittsburgh Testing Laboratory	It is not clear why this area was assumed to be "Central Shops & Maintenance, Pittsburgh Testing Laboratory."
1973–1990	1H	200-H Eff. Treatment Fac.	H-Area Unknown Facility H-Canyon and A-Line New Special Recovery Plutonium Storage Facility (PSF) Receiving Basin for Off-Site Fuel (RBOF) Resin Regeneration Facility (RRF)	The code listed in Table 5-1 for the ETF (Effluent Treatment Facility).
1973–1990	3H	H-WMO, 200-H 241-84H (ETF)	H-Area Unknown Facility New Special Recovery Plutonium Storage Facility (PSF) Receiving Basin for Off-Site Fuel (RBOF) Resin Regeneration Facility (RRF)	The Effluent Treatment Facility is labeled as either 5F or 5H in Table 5-1. The TBD notes that Building 241-84H is part of the ETF facility located in the H Area (ORAUT 2005,page 147).
1973–1990	5J	Operations Escorts	Central shops & Maintenance, Pittsburgh Testing Laboratory	Unclear why escorts would be associated with the Central Shops & Maintenance, Pittsburgh Testing Laboratory.

Table 5. Discrepancies Between SRS HP Reports Provided by NIOSH and Table 5-1 Locations

Effective Date Range from Table 5-1	Code	Location from SRS HP Reports (SRS Various Dates)	Table 5-1 Location(s)	Additional Comments
1973–1990	6F	247-F Naval Fuels	232-H, HANM, HAOM, Tritium Complex	Based on the building code lettering, the naval fuels program was in the F Area, not the H Area tritium complex. Table 5-1 does not have a category for the naval fuels area; this dosimeter code should refer to "F Area Unknown Facility."
1973–1990	7F	716-A, 716-A Auto Shop	F-Area unknown facility F-Area A-Line 221-F B-Line (FB and JB lines) 221-F Canyon	Based on the building code lettering, these locations are in the A Area.
1973–1990	7I	720-A, 720-A WSI	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area.
1973–1990	7K	722-A, 722-A E&I	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area.
1973–1990	7L	723-A, 723-A EED	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area.
1973–1990	7M	724-A, 724-A Training	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area.
1973–1990	7N	725-A, 725-A Maint	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area, though the code does indicate "maintenance."
1973–1990	7Q	722-4A, 722-4A E&I	Central shops & Maintenance, Pittsburgh Testing Laboratory	Based on the building code lettering, these locations are in the A Area.
1973–1990	8G	618-G, 618-G Class. Yard	E-Area Solid Waste Disposal Facility (SWDF)	600 series building codes simply refer to "general purpose" facilities; likewise the G designation does not refer to an area, but rather to the "general purpose" buildings found all across the site. It is not clear how this code was related to the E Area Solid Waste Disposal Facility.
1973–1990	9H	719-4A Employment	221-H Area Outside Facilities	Area designation indicates this facility is in the A Area.
1991–2003	A03	703-A (B Wing)	735-A and 735-11A	703-A is the main administration building; 735-A houses the health physics laboratory.

Table 5. Discrepancies Between SRS HP Reports Provided by NIOSH and Table 5-1 Locations

Effective Date Range from Table 5-1	Code	Location from SRS HP Reports (SRS Various Dates)	Table 5-1 Location(s)	Additional Comments
1991–2003	A09	703-A (A Wing)	735-A and 735-11A	703-A is the main administration building; 735-A houses the health physics laboratory.
1991–2003	A12	720-A WSI	Central shops & Maintenance, Pittsburgh Testing Laboratory	Area designation indicates this facility is in the A Area, likely related to Wakenhunt Securities Incorporated, who was contracted by DOE starting in 1983.
1991–2003	A15	773-A (Main Building)	776-A	773-A contained numerous radiological laboratories at SRS; 776-A housed the waste treatment facilities for materials produced in 773-A. Their intake assignments should be identical.
1991–2003	B01	WSI 703-1B	735-A and 735-11A	This badge number refers to the security office in the main Administration Building of the A Area, not the 735-A HP Laboratories.
1991–2003	F06	247-F Naval Fuels	232-H, HANM, HAOM, Tritium Complex	
1991–2003	H01	200-H Eff. Treatment Fac., Not Designated	H-Area unknown facility H-Canyon and A-Line New Special Recovery Plutonium Storage Facility (PSF) Receiving Basin for Off-Site Fuel (RBOF) Resin Regeneration Facility (RRF)	200-H Effluent Treatment Facility is shown as H05 and F05 in Table 5-1.
1991–2003	J26	Not Designated	Central shops & Maintenance, Pittsburgh Testing Laboratory	"(Not Used)" written next to area code.
1991–2003	J40	Operations Escorts	Central shops & Maintenance, Pittsburgh Testing Laboratory	Unclear why an operations escort badge would be considered Central Shops.

5.0 TEMPORAL CHARACTERIZATION OF CLAIMANT DOE FILES AND SUPPLEMENTAL MONTHLY AND QUARTERLY SUMMARY REPORTS ON THE SRDB

To assess the feasibility of implementing the Table 5-1 methodology, SC&A performed a semi-random sampling of 20 claimants. Ten (10) of the 20 claimants were selected at random from among all radiological job types who had significant employment during the SEC evaluation period (in particular the period up until about 1989). The remaining 10 claims were selected to represent maintenance and other construction trades that would be more likely to have variable work locations during the evaluation period. A description of the job titles and employment periods for the 20 sampled claimants is contained in Table 6.

Table 6. Employment Periods and Job Titles of Sampled Claimants

Ref #	Employment Start(s)	Employment End(s)	Position (s)
1	[redacted]	[redacted]	NOCTS: Unknown CATI: [redacted]
2	[redacted]	[redacted]	NOCTS: Blank DOE_Response: [redacted]
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
3	[redacted]	[redacted]	NOCTS: [redacted] CATI: [redacted]
4	[redacted]	[redacted]	NOCTS: [redacted] CATI: [redacted]
5	[redacted]	[redacted]	[redacted]
6	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
7	[redacted]	[redacted]	[redacted]
8	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
9	[redacted]	[redacted]	[redacted]
10	[redacted]	[redacted]	[redacted]
11	[redacted]	[redacted]	[redacted]
12	[redacted]	[redacted]	[redacted]
13	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	

Table 6. Employment Periods and Job Titles of Sampled Claimants

Ref #	Employment Start(s)	Employment End(s)	Position (s)
14	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
15	[redacted]	[redacted]	[redacted]
16	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
17	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
18	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	
	[redacted]	[redacted]	
	[redacted]	[redacted]	
19	[redacted]	[redacted]	[redacted]
20	[redacted]	[redacted]	[redacted]

The intent of the study was to establish the frequency with which dosimetry area codes could be applied to an actual claimant, as well as the extent to which dosimetry area codes comport with other location-based information in the claimant file. The former examination is discussed in this section; the latter is discussed in Section 6.

Claimant files were examined by SC&A and any dosimetry area codes were noted (including HPRED entries, dosimetry logbooks and neutron badging results when available). Where gaps were identified in the claimant file, the quarterly dosimetry logs located in the SRDB were consulted. For the purpose of evaluating temporal distance between the assignments of dosimeter area codes, monthly entries were assumed to apply to the first day of the month and quarterly logbooks were assumed to apply to the first day of the first month of that quarter. For example, if a claimant were employed for 1 year and only had quarterly dosimetry logs available, the area code assignments would be applied to 1/1, 4/1, 7/1, and 10/1. The average number of cycles between area codes would then be three.

A summary of the results of the frequency of area codes is found in Table 7. As seen in the table, the maximum number of cycles between the assignments of an HP Area code ranged from two to nine. The maximum number of badging cycles between assignments of a dosimeter area code ranged from three to nine. Although as noted for claimant 18 (the lowest value with a maximum of 1.5 cycles), an entire year of covered employment (1/1/1988 to 1/31/1988) contained no dosimeter area codes, as the claimant could not be identified in the quarterly logbooks. This year of employment was not used in calculating claimant #18's average or maximum frequency.

In general, most sampled claimants averaged between two and three dosimeter cycles between area code assignments. The average for all 20 claimants was 2.1 dosimeter cycles between code

assignments. It was observed that prior to 1982, dosimeter area code assignments are essentially only available on a quarterly basis. From 1982 to approximately 1988, dosimeter code assignments are available on a monthly basis in the HPRED data, if the claimant had a recorded dose during that badging cycle. Beginning sometime in 1988, dosimeter area codes are generally reported for every badging cycle, regardless of whether dose was accrued during that period. It was observed in 1989 and later years that often multiple dosimeter codes might be listed for the same badging cycle (which likely indicates multiple work locations).

Table 7. Summary of Temporal Dosimeter Area Code Information for Sampled Claimants

Claim Ref #[2]	# Dosimeter Cycles in Employment	Maximum # of Cycles Between Area Code Assignment	Average # of Cycles Between Area Code Assignment (All Years)	Additional Comments
1	177	3	2.4	
2	48	3	1.5	
3	222	6	2.4	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
4	171	3	1.8	
5	135	3	2.1	
6	55	3	2.7	
7	111	3	1.2	
8	219	6	2.5	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
9	253	6	1.7	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
10	135	3	2.9	
11	223	6	2.5	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
12	125	6	3.0	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
13	253	6	1.4	Six- month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
14	252	6	2.1	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
15	252	6	2.0	Six-month gap in area code occurred in early 1989 due to the unavailability of the 2nd quarter bioassay log.
16	22	3	1.3	Claimant had a ~5-month employment period in 1975 in which no dosimetry records could be located (this employment was not used in calculating the average cycles between area code assignment). Additionally, the claimant had dosimetry results from March–December of 1986, which is not considered covered employment.

[2] Note: This is not a NOCTS or other identifying number, it is a randomly assigned number for the purposes of this review.

Table 7. Summary of Temporal Dosimeter Area Code Information for Sampled Claimants

Claim Ref #[2]	# Dosimeter Cycles in Employment	Maximum # of Cycles Between Area Code Assignment	Average # of Cycles Between Area Code Assignment (All Years)	Additional Comments
17	82	9	2.4	9-month gap in dosimeter area codes occurred from October 1982 to July of 1983. Prior to this time, the claimant had dosimeter area codes for each of the previous six months using code "99." It is unknown what this code represents.
18	18	2 (see additional comments)	1.5 (see additional comments)	Claimant's last employment at SRS was from [redacted]–[redacted]; no external dosimetry or location information could be located during this time in either the DOE_Response or the logbook files. This year of employment was not considered in calculating the maximum or average time between assignments of dosimeter area codes.
19	108	3	3.0	
20	169	3	2.2	

6.0 COMPARISON OF CLAIMANT DOSIMETER LOCATION/AREA CODES TO ALTERNATE AVAILABLE LOCATION INFORMATION

In addition to temporal considerations discussed in Section 5, one important facet of the Table 5-1 methodology is establishing the effectiveness and accuracy of location assignment when applied to real claimant data. To this end, SC&A used the same sample of claimants described in Section 5 and evaluated the available dosimeter area-specific information versus other information on job location available for the individual claimants.

Other location-based information can consist of, but is not necessarily limited to:

- Bioassay sampling
- In-vivo monitoring
- CATI interviews
- Contamination incident/skin decontamination documentation
- Missing exposure investigations (i.e. a "lost badge" report)

By far, the most common source of alternate work location information is present in the internal monitoring records (bioassay and in-vivo sampling). In reality, this type of information would not exist for the hypothetical unmonitored worker to which coworker intakes would be applied. However, the comparison using workers who have both external dosimetry and other alternate sources of work location information is illustrative of the accuracy of using external dosimetry alone to establish a claimant's work area.

As noted in Section 2, up until 1989, only a single dosimeter area code is available for each badging cycle. For the period 1972–1981, dosimeter area codes are commonly only available on a quarterly basis. For the purposes of this comparison, the assignment of the dosimeter area code was evaluated on the first day of an individual badging cycle (i.e., the first of the month) or the first day of the quarterly evaluation report (1/1, 4/1, 7/1, 10/1). Alternate location information was based on the date of the sample or incident and assessed for the appropriate month. To better explain this approach, the reader can refer to Table 8, which shows an example of a typical comparison.

Table 8. Example of a Comparison of External Dosimetry Codes and Alternate Information such as Bioassay

Badging Period	External Dosimetry Area Code	Alternate Location	Type of Record(s)	Reference
4/1–30/74	3M		Quarterly Logbook	Ref 50121
5/1–31/74				
6/1–30/74		M Area, 313M	Bioassay cards, In vivo	DOE_Response
7/1–31/74	3M	M Area	Quarterly Logbook, Bioassay card	Ref 50126, DOE_Response

This example shows a situation in which a worker had quarterly monitoring records for the second and third quarter of 1974 (showing area code "3M"). According to Table 5-1, dosimetry

code "3M" refers to the "300 M-Area, M area unknown facility." In addition, there are two bioassay samples in June and July of 1974 (M Area) and an in-vivo count in June (313-M). In this example, there is no discrepancy between the work area assumed from the external dosimetry area code and the other information available.

However, discrepancies in other situations did arise during the course of this review and generally fell into four categories with regard to the claimant favorability of the proposed approach:

1. **Not claimant favorable**: Use of the dosimeter area code to assign coworker intakes would result in fewer contaminant intake assignments than other information would indicate.

2. **Unknown or Variable Favorability**: Use of the dosimeter area code would assign a different, but not necessarily unfavorable, mix of contaminant intakes compared to other information. An example of this might be the dosimeter area assigning thorium where the alternate information might assign fission products.

3. **Neutral Favorability**: While there was a discrepancy in location, the dosimeter code and alternate information would result in the same mix of contaminant intakes.

4. **Claimant Favorable**: Use of the dosimeter area code would assign a larger mix of contaminant intakes than would be assigned using alternate information.

The number of discrepancies identified during the claimant sampling and how they fit into each category is shown in Table 9. As can be seen, the majority of cases where discrepancies were observed would result in a claimant-favorable coworker intake assignment. Three quarters of the sampled claimants had at least one instance where the application of Table 5-1 over other specific area information would result in favorable intake assignments. Just over 50% of the total observable discrepancies among all sampled claimants would have a claimant-favorable result. It is not clear whether this result is an artifact of the subset of workers chosen or rather a slight systemic bias in favor of the claimants.

However, on the other hand, use of the Table 5-1 methodology would also have a negative impact in at least some circumstances for 13 of the 20 sampled claimants (65%). Just under one quarter of the observed discrepancies would result in a claimant-unfavorable result if the dosimeter area code methodology were adopted; 4 of these 13 cases with claimant-unfavorable observations also had no corresponding favorable discrepancies. For specific information on each of the observable discrepancy cases, please refer to Tables 10–13 in Attachment 2.

It is SC&A's position that the aforementioned analysis demonstrates that the Table 5-1 suggested methodology, while largely resulting in claimant-favorable results, also has the potential to underestimate coworker intake assignments for at least some workers. Additionally, Table 9 demonstrates the potential for variable work location assignments, which could realistically be missed by utilizing dosimeter area locations. This is particularly true in cases where dosimeter information is only available on a quarterly basis.

Table 9. Summary Characteristics of Discrepancies Observed between Dosimeter Results and Other Location Information

Category of Discrepancy	Number of Claimants Affected in Sample	Total Number of Observations in Sample (% of Total)	Additional Comments
Not Favorable	13/20	22 (22.7%)	Many of the cases deemed to be unfavorable were instances where the dosimeter indicated a reactor area; however, bioassay or other information indicated another area with a larger exposure potential to other contaminants.
Unknown/ Variable	3/20	8 (8.2%)	Most of the unknown or variable cases involved the juxtaposition of F and H Areas (i.e., dosimeter indicates F Area, while other information indicates H Area).
Neutral	4/20	16 (16.5%)	
Favorable	15/20	51 (52.6%)	A little over half of the cases with contradicting information would be deemed favorable to the claimant using Table 5-1.

7.0 SUMMARY CONCLUSIONS

SC&A evaluated the completeness of dosimeter area code data available in the SRDB to fill in temporal gaps observed in individual claimant dosimetry files (see Sections 2 and 3). SC&A's conclusion from that review is that dosimetry logbooks exist on a quarterly basis from 1972 up through 1989 that can be used to fill in the large temporal gaps (on the order of multiple years) observed in actual claimant files during this period. No significant legibility issues were identified by SC&A in the dosimetry logbooks that would preclude their use.

Secondly, SC&A reviewed the ability to trace the relationship between dosimeter area codes and work locations in Table 5-1 to the source documentation provided by NIOSH. While many of the dosimeter codes could be traced to the original health physics documentation, several area codes contained in Table 5-1 could not be identified in the source documents (see Section 4, Table 4). Additionally, it appears to SC&A that there are discrepancies between the area code/work location presented in Table 5-1 and the information provided in the source references (see Section 4, Table 5). SC&A acknowledges that a vigorous quality assurance analysis, additional technical rationale, and specific annotation of Table 5-1 provided by NIOSH could potentially alleviate these concerns.

Finally, SC&A examined a sample of 20 claimants to assess the temporal completeness and characterization of any observed contradictory location information contained in the individual worker monitoring files. Temporally, the assignment of a dosimeter area code averaged once every 2.1 months from 1972–1989 (after this time, dosimeter area codes were generally on a monthly basis or less). The maximum length of time between the assignments of dosimeter area codes was 9 months, although one sampled claimant had an entire single year employment period with no identified dosimeter area codes. In general, area dosimeter code assignments are only available on a quarterly basis from 1972 into the mid-1980s. After this time, the frequency of dosimeter area code assignments increased until approximately 1992, when it was observed that area codes were reported on a monthly basis. Some observed cases showed multiple dosimeter area codes for the same badging period (indicating documentation of multiple work areas within the period).

As described in Section 6, SC&A identified examples within the claimant sample in which discrepancies exist between dosimeter area code and other alternate location information in the worker's dosimetry file. Observed discrepancies had varying effects on the hypothetical claimant favorability of coworker dose assignment based on Table 5-1. These discrepancies are summarized in Section 6, Table 9. Specifics on each observed example are shown in Attachment 2, Tables 10–13. Although a large portion of the observed discrepancies would result in claimant-favorable coworker intake assignments, SC&A also noted several claimant "unfavorable" intake assignments on at least some occasions for 13 of the 20 sampled claimants.

Tables 10–13 in Attachment 2 underscore SC&A's primary finding that the use of dosimeter area codes does not provide a sufficiently accurate or reliable basis to assign a unique mix of contaminant intakes forming the basis of the proposed SRS coworker models. This is particularly true of the period prior to July of 1989, when there is greater uncertainty concerning the temporal assignment of badges. SC&A recommends that parsing workers by area for the

purposes of coworker assignment only be used in instances of irrefutable evidence of work location.

8.0 REFERENCES

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SRS 1974. *1974 Quarterly Summaries, Quarterly Summaries of: Dosimetr, Bioassay and Whole Body*. Savannah River Site. December 31, 1974. SRDB Ref ID: 57123.

SRS 1979. *1979 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body*. Savannah River Site. December 31, 1979. SRDB Ref ID: 57161.

ATTACHMENT 1: RECREATION OF TABLE 5-1 OF ORAUT-OTIB-0081, REV. 2

(See ORAUT-OTIB-0081, Rev. 2, page 26)

Building/ Facility	Dosimeter Codes 1961–1972	Dosimeter Codes 1973–1990	Dosimeter Codes 1991–2003	Dosimeter Codes 2004–Present	Radionuclides of Concern
Reactors (R, P, L, K, C)	7A, 8A, 9A, 10A, 11A	1C through 6C, 1K, 1P, 1L, 1R	C01, C02, C03, K01, L01, P01	LLL, NMM, SDD[a]	Tritium, fission products
F-Area unknown facility	1A	1F through 5F, 7F through 9F	F, F01 through F05, F07 through F09	235, CLB, FBL, FCA	Plutonium mixture, uranium,
F-Area A-Line	1A	See F canyon	See F canyon	FCA	Uranium
221-F B-Line (FB and JB lines)	1A	1F through 5F, 7F through 9F	F, F01, through F05, F07 through F09	FBL, FCA	Plutonium mixture, americium
221-F Canyon	1A	1F through 5F, 7F through 9F	F, F01, through F05, F07 through F09	FBL, FCA	Plutonium mixture, uranium, fission products, thorium (through 1966), neptunium
F-Area Outside Facilities	1B	9F	F09	FCA	Plutonium mixture, uranium, fission products
PuFF and PEF (235-F)	1A	5F, 8F	F05, F08	235	Plutonium mixture, americium, neptunium, thorium
235-F Vaults	1A	2F, 5F, 8F	2F, F05, F08	235	Plutonium mixture, uranium, neptunium, americium, curium, thorium
772-F and 772-1F Laboratories	1A	1A[b]	A01	CLB	Plutonium mixture, uranium, fission products, americium, tritium, neptunium
F/H Tank Farms, Effluent Treatment Facility (ETF), Cooling Water and Retention Basins		5F, 5H	F05, H05	ETP, FTF	Plutonium mixture, uranium, fission products, americium, neptunium
H-Area unknown facility	2A	1H through 6H	H01 through H06	299, HBL, HCA	Tritium, plutonium mixture, uranium, americium, fission products, neptunium
HB Line Facility	2A	6H	H06	HBL	Plutonium mixture, fission products, americium, neptunium, uranium[d]
H-Canyon and A-Line	2A	1H, 2H, 5H, 6H	H, H01, H02, H05, H06	HCA	Plutonium mixture, uranium, fission products, neptunium
221-H Area Outside Facilities	2A	9H	H09	HCA	Tritium, plutonium mixture, uranium, fission products, neptunium

Building/ Facility	Dosimeter Codes 1961–1972	Dosimeter Codes 1973–1990	Dosimeter Codes 1991–2003	Dosimeter Codes 2004–Present	Radionuclides of Concern
232-H, HANM, HAOM, Tritium complex		6F, 4H	F06, H04, T	TEF, TRI	Tritium
300 M-Area, M area unknown facility	3A	3M	M03	SDD[a]	Uranium, thorium, plutonium mixture, neptunium, americium, curium (1964–1965)
704-U, 704-B		1U, 6E, 7G	U, U01, E06, G07	No active codes	Fission products
723-A, 773-A	5A, 6N	1A, 5A	A01, A02, A05	SRTC	Plutonium mixture, americium, curium, californium, thorium, (October 1972 and after), uranium, neptunium, fission products, tritium
735-A and 735-11A	6F	5D	A02, A03, A09, A16, B01	SRTC (apply 773-A Intakes	Environmental radionuclides, neptunium (1962)
776-A		1A, 15A	A01, A15	SRTC (apply 773 A intakes)	Plutonium mixture, americium, curium, californium, thorium, uranium, neptunium (1961–1988), fission products, tritium
777-M	5B	5B	A33	No active codes	Uranium, fission products, neptunium (through 1984)
CMX and TNX	5C	5C	T01	No active codes	Uranium
Central shops & Maintenance, Pittsburgh Testing Laboratory	6C, 6H, 6I, 6M, 6N, 6R, 12D, 12E, 12I	5J, 5W, 6B, 6W, 7A, 7B, 7G, 7I, 7J, 7K, 7L, 7M, 7N, 7R, 7Q, 7W, 8A through 8C, 8H through 8M, 8P, 8S, 8T, 1N	A12, A24, A25, A26, A27, A29, A34, J01 through J08, J12 through J41	No active codes	Plutonium mixture, uranium, fission products, tritium, americium, curium, neptunium, thorium
D-Area	4A	1D, 4D	D, D01, D04	SDD	Tritium
E-Area Solid Waste Disposal Facility (SWDF)	12A	12B, 4F, 3G, 8G	B12, G03, F04	SSS	Tritium, plutonium mixture, fission products, neptunium
New Special Recovery		See H-Area unknown facility	See H-Area unknown facility	MPF	Plutonium mixture, americium, uranium
Plutonium Storage Facility (PSF)		See H-Area unknown facility	See H-Area unknown facility	MPF	Plutonium mixture, americium, uranium
Receiving Basin for Off-Site Fuel (RBOF)	See H-Area unknown facility	See H-Area unknown facility	See H-Area unknown facility	RBO	Plutonium mixture
Resin Regeneration Facility (RRF)		See H-Area unknown facility	See H-Area unknown facility	RBO	Fission products

Building/ Facility	Dosimeter Codes 1961–1972	Dosimeter Codes 1973–1990	Dosimeter Codes 1991–2003	Dosimeter Codes 2004–Present	Radionuclides of Concern
S-Area DWPF		1S, 2S, 1W, 2W	S01, S02	SWM	Plutonium mixture, fission products
Waste Certification Facility		3G	G03	SSS	Tritium, plutonium mixture, fission products
Z-Area		2Z	Z02	ZZZ	Tritium, fission products, plutonium mixture, all transuranic elements
Not identifiable or unknown[c]		7Y, 8D, 8E, 000, missing	R01, Y01, missing	Blank, any code not already listed	Plutonium mixture, uranium, fission products, tritium, americium, curium, californium, neptunium, thorium

Note: Any code with X should not be included. These indicate off-plant assignment.

a. Code SDD is used both for the reactors and 300-M area. If no other information regarding work location is available, the applicable radionuclides for both locations should be assigned.
b. Code 1A is used for both 772 and 773 prior to 1991. If no other information regarding work location is available, the applicable radionuclides for both locations should be assigned.
c. Unknown facility radionuclides should only be assigned if no information is available from any source regarding the worker's work location.
d. U-232/233 in Tables 5-8 through 5-10 should only be assigned for the HB Line for January 1, 1964, through September 30, 1972.

ATTACHMENT 2: EXAMPLES OF DISCREPANCIES IN DOSIMETER RESULTS THAT WOULD RESULT IN NEUTRAL OR CLAIMANT-FAVORABLE CONTAMINANT INTAKES

Table 10. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Unfavorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
2	3/1/90: L01	In Vivo on 3/2/90: Central Shops	**Unfavorable:** Dosimeter code (L Reactor): Fp, H-3 Alternate Location (Central shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U**	DOE Response indicates the worker was a [redacted]and [redacted]. M03 is only listed in Table 5-1 beginning in 1991, but was in use at least as early as 1990.
2	4/1/90: M03	Bioassay on 4/17/90: Central Shops	**Unfavorable**: Dosimeter code (300 M Area, Unknown facility): Am, Np, Pu, Th, U. Alternate Location (Central shops): Am, **Cm, Fp, H-3**, Np, Pu, Th, U	M03 is only listed in Table 5-1 beginning in 1991, but was in use at least as early as 1990.
3	1/1/89: 2F 7/1/89: F02	Bioassay on 2/9/89: H Area	**Unfavorable**: Dosimeter code (F Area Unknown Facility): Am, Fp, Np, Pu, U Alternate Location (H Area Unknown Facility): Am, Fp, **H-3**, Np, Pu, U	2F and F02 refer to various F Area facilities according to Table 5-1. "2F" appears as one of three codes for the 235F area, but F02 does not. Therefore, it is assumed that 2F and F02 refer to "F Area Unknown Facility" for this comparison.
4	7/1/76: 1P	Bioassay on 7/26/76: F Area	**Unfavorable:** Dosimeter code (Reactors): H-3, Fp Alternate Location (F Area Unknown Facility): **Am**, Fp, **Np, Pu, U.**	Bioassay sample was for uranium, which is not assigned for the P Area reactors. Note: assignment to F Area would also leave out assigning H-3 such as the reactor area prescribes.
8	9/1/89: F02	Special Bioassay Request on 9/6/89: 772-F	**Unfavorable:** Dosimeter code (F Area Unknown Facility): Am, Fp, Np, Pu, U Alternate Location (772-F): Am, Fp, **H-3**, Np, Pu, U	According to Table 5-1, dosimeter code F02 wasn't in use until 1991. Table 5-1 also attributes code F02 to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.

Table 10. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Unfavorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
9	7/1/74: 3M 10/1/74: 3M	Bioassay on 9/18/74: A Area	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (A Area): Am, **Cf, Cm, Fp, H-3,** Np, Pu, Th, U	According to the TBD, "A Area" is very close to "M Area" and so may have the same contaminant mix. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In this case, the assignment of M Area Unknown Facility contaminants would be claimant unfavorable.**
9	1/1/75: 1K	Bioassay on 1/6 and 1/8/75: A Area	**Unfavorable:** Dosimeter Code (Reactors): Fp, H-3 Alternate Location (A Area): **Am, Cf, Cm**, Fp, H-3, **Np, Pu, Th, U**	According to the TBD, "A Area" is very close to "M Area" which assigns Am, Np, Pu, Th and U. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In either of the above cases, the assignment of reactor contaminants would be claimant unfavorable.**
9	7/1/75: 1K	Bioassay on 7/15/75: A Area	**Unfavorable:** Dosimeter Code (Reactors): Fp, H-3 Alternate Location (A Area): **Am, Cf, Cm**, Fp, H-3, **Np, Pu, Th, U**	According to the TBD "A Area" is very close to "M Area" and is often referred to as the "Administration Area" (ORAUT 2005, pg. 57) it is also appears to encompasses laboratory areas like Building 773-A (ORAUT 2005, pg. 36, and Reid et al 2002, pg. 226). For the purposes of comparison it was assumed "A Area" bioassay represented Building 773-A.
9	10/1/75: 1K	Bioassay on 10/7/75: M Area	**Unfavorable:** Dosimeter Code (Reactors): Fp, H-3 Alternate Location (M Area Unknown Facility): **Am, Np, Pu, Th, U**	Note: Assignment to M Area Unknown Facility would omit intakes for Fp and H-3.
10	11/1/83: 1C Terminated 12/31/83	In Vivo on 12/6/83: 182F	**Unfavorable:** Dosimeter Code (Reactors): Fp, H-3 Alternate Location: (F Area Unknown Facility): **Am**, Fp, **Np, Pu, U**	

Table 10. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Unfavorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
11	1/1/76: 3M 4/1/76: 3M	Bioassay on 2/5/76: A Area	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (A Area): Am, **Cf, Cm, Fp, H-3,** Np, Pu, Th, U	According to the TBD, "A Area" is very close to "M Area" and so may have the same contaminant mix. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In this case, the assignment of M Area Unknown Facility contaminants would be claimant unfavorable.**
11	4/1/76: 3M	Bioassay on 4/2/76: A Area	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (A Area): Am, **Cf, Cm, Fp, H-3,** Np, Pu, Th, U	According to the TBD "A Area" is very close to "M Area" and so may have the same contaminant mix. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In this case, the assignment of M Area Unknown Facility contaminants would be claimant unfavorable.**
11	10/1/76: 3M	Bioassay on 10/7/76: A Area	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (A Area): Am, **Cf, Cm, Fp, H-3,** Np, Pu, Th, U	According to the TBD, "A Area" is very close to "M Area" and so may have the same contaminant mix. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In this case, the assignment of M Area Unknown Facility contaminants would be claimant unfavorable.**
11	1/1/77: 3M	In Vivo on 1/20/77: 717A	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (Not identifiable or unknown): Am, **Cf, Cm, Fp, H-3**, Np, Pu, Th, U	
11	1/1/78: 3M	Bioassay on 1/6/78: A Area	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (A Area): Am, **Cf, Cm, Fp, H-3,** Np, Pu, Th, U	According to the TBD, "A Area" is very close to "M Area" and so may have the same contaminant mix. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. **In this case, the assignment of M Area Unknown Facility contaminants would be claimant unfavorable.**

Table 10. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Unfavorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
11	4/1/80: 3M 7/1/80: 3M	Bioassay on 5/2 and 6/25/80: "717"	**Unfavorable:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, Th, U Alternate Location (Not identifiable or unknown): Am, **Cf, Cm, Fp, H-3**, Np, Pu, Th, U	
12	7/1/75: 2H	Bioassay on 7/10/75: Central Shops	**Unfavorable:** Dosimeter Code (H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U Alternate Location (Central shops): Am, **Cm,** Fp, H-3, Np, Pu, **Th,** U	
13	10/1/81: 2F	Bioassay on 10/30/81: A Area	**Unfavorable:** Dosimeter code (235-F Vaults): Am, Cm, Np, Pu, Th, U Alternate Location (A Area): Am, Cf, Cm, **Fp, H-3**, Np, Pu, Th, U	
13	10/1/93: A03	Bioassay on 10/13/93: Facility – H	**Unfavorable:** Dosimeter Code (735-A and 735-11A): environmental radionuclides Alternate Location (Tritium Facility, see comments): **H-3**	It was assumed for this comparison that "Facility H" refers to the tritium complex, since it is a tritium bioassay result. It is also possible that "Facility H" refers to the H Area, which would assign **Am, Fp, H-3, Np, Pu, and U**.
14	9/1/93: A03	Bioassay on 9/16/93: F Area In Vivo on 9/15/93: 703-F	**Unfavorable:** Dosimeter Code (735-A and 735-11A): environmental radionuclides Alternate Location (F Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	

Table 10. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Unfavorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	1/1/92: K01, HB2, H02	Bioassay on 1/17, 1/19, 1/29, 1/30/92: H Area, C Area	**Unfavorable:** Dosimeter Code (Reactors, H-Canyon and A-Line): Fp, H-3, Np, Pu, U Alternate Location (H Area Unknown Facility,, Reactors): **Am**, Fp, H-3, Np, Pu, U	Note: HB2 is not included in Table 5-1 and so is not evaluated for its effect on intake assignment. Table 5-1 also attributes dosimeter code H02 with "H Area Unknown Facility." If this location is selected instead, then the comparison between dosimeter codes and alternate locations is identical. It is not clear from OTIB-0081 how periods with multiple dosimeter area codes are used; SC&A has assumed that the contaminant groupings are combined.
18	1/1/76: 4H 4/1/76: 4H	Bioassay in March 1976: G Area	**Unfavorable:** Dosimeter Code (H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U Alternate Location (Not Identifiable or Unknown): Am, **Cf, Cm**, Fp, H-3, Np, Pu, **Th**, U	Date in bioassay logbook only says "3/76." Note: 4H is one of two dosimeter codes used to refer to the 232-H, HANM, HAOM, Tritium Complex (the other is 6F). This facility only assigns tritium intakes and so selection of this location would be very claimant unfavorable.

Table 11. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Unclear Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
11	1/1/80: 3M	In Vivo on 1/15/80: 717F	**Unclear Favorability:** Dosimeter Code (M Area Unknown Facility): Am, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility): Am, **Fp**, Np, Pu, U	It was assumed for this comparison that 717F was an F Area facility. If instead "Not identifiable or unknown" were assumed, then the following radionuclides would have been assigned: Am, **Cf, Cm, Fp**, **H-3**, Np, Pu, Th, U. These selections would make the use of the dosimeter area code **unfavorable.**
12	4/1/78: 2F 7/1/78: 2F	Bioassay on 5/15/78: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.
12	1/1/79: 2F 4/1/79: 2F	Bioassay on 2/26 and 3/6/79: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.
12	7/1/80: 2F	Bioassay on 7/30 and 7/31/80: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.
12	4/1/81: 2F	Bioassay on 4/15/81: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.

Table 11. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Unclear Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
13	4/1/76: 2F	Bioassay on 4/19/76: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.
13	5/1/80: 2F	Bioassay on 5/24/80: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.
13	6/1/87: 2F	Bioassay 6/16/87: H Area	**Unclear Favorability:** Dosimeter code (235-F Vaults): Am, **Cm**, Np, Pu, **Th**, U Alternate Location (H Area Unknown Location): Am, **Fp, H-3**, Np, Pu, U	Note: Assignment of 235-F Vault contaminants would omit Fp and H-3; assignment of H Area Unknown Location would omit Cm and Th. Table 5-1 also attributes dosimeter code 2F to 221-F Canyon, 221-F B Line (FB and JB lines), and F Area – A Line. All have different radionuclide mixes that are bounded by F Area Unknown Facility.

Table 12. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Neutral Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
3	1/1/91: H06	Bioassay on: 1/29: F Area In Vivo on: 1/9/91: 200-F	**Neutral Favorability:** Dosimeter Code (HB Line Facility): Am, Fp, Np, Pu, U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U	Since H06 is the only dosimeter code associated with the HB Line Facility, that location is assumed for this comparison. However, Table 5-1 also associates "H06" with H Area Unknown Facility (Am, Fp, H-3, Np, Pu, U) and the H-Canyon and A-line (Fp, Np, Pu, U). If the former location is assumed, the dosimeter code is claimant favorable; if the latter location is assumed, then the dosimeter code is not claimant favorable.
11	4/1/83: 7G 7/1/83: 7G	In Vivo on 6/8/83: 784-1A	**Neutral Favorability** (see comments): Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (Not identifiable or unknown): Am, **Cf**, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
11	3/1/91: A24	In Vivo on 3/27/91: 717A	**Neutral Favorability** (see comments): Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (Not identifiable or unknown): Am, **Cf**, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
15	5/1/82: 7L	In Vivo on 5/28/82: 723-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A): Am, **Cf**, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.

Table 12. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Neutral Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	7/1/83: 7L	In Vivo on 7/18/83: 723-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A): Am, **Cf**, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
15	7/1/84: 7L	In Vivo on 7/12/84: 723-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A): Am, **Cf**, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
15	9/1/89: A27	Bioassay on 9/4, 9/15, 9/21/89: L Area In Vivo on 8/28/89: 723-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (Reactors): Fp, H-3 Alternate Location (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
15	4/1/90: A27	Neutron logbook for April shows "A15"	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (776-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.

Table 12. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Neutral Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	5/1/90: A27	Neutron logbook for April shows "A15" Bioassay on 5/7/90: A Area	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (A Area): see comments	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight. According to the TBD, "A Area" is very close to "M Area" which assigns Am, Np, Pu, Th and U. If this contaminant mix was selected, it would omit the Cm, Fp and H-3 assigned to the central shops. Alternatively, the "not identifiable or unknown" designation A Area might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U; these are essentially the same contaminants assigned to the central shops.
15	7/1/90: A27	In Vivo on 7/3/90: 723-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.
15	8/1/91: A27	In Vivo on 8/28/91: 700-A	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (Unidentified location or unknown): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	Note: Central Shops does not list californium as a contaminant of interest; it is unknown if this was simply an oversight.

Table 12. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Neutral Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	8/1/92: A27	In Vivo on 8/12/92: 723-A Bioassay on 8/1, 8/17, 8/25, 8/28, 8/30/92: H Area, C Area	**Neutral Favorability:** Dosimeter Code (Central Shops): Am, Cm, Fp, H-3, Np, Pu, Th, U Alternate Location (723-A, H Area Unknown Facility, Reactors): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	
15	5/1/93: A02, H09	Incident report on [redacted]: 723-A	**Neutral Favorability** Dosimeter Code 1 (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U Dosimeter Code 2(221-H Area Outside Facilities): Fp, H-3, Np, Pu, Np Alternate Location: (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U	Note: 2 dosimeters issued for May 1993. Incident report from May shows claimant was involved in a contamination incident in [redacted]. Table 5-1 also attributes "A02" with 735-A and 735-11A, this area assigns only environmental radionuclides. If this area were to be selected instead of 723-A/773-A it would be claimant unfavorable.
15	7/1/93: A02, H06	N/A	**Neutral Favorability**: Dosimeter Code 1 (723-A, 773-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U Dosimeter Code 2 (H Area Unknown Facility): Am, Fp, H-3, Np, Pu	Note: 2 dosimeters issued for July 1993. It is not known when the dosimeters might have been changed out during the monitoring period, or if they were worn in tandem for a period of time. Table 5-1 also attributes dosimetry code H06 to the HB Line Facility and H-Canyon and A-Line – each has a different mix of radionuclides.

Table 12. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Intake Assignments of Neutral Favorability

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	9/1/93: A02, H06	In Vivo on 9/27/93: 723-A Bioassay on 9/28/93: A Area	**Neutral Favorability**: Dosimeter Code 1 (723-A, 773-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U Dosimeter Code 2 (H Area Unknown Facility): Am, Fp, H-3, Np, Pu Alternative Location 1 (723-A): Am, Cf, Cm, Fp, H-3, Np, Pu, Th, U Alternative Location 2 (A Area): see comments	Note: 2 dosimeters issued for July 1993. Table 5-1 also attributes dosimetry code H06 to the HB Line Facility and H-Canyon and A-Line – each has a different mix of radionuclides According to the TBD, "A Area" is very close to "M Area" which assigns Am, Np, Pu, Th and U. Alternatively, the "not identifiable or unknown" designation might be used which assigns Am, Cf, Cm, Fp, H-3, Pu, Th, U. This mix of radionuclides is the same as for 723-A/773-A.
17	None Available	Bioassay on 8/21/76: Central Shops	**Neutral Favorability** Dosimetry Code: None available, see comments Alternative Location (Central shops): Am, Cm, Fp, H-3, Np, Pu, Th, U	Note: An external dosimetry logbook exists that covers August of 1976; however, the claimant was not found in the logbook. Furthermore, August 1976 is not considered covered employment for the claimant despite the urinalysis sample present in the DOE records. Since no external dosimetry area code is available, the category of "Unidentified location or unknown" would be applied.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
1	1/1/80: 4H	In Vivo on 1/23/80: 704-2F	**Favorable:** Dosimeter code (H Area Unknown Facility): Am, Fp, **H-3**, Np, Pu, U. Alternate location (F Area Unknown Facility): Am, Fp, Np, Pu, U.	Unclear if In Vivo location refers to the counter location or work location.
3	1/1/73: 2F 4/1/73: 2F	Bioassay on 2/1, 2/6, 2/14, 3/25/73: C Area	**Favorable:** Dosimeter code (235-F Vaults): **Am, Cm, Np, Pu, Th, U** Alternate Location (Reactors): **H-3, Fp**	Dosimeter code 2F could also refer to "F Area Unknown Facility" instead of 235-F. This area does not assign thorium or curium, but does assign fission products. Note: Assignment to 235-F would also leave out assigning H-3 and Fp such as the reactor area prescribes.
3	10/1/73: 2F 1/1/74: 2F	Bioassay on 11/19/73: C Area	**Favorable:** Dosimeter code (235-F Vaults): **Am, Cm, Np, Pu, Th, U** Alternate Location (Reactors): **H-3, Fp**	Dosimeter code 2F could also refer to "F Area Unknown Facility" instead of 235-F. This area does not assign thorium or curium, but does assign fission products. Note: Assignment to 235-F would also leave out assigning H-3 and Fp such as the reactor area prescribes.
3	7/1/88: 8T	In Vivo on 7/20/88: 704-16F	**Favorable:** Dosimeter code (central shops): Am, **Cm**, Fp, **H-3**, Np, Pu, **Th,** U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U.	Unclear if In Vivo location refers to the counter location or work location.
4	1/1/76: 2F	Bioassay on 1/6, 1/15, 1/23 and 1/30/76: P Area	**Favorable:** Dosimeter code (235-F Vaults): **Am, Cm, Np, Pu, Th, U** Alternate Location (Reactors): **H-3, Fp**	Dosimeter code 2F could also refer to "F Area Unknown Facility" instead of 235-F. This area does not assign thorium or curium, but does assign fission products. Note: Assignment to 235-F would also leave out assigning H-3 and Fp such as the reactor area prescribes.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
6	3/1/75: 7A	Bioassay on 3/17 and 3/19/75: K Area	**Favorable:** Dosimeter code (central shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): H-3, Fp	Covered employment for this period ceases on 3/20/75; however, the claimant file contains external badging records into May of 1975.
6	7/1/78: 7A 10/1/78: 7A	Skin Decontamination on 8/3/78: 241-H Tank 16 Missing Exposure Investigation 8/1 – 8/30/78: 241-H Tank 16 Bioassay on 8/4/78: F Area	**Favorable:** Dosimeter code (central shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility, H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	Note: Alternate locations involve both Unknown H and Unknown F Areas; for the purposes of this comparison the two were combined.
7	9/1/77: 2H 11/1/77: 2H	Bioassay on 10/31/77: F Area	**Favorable:** Dosimeter code (H Area Unknown Facility): Am, Fp, **H-3**, Np, Pu, U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U	
8	4/1/82: 2H 7/1/82: 2H	Bioassay on 6/21/82: C Area	**Favorable:** Dosimeter code (H Area Unknown Facility): **Am**, Fp, H-3, **Np, Pu, U** Alternate Location (Reactors): Fp, H-3	

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
9	4/1/76: 2H	In Vivo on 4/21/76: 221-F Bioassay on 4/2/76: F Area	**Favorable:** Dosimeter Code (H Area Unknown Facility): **Am**, Fp, **H-3**, Np, Pu, U Alternate Location (221-F Canyon): Fp, Np, Pu, U	Table 5-1 also attributes dosimeter code 2H to the H-Canyon and A-Line (assigns Fp, Np, Pu and U, the same mix as 221-F Canyon) as well as New Special Recovery area, Plutonium storage facility (PSF), Receiving Basin for Off-Site Fuel (RBOF), and the Resin Regeneration Facility (RRF). Each of these areas assumes the same radionuclide mix as H Area Unknown Facility. 221-F could also refer to the "221-F B-Line (FB and JB Lines), this area only assigns Am and Pu.
9	1/1/85: 3H	Bioassay on 1/17/85: K Area	**Favorable:** Dosimeter code (H Area Unknown Facility): **Am,** Fp, H-3, **Np, Pu, U** Alternate Location (Reactors): Fp, H-3	Table 5-1 also attributes dosimeter code "3H" with the New Special Recovery area, Plutonium storage facility (PSF), Receiving Basin for Off-Site Fuel (RBOF), and the Resin Regeneration Facility (RRF). Each of these areas assumes the same radionuclide mix as H Area Unknown Facility.
9	5/1/89: 2H 7/1/89: H02	In Vivo on 6/19/89: 105K	**Favorable:** Dosimeter code (H Area Unknown Facility): **Am**, Fp, H-3, **Np, Pu, U** Alternate Location (Reactors): Fp, H-3	
10	7/1/79: 2F 10/1/79: 2F	In Vivo on 9/26/79: 484D	**Favorable:** Dosimeter code (235-F Vaults): **Am, Cm, Np, Pu, Th, U** Alternate Location (D Area): **H-3**	Location "484D" is not contained in Table 5-1, it was assumed for this comparison that it represents the "D Area." **However, if "Not Identifiable or Unknown" were selected instead, the use of the dosimeter code would be claimant unfavorable.** Note: Selection of dosimeter code location would omit tritium.
12	10/1/74: 2H 1/1/75: 2H	Bioassay on 12/13/74: P Area	**Favorable:** Dosimeter Code (H Area Unknown Facility): **Am**, Fp, **H-3**, Np, Pu, U Alternate Location (Reactors): Fp, H-3	

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
13	7/1/78: 2F	Bioassay on 7/23/78: D Area	**Favorable:** Dosimeter code (235-F Vaults): **Am, Cm, Np, Pu, Th, U** Alternate Location (D Area): **H-3**	Note: Selection of dosimeter code location would omit tritium.
15	7/1/76: 5A 10/1/76: 5A	Bioassay on 8/9/76: F Area	**Favorable:** Dosimeter Code (723-A, 773-A): Am, **Cf, Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	
15	4/1/82: 7L	Bioassay on 4/26 and 4/30/82: L Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	6/1/82: 7L	Bioassay on 6/14 and 6/17/82: L Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	10/1/83: 7L 1/1/84: 7L	Bioassay on 11/16/83: L Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	3/1/84: 7L	Bioassay on 3/14/84: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	6/1/84: 7L	Bioassay on 6/4, 6/5, 6/16/84: K Area, L Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	4/1/85: 7L	Bioassay on 4/6 and 4/20/85: P Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	7/1/85: 7L	Bioassay on 7/11, 7/18, 7/21, 7/25, 7/27/85: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	9/1/85: 7L	Bioassay on 9/2, 9/7, 9/13/85: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	10/1/85: 7L	Bioassay on 10/2, 10/7/85: P Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	2/1/86: 7L	Bioassay on 2/1, 2/5, 2/17, 2/18, 2/19, 2/20/86: L and K Areas	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	4/1/86: 7L	Bioassay on 4/3/86: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	7/1/86: 7L	Bioassay on 7/1, 7/10/86: C and K Areas	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	8/1/89: A27	Bioassay on 8/9, 8/12, 8/19, 8/20/89: L Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	11/1/89: A27	Bioassay on 11/14/89: P Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	2/1/91: A27	Bioassay on 2/7/91: H Area	**Favorable:** Dosimeter Code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	
15	7/1/91: A27	Neutron logbook for July: H02	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, **H-3**, Np, Pu, **Th**, U Alternate Location (H-Canyon and A-Line): Fp, Np, Pu, U	Table 5-1 also attributes dosimeter code H02 with H Area Unknown Facility which assigns the following contaminants: Am, Fp, H-3, Np, Pu, U. If this location were selected, it would omit Cm and Th.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
15	4/1/92: A27	Bioassay on 4/28, 4/29/92: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	5/1/92: A27	Bioassay on 5/11/92: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	6/1/92: A27	Bioassay on 6/23, 6/25 – 6/30/92: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	7/1/92: A27	Bioassay on 7/1, 7/3, 7/16, 7/18-7/20, 7/23, 7/25, 7/30/92: C Area, H Area	**Favorable:** Dosimeter Code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu**, Th,** U Alternate Location (H Area Unknown Facility, Reactors): Am, Fp, H-3, Np, Pu, U	
15	9/1/92: A27	Bioassay on 9/10, 9/17/92: C Area	**Favorable:** Dosimeter Code (Central Shops): **Am, Cm**, Fp, H-3, **Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	
15	2/1/93: A02	Bioassay on 2/18, 2/25/93: L and H Area	**Favorable:** Dosimeter Code (723-A, 773-A): Am, **Cf, Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (H Area Unknown Facility, Reactors): Am, Fp, H-3, Np, Pu, U	Table 5-1 also attributes "A02" with 735-A and 735-11A; this area assigns only environmental radionuclides. If this area were to be selected instead of 723-A/773-A, it would be claimant unfavorable.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
17	5/1/82: "99"	Bioassay on 5/5, 5/7, 5/19, 5/21, 5/28/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.
17	6/1/82: "99"	Bioassay on 6/11, 6/28/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.
17	7/1/82: "99"	Bioassay on 7/2, 7/9, 7/16, 7/30/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.
17	8/1/82: "99"	Bioassay on 8/6, 8/13, 8/20, 8/27/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.
17	9/1/82: "99"	Bioassay on 9/3, 9/10, 9/17, 9/27/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
17	10/1/82: "99"	Bioassay on 10/1, 10/8, 10/15, 10/22/82: L Area	**Favorable:** Dosimetry code (Unidentified location or unknown): **Am, Cf, Cm**, Fp, H-3**, Np, Pu, Th, U** Alternate Location (Reactors): Fp, H-3	Dosimetry code "99" is not mentioned in Table 5-1; for the purposes of this comparison, it was assumed that the category of "Unidentified location or unknown" would be applied.
19	10/1/80: 4H 1/1/81: 4H	Bioassay on 11/26/80: C Area	**Favorable:** Dosimeter code (H Area Unknown Facility): **Am**, Fp, H-3, **Np, Pu, U** Alternate Location (Reactors): Fp, H-3	Table 5-1 also attributes dosimetry code "4H" as one of only two dosimetry codes used to refer to 232-H, HANM, HAOM, Tritium Complex. **This location only assigns tritium intakes. If this location were selected, it would be very claimant unfavorable.**
20	3/1/75: 7A	Bioassay on 3/13, 3/17 - 3/19/75: F Area	**Favorable:** Dosimetry code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U	
20	4/1/75: 7A	Bioassay on 4/28/75: F Area	**Favorable:** Dosimetry code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U	
20	1/1/79: 7A	Missing Exposure Investigation for January monitoring period: 235-F	**Favorable:** Dosimetry code (Central Shops): Am, Cm, **Fp, H-3**, Np, Pu, Th, U Alternate Location (235-F): Am, Cm, Np, Pu, Th, U	Work area in Missing Exposure Investigation report was listed as 235-F Regulated Areas. Claimant [**redacted**]and [**redacted**]. He wore [**redacted**]. Claimant missed dose from 1/2 - 1/10 was estimated to be 80/80.

Table 13. Examples of Location Discrepancies between Dosimeter Area Code and Other Work Location Information that Would Produce Favorable Intake Assignments

Worker Ref #	Dosimeter Location Data	Alternate Locations Identified	Comparison of Hypothetical Coworker Intake	Additional Comments
20	4/1/80: 7A 7/1/80: 7A	Bioassay on 6/3, 6/4, 6/5/80: H Area	**Favorable:** Dosimetry code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	
20	7/1/80: 7A 10/1/80: 7A	Bioassay on 8/25, 9/17/80: F Area	**Favorable:** Dosimetry code (Central Shops): Am, **Cm**, Fp, **H-3**, Np, Pu, **Th**, U Alternate Location (F Area Unknown Facility): Am, Fp, Np, Pu, U	
20	4/1/81: 7A 7/1/81: 7A	Bioassay on 6/8/81: H Area	**Favorable:** Dosimetry code (Central Shops): Am, **Cm**, Fp, H-3, Np, Pu, **Th**, U Alternate Location (H Area Unknown Facility): Am, Fp, H-3, Np, Pu, U	

ATTACHMENT 3: NIOSH PROVIDED LISTING OF AVAILABLE DOSIMETRY LOGBOOKS ON THE SITE RESEARCH DATABASE COVERING THE SEC PERIOD

Timeframe Covered	SRDB Reference ID	SRDB Title
1972, Oct.	50496	Personnel Dosimetry and Exposure for 1972
1972, Q4	50363	SRS Dosimetry Quarterly Report for Fourth Quarter 1972
1973, Q1	50187	SRS Dosimetry Quarterly Reports for Period Ending March 1973
1973, Q2	50197	SRS Dosimetry Quarterly Reports for Period Ending June 1973
1973, Q3	50202	SRS Dosimetry Quarterly Report for Period Ending September 1973
1973, Q4	50211	SRS Dosimetry Quarterly Report for Period Ending December 1973
1974, Monthly Statistics Only	57123	1974 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1974, Q1	50102	SRS Dosimetry Quarterly Report for Period Ending March 1974
1974, Q2	50121	SRS Dosimetry Quarterly Report for Period Ending June 1974
1974, Q3	50126	SRS Dosimetry Quarterly Report for Period Ending September 1974
1974, Q4	50124	SRS Dosimetry Quarterly Report for Period Ending December 1974
1975, Monthly Statistics Only	57181	1975 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1975, Q1	50207	SRS Dosimetry Quarterly Report for Period Ending March 1975
1975, Q2	50193	SRS Dosimetry Quarterly Report for Period Ending June 1975
1975, Q3	50204	SRS Dosimetry Quarterly Report for Period Ending September 1975
1975, Q4	50179	SRS Dosimetry Quarterly Report for Period Ending December 1975
1976 Monthly Statistics Only	57127	1976 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1976, Q1	50082	SRS Dosimetry Quarterly Report for Period Ending March 1976
1976, Q2	50083	SRS Dosimetry Quarterly Report for Period Ending June 1976
1976, Q3	50086	SRS Dosimetry Quarterly Report for Period Ending September 1976
1976, Q4	50087	SRS Dosimetry Quarterly Report for Period Ending December 1976
1977 Monthly Statistics Only	57149	1977 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1977, Q1	50267	SRS Dosimetry Quarterly Report for First Quarter 1977
1977, Q2	50264	SRS Dosimetry Quarterly Report for Second Quarter 1977
1977, Q3	50271	SRS Dosimetry Quarterly Report for Third Quarter 1977
1977, Q4	50270	SRS Dosimetry Quarterly Report for Fourth Quarter 1977
1978 Monthly Statistics Only	57155	1978 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1978, Q1	50294	SRS Dosimetry Quarterly Report for First Quarter 1978
1978, Q2	50292	SRS Dosimetry Quarterly Report for Second Quarter 1978
1978, Q3	50289	SRS Dosimetry Quarterly Report for Third Quarter 1978
1978, Q4	50288	SRS Dosimetry Quarterly Report for Fourth Quarter 1978
1979, Monthly Statistics Only	57161	1979 Quarterly Summaries, Quarterly Summaries of: Dosimetry, Bioassay and Whole Body
1979, Q1	50210	SRS Dosimetry Quarterly Report for Period Ending March 1979
1979, Q2	50213	SRS Dosimetry Quarterly Report for Period Ending June 1979
1979, Q3	50216	SRS Dosimetry Quarterly Reports for Period Ending September 1979

Timeframe Covered	SRDB Reference ID	SRDB Title
1979, Q4	50222	SRS Dosimetry Quarterly Report for Period Ending December 1979
1980, Q1	50156	SRS Dosimetry Quarterly Report for Period Ending March 1980
1980, Q2	50158	SRS Dosimetry Quarterly Report for Period Ending June 1980
1980, Q3	50173	SRS Dosimetry Quarterly Report for Period Ending September 1980
1980, Q4	50175	SRS Dosimetry Quarterly Report for Period Ending December 1980
1981, Q1	50438	SRS Dosimetry Quarterly Report for First Quarter 1981
1981, Q2	50437	SRS Dosimetry Quarterly Report for Second Quarter 1981
1981, Q3	50436	SRS Dosimetry Quarterly Report for Third Quarter 1981
1981, Q4	50432	SRS Dosimetry Quarterly Report for Fourth Quarter 1981
1982, Q1	50462	SRS Dosimetry Quarterly Report for First Quarter 1982
1982, Q2	50461	SRS Dosimetry Quarterly Report for Second Quarter 1982
1982, Q3	50456	SRS Dosimetry Quarterly Report for Third Quarter 1982
1982, Q4	50455	SRS Dosimetry Quarterly Report for Fourth Quarter 1982
1983, Q1	50448	SRS Dosimetry Quarterly Report for First Quarter 1983
1983, Q2	50446	SRS Dosimetry Quarterly Report for Second Quarter 1983
1983, Q3	50463	SRS Dosimetry Quarterly Report for Third Quarter 1983
1983, Q4	50470	SRS Dosimetry Quarterly Report for Fourth Quarter 1983
1984, Q1	50476	SRS Dosimetry Quarterly Report for First Quarter 1984
1984, Q2	50483	SRS Dosimetry Quarterly Report for Second Quarter 1984
1984, Q3	50486	SRS Dosimetry Quarterly Report for Third Quarter 1984
1984, Q4	50502	SRS Dosimetry Quarterly Report for Fourth Quarter 1984
1985, Q1	50517	SRS Dosimetry Quarterly Report for First Quarter 1985
1985, Q2	50515	SRS Dosimetry Quarterly Report for Second Quarter 1985
1985, Q3	50547	SRS Dosimetry Quarterly Report for Third Quarter 1985
1985, Q4	50551	SRS Dosimetry Quarterly Report for Fourth Quarter 1985
1986, Q1	50613	SRS Dosimetry Quarterly Report for First Quarter 1986
1986, Q1 Tritium	50614	SRS Dosimetry Quarterly Report for First Quarter 1986, Tritium
1986, Q3	50556	SRS Dosimetry Quarterly Report for Third Quarter 1986
1986, Q4	50611	SRS Dosimetry Quarterly Report for Fourth Quarter 1986
1987, Q1	50618	SRS Dosimetry Quarterly Report for First Quarter 1987
1987, Q2	50504	SRS Dosimetry Quarterly Report for Second Quarter 1987
1987, Q3	50506	SRS Dosimetry Quarterly Report for Third Quarter 1987
1987, Q4	50521	SRS Dosimetry Quarterly Report for Fourth Quarter 1987
1988, Q1	50093	SRS Dosimetry Quarterly Report for Period Ending March 1988
1988, Q2	50525	SRS Dosimetry Quarterly Report for Second Quarter 1988
1988, Q3	50530	SRS Dosimetry Quarterly Report for Third Quarter 1988
1988, Q4	50532	SRS Dosimetry Quarterly Report for Fourth Quarter 1988
1989, Q1	50538	SRS Dosimetry Quarterly Report for First Quarter 1989

ATTACHMENT 4: EMAIL FROM NIOSH IN RESPONSE TO 4/26/2014 WORK GROUP ACTION ITEMS RELATED TO DOCUMENTING TABLE 5-1

From: Taulbee, Timothy D. (CDC/NIOSH/DCAS)
Sent: Tuesday, March 04, 2014 11:00 AM
To: [Joe Fitzgerald – SC&A][redacted]; Barton, Robert (CDC/NIOSH/OD) (CTR)
Cc: Katz, Ted (CDC/NIOSH/OD); Neton, Jim (CDC/NIOSH/DCAS); Rutherford, LaVon B. (CDC/NIOSH/DCAS); Griffon, Mark; Clawson, Bradley P. (CDC/NIOSH/OD); 'Lockey, James ([redacted])'; Schofield, Phillip M. (CDC/NIOSH/OD); [redacted]
Subject: NIOSH Response to Action #4 (Dosimetry Codes and Quarterly Reports)

Joe and Bob,

Please find attached a spreadsheet which lists the SRS Quarterly Dosimetry reports. If you need help reading these printouts just let me know and I can go over them with you. The important point in reading the files is the combination of Roll, Payroll Number and Name to identify a worker and then the HP Area for the location. A breakdown of the rolls is taken from DPSOP-45 (SRDB# 53157 pdf page 57).

Code (Roll) Number

1 Operation Wilmington Salary (This group comprises the salaried technical engineers, chemists, and managers)
2 Operations Local Roll (This group comprises the operators, technicians, instrument technicians, maintenance, etc…)
3 Construction Wilmington Salary (This group comprises the construction managers, planners, etc…)
4 Construction Local Roll (This group is the "DuPont Construction Workers" however, many of them are actual from Miller-Dunn, BF Shaw, prime construction subcontractors. Further delineation of this group is the subject of NIOSH's action item #8 to better understand whether the minor subcontractors are actually in this group.)
Within the Construction group, the Prefix in addition to the Roll number is also important. This describes the craft of the particular employee. On the last page of the SRS HP Area and Department Code Compilation document you will find the craft codes.
5 AEC Personnel

As noted above, I have also attached the HP Area and Department code compilation. This compilation are snapshots in time and contains the translation as the codes changed from one time period to the next. We have code listings for 1959, 1972, 1973, 1977, 1984, 1990, 1992. So the bulk of the information we have is for the time period of interest.

I think this is all that you need to get started with your review of Table 5-1 from ORAUT-OTIB-0081. We have done our best to be comprehensive with the goal of inclusion in Table 5-1 and look forward to hearing the results of your review. As for other source documents used to develop Table 5-1, it largely comes from site knowledge gained during the past 5 years of research of the Monthly Reports and descriptions of radiological work in the various areas from historical documents. There are several historical documents I would point you to in the SRDB if you are looking for an overview of potential exposures. These include the following:

SRDB#	Title
11249	History of DuPont at the Savannah River Site
10931	History of Personnel Radiation Dosimetry at SRS

45046 50 Years of Excellence in Science and Engineering at the SRS
24750 Savannah River Site at Fifty Reactor On
71618 300/M Area Fuel and Target Fabrication
93961 CMX and TNX Savannah River's Pilot Plants
89232 History of the Savannah River Laboratory Volume I – Production Reactors
89523 History of the Savannah River Laboratory Volume II – Separations Technology
90054 History of the Savannah River Laboratory Volume III – Power Reactor and Fuel Technology
89234 History of the Savannah River Laboratory Volume IV – Isotope Technology
89532 History of the Savannah River Laboratory Volume XII – Spent Fuel Technology

Let me know if you have any questions or need further information. I believe this competes our response for NIOSH Action #4 listed in your summary.

Thanks,

Tim