
DRAFT WHITE PAPER

**REVIEW OF SOME SRS CLAIMANT CASES TO EXAMINE
BADGE AND AREA CODES FOR ADEQUACY IN THORIUM
SEC IMPLEMENTATION**

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Prepared by

Lynn Ayers

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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S. Cohen & Associates: <i>Technical Support for the Advisory Board on Radiation & Worker Health Review of NIOSH Dose Reconstruction Program</i>	Document Description: Analysis of Some SRS Claims
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Record of Revisions

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0 (Draft)	11/28/2011	Initial issue

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INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) published Addendum 2 to its Evaluation Report for the Savannah River Site (SRS) Special Exposure Cohort (SEC) (NIOSH 2011). This report recommended that certain workers at SRS be added to the SEC, as follows:

All externally monitored employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Savannah River Site from January 1, 1953 through December 31, 1957, and whose records have dosimetry codes A, G, CMX, or TNX; and all externally monitored employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Savannah River Site from January 1, 1958 through September 30, 1972, and whose records have dosimetry codes 5A, 5C, 6B through 6Z, 12D through 12H, or 12J through 12Z for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees included in the Special Exposure Cohort. [NIOSH 2011]

Some petitioner and claimant representatives believed that the dosimetry records were not adequate in several respects to prevent workers who were exposed to thorium in the designated work areas from being incorrectly excluded from the SEC.

This report examines 10 claimant cases to evaluate completeness of the dosimetry codes. Some of these cases were provided by petitioner and/or claimant representatives. See Attachment 1 for a list of claims reviewed.

SC&A reviewed dosimeter badge data and dosimetry cards from the claimants' DOE Files for employment years from January 1953 through September 1972. Dosimetry codes from these sources were noted and compared against other indicators of work locations within the DOE File, such as bioassay cards. Computer Assisted Telephone Interview (CATI) responses were considered as well. SC&A noted discrepancies, gaps, illegible entries, and other issues that might compromise implementation of the proposed SEC class.

We stress that this is a small sample and is not sufficient to enable statistically valid conclusions. Rather, it is meant to examine whether there are gaps in the data, as described by claimant representatives, or whether the records are complete enough to implement the SEC in these sample cases.

Main finding: There are extensive gaps in the records. There was only 1 case out of 10 where the assigned area and dosimetry codes are complete and legible with no uncertainties or discrepancies. Four (4) of the 10 cases have codes corresponding to inclusion in the proposed SEC class; these cases also have gaps. Five (5) of the 10 cases have incomplete, illegible, and/or indeterminate records of work location. In these cases, it appears that excluding workers due to the lack of an SEC code per the proposed NIOSH

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SEC class definition would not be claimant favorable, since it would be impossible to assure that they did not, in fact, qualify.

DATA AND ANALYSIS

SC&A found that dosimetry records for the 10 claims were of the types described by Dr. Taulbee at the Advisory Board meeting in August 2011 (ABRWH 2011). Dosimetry cards were used through 1958. Generally, each card had one “Assigned Area” field covering a period of 6 months to 1 year at a time. Beginning in 1958, quarterly reports of badge data generally provide dosimetry codes on a biweekly or quarterly basis. Some of these reports reflected changes in work location within a quarter, or even within a single biweekly exchange cycle. This conveys a sense of greater precision in identifying worker locations during the latter period.

Two questions affect the use of dosimetry records to determine inclusion in an SEC class. The first is the completeness of data available for review; the second is the usefulness of this data in identifying work locations. The issue of completeness addresses the question of whether workers had legible dosimetry codes for the entire period from January 1953 through September 1972 (the proposed SEC period), or whether there were gaps in data or other problems with the records. Table 1 quantifies the data in terms of claimant-years; how many claimants have legible data available for how many years, as a percentage of the combined years of service during the SEC period for all selected claimants. Employment start and end dates, where available, were considered in assessing data completeness. However, except where explanations are readily available in the documents reviewed, SC&A did not attempt to investigate the possibility that data gaps might be explained by interruptions in service.

Table 1. Summary of Dosimetry Code Availability for Selected Claimant Files

	Available & Legible		Blank, Illegible, Not Copied		Record Unavailable	
	Full Year	Partial Year	Full Year	Partial Year	Full Year	Partial Year
Jan. 1958 – Sep. 1972 n = 103	64 (62%)	27 (26%)	1 (1%)	2 (2%)	11 (11%)	25 (24%)
Jan. 1953 – Dec. 1957 n = 36	12 (33%)	8 (22%)	10 (28%)	6 (17%)	6 (17%)	2 (6%)
All Years n = 139	76 (55%)	35 (25%)	11 (8%)	8 (6%)	17 (12%)	27 (19%)

Table 1 indicates significant gaps in the records for each of the two periods evaluated and for the two periods combined. From 1958 through 1972, 62% of the claimant-years were fully represented with legible dosimetry records. While another 26% of the claimant-years have some data available, this still appears to pose a problem for the implementation of the SEC. During the presentation of the NIOSH proposal for an addition to the SEC class on August 24, 2011, Dr. Taulbee stated that a single instance of a qualifying dosimeter or area code in a worker’s record should be sufficient to include a worker in the SEC class, though he noted that the matter of implementing the proposed class was up to the Department of Labor (ABRWH 2011, pp. 198–199). The gaps were even larger in the earlier period, 1953 to 1957, when only 33% of the

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worker-years had complete data, and only 55% have legible data representing the worker’s location during any part of the year.

Several factors influenced the availability of legible records in the claimants’ files. One factor is copy quality. In many cases, records were present in the claimant files, but the indicators of work location could not be read. Some copies are simply too light or too blurred to distinguish the codes. Many copies of dosimetry cards from the pre-1958 period were overexposed at the bottom, where the assigned area field is located. Another problem with the cards is that the assigned area would be scratched out as employee assignments changed during the year. Some of the entries could be read through the lines; others were completely obscured. If an entry was crossed out without replacement, we inferred that no valid area code was available for that period. If a legible replacement entry was available, we regarded the replacement entry as evidence of worker location for the part of the period represented by the card. Some cards have no entry for the assigned area; the field is blank. Another problem, noted in one file, is that the wrong page of a quarterly report was copied; the record provided by DOE does not include the claimant’s data. All of the complications described in this paragraph were counted in the “Blank, Illegible, Not Copied” category of Table 1. The only situation counted as “Record Unavailable” is a period with no report or card available in the DOE file.

Table 2 provides specific observations for each claimant. One column describes any gaps, discrepancies, or uncertainties that might complicate assessment of a claimant’s work location. Another column lists evidence from the DOE files that would support inclusion in the SEC class as recommended by NIOSH.

One issue noted in the “inconclusive” column is dosimetry code 000, which appears in the quarterly badge reports. SC&A consulted NIOSH for assistance in interpreting this code; it is currently assumed that 000 represents an unknown work location.

Table 2. Detailed Observations from Review of Selected Claimant Files

Case ID	Years Employed*	Missing or Inconclusive Area Designations	Potential SEC Inclusion Indicators
1	1953–1964	1955–1957 (assigned areas illegible on cards) 1953 (no records)	None noted
2	1953–1972	1972 (no records for Q3) 1971 (no records for Q1) 1970 (no records for Q2, Q4) 1968 (code 000 for Q1) 1967 (no records for Q1-Q2, Q4; code 000 for Q3) Bioassay Jun. 1967, location “A” 1966 (no records) 1964–1965 (code 000 for all quarters) 1963 (code 000 for Q2-Q4) 1962 (no records for Q2) 1958 (no records Q1, Q3, Q4) 1955 (several entries for assigned area, all scratched out) 1954 (one assigned area scratched out and replaced) 1953 (no records for Q2)	1971 Q2-Q4 code 6G 1972 Q1, Q2 code 6G 1956–1957 area G2 1954 area G2 or G7 1953 Q3, Q4 area A

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Case ID	Years Employed*	Missing or Inconclusive Area Designations	Potential SEC Inclusion Indicators
3	1953–1972	1972 (no records for Q3) 1971 (no records) 1970 (no records for Q2-Q4) 1969 (no records for Q4) 1966 (no records for Q1-Q2) 1965 (no records for Q2-Q4) 1964 (no records for Q4; code 000 for Q1) 1963 (no records for Q2; code 000 for Q4) 1962 (no records for Q1-Q2) 1961 (no records for Q3) 1960 (no records for Q2-Q3) 1958–1959 (no records) 1955 (assigned area is blank; 2 data entries marked A-1) 1953 (no records)	1970 Q1 code 5A 1969 Q1-Q3 code 5A 1967-1968 code 5A Two bioassays Jul-67, location 773-A 1966 Q3-Q4 code 5A 1956–1957 area A1 1955 2 data entries A1 1954 area A6
4	1953–1954	1967–1969 DOE located dosimetry data for 3 or 4 cycles when the claim file does not indicate employment at SRS. 1953–1954 (no records – job did not require monitoring)	None noted
5	1953–1959	1958 (no records Q1-Q3) 1957 (no records) 1954 (assigned area scratched out on Q1-Q2 side) 1953 (no records for Q1-Q3; start date Feb. 1953)	None noted
6	1953–1972	1972 (no records for Q1, Q3) 1971 (no records) 1970 (no records for Q1, Q2, Q4) 1966–1967 (no ext. data; Pu bioassay 04/67 location P) 1965 (code 000 for Q1-Q2) 1964 (code 000) 1963 (code 000 for Q2-Q4; no records for Q1) 1960–1962 (data for only 1 badge cycle [2 wk] per year) 1959 (no records) 1954–1957 (assigned area illegible copies) 1953 (no records)	None noted
7	1954–1972	No discrepancies or missing intervals were noted	None noted
8	1953–1972	1968 (Q3 code 12 – letter is not legible on copy) 1958 (card area D-2; printouts 5C = CMX/TNX) 1957 (2 areas scratched out, replaced) 1956 (1 area scratched out, replaced with A9) 1955 (1 area scratched out, not replaced, on Q3-Q4 side) 1954 (3 areas scratched out both sides, replaced with D on Q3-Q4 side)	1969 Q1-Q2 code 12G 1968 Q1-Q4 code 12G 1962 Q1 code 5A 1961 Q1-Q4 code 5A Bioassay Nov. 1961, 773A 1960 Q2-Q4 code 5A 1959 Q1 code 5C Bioassays Feb.–Mar. 1959 location “CMX” 1958 Q1-Q4 code 5C Bioassay Jul. 1958 “CMX” 1956 area A9
9	1961–1972	1972 (no records) 1968 (Q1-Q2 partially obscured/illegible)	1970–1971 code 6K

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Case ID	Years Employed*	Missing or Inconclusive Area Designations	Potential SEC Inclusion Indicators
10	1961–1964	1964 Q3 (code 000 – unknown) Bioassay Aug-64, location “A” 1962–1963 (no records – possibly d/t military service)	None noted

* Only listing years within the proposed SEC period, January 1953–September 1972.

Seven (7) of the 10 claimants were employed at SRS in 1958, when dosimetry cards and quarterly badge reports are both found in claimant files. Since dosimetry codes from the badge reports are the primary indicators for SEC class inclusion for 1958, the cards from this year are not considered a primary data source; SC&A did not report missing or illegible cards for 1958 as a concern in Tables 1 and 2. However, as an exercise in evaluating the reliability of dosimetry cards to indicate work location, SC&A attempted to compare information from the cards and quarterly reports. We found that one case demonstrates clear agreement between the card and the quarterly report, one demonstrates a significant discrepancy, one has no records in either form for 1958, and four cases could not be compared due to blank or illegible card entries. The results are presented in Table 3.

Table 3. Comparison of Dosimetry Cards and Quarterly Reports for 1958

Case Number	1958 External Dose Card “Assigned Area”	1958 Badge Report Dosimetry Code(s)	Agreement/Disagreement Between Sources re: SEC inclusion
1	Assigned Area illegible on copy	Q1-Q4, code 8A (100P).	Cannot compare locations.
2	Assigned Area is blank; data for Q2 only	Q2 only, code 7A (100R). No codes for three quarters.	Monitored periods agree. Cannot compare locations.
3	No record	No record.	Cannot compare locations.
5	Assigned Area illegible on copy	Q4 only, codes 2A (200H) & 2Z (not provided). No codes for three quarters.	Cannot compare locations.
6	Assigned Area illegible on copy	Q1-Q4, code 10A (100K).	Cannot compare locations.
7	K (non-SEC area)	Q1-Q4, code 10A (100K), non-SEC code.	Agreement.
8	D-2 (non-SEC area)	Q1-Q4, code 5C (CMX/TNX – SEC code).	Disagreement between assigned area and dosimetry code.

SC&A was not able to complete a detailed comparison between work locations indicated by CATIs and dosimetry records, as we can only translate the area and dosimetry codes that are listed in the SEC class definition or in Table 7-5 of ER Addendum 2 (NIOSH 2011, pp. 42–43). We could not determine, for example, if area code “D-1” and dosimetry codes “1B” or “2Z” match work locations identified in claimants’ CATI reports. However, a few anecdotal observations can be made. Some CATI references to specific facilities could be matched with work locations indicated by the dosimetry records. For example, a worker who claimed to have worked in C Reactor and 200F has specific dosimetry codes for those facilities (code 11A and

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1A, respectively). A worker who mentioned an incident cleanup in 221 F Canyon has dosimetry code 1A (200F Separations) during the specified time. None of the CATIs specifically identifies a facility or area associated with the SEC class. One worker claimed to have worked in “773” (with no letter suffix); this worker’s dosimetry codes and bioassay records do indicate work in 773-A (an SEC location).

The CATI’s usefulness seems limited, because it generally provides a broad overview of work history recalled by the worker or survivor, whereas the dosimetry codes required to qualify a worker for inclusion in the SEC (NIOSH 2011) are precisely defined in time and space. Since this degree of fine-grained determination is required for inclusion in the SEC, using a CATI as a supplemental or complementary source would not appear to enhance the ability to ensure that a worker was not present in the SEC areas during some part of his/her period of employment.

FINDINGS

Finding 1: One (1) of the 10 cases examined has complete dosimetry code designations for the duration of employment during the proposed SEC period. This case would conclusively not meet the criteria for inclusion in the SEC class. [Case 7]

Finding 2: Four (4) of the 10 cases examined had incomplete or missing data, but at least 1 dosimetry code that supports inclusion in the SEC. In all 4 of these cases, SEC-eligible dosimetry codes cover a work period greater than 1 year (250 work days). These cases appear to meet the criteria proposed by NIOSH, despite periods of missing or inconclusive records. [Cases 2, 3, 8, and 9]

Finding 3: Five (5) of the 10 cases examined have gaps in the records; the available records do not contain any area or dosimetry codes specified in NIOSH’s proposed class definition. In view of the gaps in the data, it does not seem feasible to rule out the possibility that these claimants may have worked in areas that would make them eligible for inclusion in the SEC class. [Cases 1, 4, 5, 6, and 10]

- Case 1 has illegible “Assigned Area” entries for 3 years (1955–1957) and no dosimetry records for 1953.
- Case 4 has dosimetry records from a period when the claim file does not indicate employment at SRS. The three available dosimetry records from this period do not support inclusion in the SEC class. A fourth record was apparently identified by DOE, but the page containing the claimant’s badge number was not provided; this interval cannot be assessed for work location. Since the employment record is incomplete, it is not possible to determine if the monitoring record is complete.
- Case 5 has no records for three quarters of 1958, all of 1957, and three quarters of 1953. In addition, the “Assigned Area” was scratched out for the first half of 1954.
- Case 6 has no external dosimetry records for half of 1972, all of 1971, three quarters of 1970, and all of 1966–1967, although a bioassay was recorded for location “P” in June 1967. Case 6 also has nine consecutive quarters of dosimetry code 000 (unknown).

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- Case 10 has no dosimetry records for 1953–1954, which may be explained by military service. Case 10 also has dosimetry code 000 for the third quarter of 1964.

Finding 4: Some apparent discrepancies were noted, particularly for the earlier years. These examples may not directly impact inclusion or exclusion for these individuals, but they are considered in the larger context of accurately determining work locations from the area codes.

- Case 5, 1955, assigned area “D1;” plutonium bioassay in April 1955 indicates location “200F.” SC&A does not have access to an interpretation of area code “D1,” but it does not appear to represent 200F.
- Case 8 has two transfer notations on a bioassay card from 1957; “A9 to D” in January, and “D to CMX” in June. The claimant’s external dose card for 1957 has 2 scratched out entries, one legible as “A9,” with a final entry of “D-2.” “CMX” is not indicated on the card.

OBSERVATIONS

Observation 1: Additional guidance is needed for interpreting codes that are similar, but not identical, to the codes specified in NIOSH’s class definition.

- Several examples of alpha-numeric codes were noted prior to 1958. SC&A assumed that the letter code would determine SEC inclusion or exclusion, regardless of numeric suffixes. For example, we interpreted area code D8 to indicate D Area (a non-SEC location); we interpreted area code G2 to represent G Area; and area codes A1, A6, and A9 to indicate A Area (G and A Areas are SEC locations).
- Some claimant files include multiple cards for the same periods in 1953; it appears that separate cards were maintained in different work areas. SC&A was uncertain about interpreting assigned areas on some of these cards. Cases 2 and 8, for example, have cards marked “300M Area (A)” and cards marked “A” for the same periods. It is not clear if the “A” cards represent “A Area,” which is included in the SEC, or if this is an abbreviated notation for “300M Area (A).”
- SC&A used bioassay records to supplement our understanding of claimants’ work locations. One location code found on bioassay cards caused some confusion in evaluating SEC inclusion potential. Two claimants had bioassays recorded for location “A” in the 1960s. In both cases, the dosimetry records were obscure with regard to assigned location. Case 2 had a bioassay for location “A” in June 1967; dosimetry records are not available for this period. Case 10 had a bioassay for location “A” in August 1964, when the claimant’s dosimetry code is 000. SC&A was unable to determine whether or not these records indicate work in “A Area” (an SEC location). Case 2 has a dosimetry code providing evidence for SEC inclusion. Case 10 does not.

Observation 2: The wording of the class definition is unclear in regard to the requirement for 250 days of employment.

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At the Advisory Board meeting of August 24, 2011 (ABRWH 2011), Board Member Field asked how workers would meet the “hurdle for the 250 days.” Would they need to have one of the dosimetry codes for a 250-day period or work at the facility [for 250 days] and have that dosimetry code for some period of time? Dr. Taulbee indicated that this question would boil down to DOL’s implementation of the class. However, he offered his personal opinion that “they would only have to have one dosimeter through that time period” with the requisite designation. At the present time, it is unclear how the 250-day criterion would be met if Dr. Taulbee’s suggestion is accepted. On the other hand, there were gaps in the records of 9 out of the 10 cases examined. In such cases, it is likely that in many cases it would be impossible to ensure that workers who fell short of 250 days with the requisite code would not have had 250 days, had the records been complete.

REFERENCES

ABRWH (Advisory Board on Radiation and Worker Health) 2011. *Transcript of the 79th Meeting of the Advisory Board on Radiation and Worker Health*. Cincinnati, Ohio. August 24, 2011, pp. 199–200.

NIOSH (National Institute for Occupational Safety and Health) 2011. *SEC Petition Evaluation Report, Petition SEC-00103, Addendum 2*. Cincinnati, Ohio. August 9, 2011.

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ATTACHMENT 1: LIST OF CLAIMS REVIEWED

Case ID	NIOSH ID	SRS Employment Dates Listed on Claim	Job Designations Listed on Claim (see note)
1	[redacted]	12/11/1951–05/28/1954 08/23/1954–04/17/1964	[redacted] Operator, [redacted] Operator
2	[redacted]	03/30/1953–04/30/1976	Operations – [redacted]
3	[redacted]	09/10/1951–12/10/1955 12/19/1955–05/31/1979	[redacted] Clerk
4	[redacted]	12/11/1951–01/05/1954 05/29/1975–06/18/1975 07/14/1983–07/01/1996	Construction/Carpentry
5	[redacted]	02/26/1953–01/16/1959	[redacted] Advisor
6	[redacted]	05/07/1952–08/30/1953 08/31/1953–06/30/1957 07/01/1957–12/31/1981	Engineer
7	[redacted]	07/26/1954–12/31/1972	Mechanic
8	[redacted]	11/19/1951–12/31/1984	Electrical and Instrument Repair
9	[redacted]	05/16/1961–05/31/1995	Laborer, Process Operator, Fire Equipment Inspector, Equipment Operator, Crane Operator and Supervisor
10	[redacted]	1961–1964	Janitor, Decontaminator

Note: The job designation does not mean that all of the worker's time was spent in a particular area, even if the designation indicates a particular area (such as reactors or canyons). Many construction workers would be expected to work in several areas of SRS or the entire plant.

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