



## MEMORANDUM

TO: Idaho National Laboratory Work Group  
FROM: SC&A, Inc.  
DATE: September 29, 2016  
SUBJECT: Verification and Validation (V&V) Plan for Temporary Badges at CPP (1963–1970)

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### Introduction and Background

The Special Exposure Cohort (SEC) evaluation report for the Idaho National Laboratory (INL) was initially finalized in March 2015 and recommended a class of all workers located at the Chemical Processing Plant (CPP) and who were monitored externally at CPP from 1963 to 1974. Since that time, both the National Institute of Occupational Safety and Health (NIOSH) and SC&A have performed multiple assessments using available claimant files to evaluate the appropriateness and validity of the dosimetry requirement. Some of the main discoveries as a result of those assessments and additional research are as follows:

- Efficiency measures were applied to some claims resulting in only annual dose summaries being transmitted by the U.S. Department of Energy (DOE). This was resolved in the fall of 2015, with DOE agreeing to send complete radiological monitoring histories instead of summaries.
- Some record formats for construction workers had not been previously identified as associated with CPP work and exposure. These records have subsequently been captured and will be included in worker exposure records as appropriate.
- Beginning in early 1970, INL workers were allowed to use their badge from their primary areas of work to enter other locations at the site. This resulted in a revision to the class definition that changed the criteria from a CPP-specific badge to any INL dosimetry badge for the period March 1, 1970, to December 31, 1974.<sup>1</sup>
- For some portions of the SEC period, temporary badges or visitor cards had not been officially entered into the INL dosimetry system if the exposure on the badge was zero. Although the visitor cards were not entered into the dosimetry system, the original visitor cards were kept by the site.

For the last bullet, DOE is currently undertaking an extensive coding and indexing effort to assure that all temporary badges/visitor cards are correctly entered into the dosimetry system and that worker dosimetry records are complete. One of the main concerns expressed at the March 2016 INL Work

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<sup>1</sup> The earlier portion of the SEC period (January 1, 1963–February 28, 1970) still required a CPP-specific dosimetry badge. The Advisory Board voted to accept the latter SEC period (March 1, 1970–December 31, 1974).

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Group meeting involved the completeness of relevant temporary/visitor dosimetry records, as well as potential issues related to the implementation of these dosimetry records once they had been coded and indexed.

On the issue of data completeness, NIOSH compared monthly health physics reports detailing the number of badges issued for CPP against the actual number of captured badges in NIOSH's possession. NIOSH presented the results of that comparison on August 2, 2016; therefore, this issue is not discussed further.

On the issue of implementation, the Work Group asked SC&A to investigate and propose a method to verify and validate that the complete set of visitor records is being implemented correctly on an individual basis. This memo provides an overview of SC&A's proposed approach and methodology to evaluate the implementation process for temporary badges/visitor cards.

### **Description of Proposed Methodology**

As described in the previous section, it was INL site policy not to enter visitor badges into the main dosimetry system if the exposure incurred by the worker was zero. Since this policy was discovered, DOE has undertaken a massive coding and indexing effort of all visitor badges to assure that all dosimetry for the site is included in their database and thus available to the U.S. Department of Labor (DOL) for SEC determinations and to NIOSH for accurate dose reconstruction.

During data capture efforts at INL, NIOSH captured all of the visitor cards and temporary badge reports for CPP from 1963 to 1974.<sup>2</sup> While the records have been captured, they are not coded or searchable in any meaningful way. However, by manually examining these captured visitor cards, analysts can identify individual claimants by name and security number. This sample of claimant visitor cards provides a comparative set of data that can be used to verify that temporary badges are correctly included in the records provided by DOE to NIOSH. Claimant visitor cards included in the verification and validation (V&V) sample would have to meet the following criteria:

- The claimant requires an updated dose reconstruction and was employed in the period from 1963 to 1974. These would include claims that do not currently qualify for the designated SEC (March 1, 1970–December 31, 1974), or who require partial dose reconstructions for non-SEC cancers.
- The individual visitor card associated with the claimant is not already included in available monitoring records from DOE.
- The claimant can be directly associated with the individual visitor card by security number.

This last criterion will necessarily limit the pool of available claimants for V&V sampling; however, it is deemed appropriate to avoid uncertainty when only the name is available to identify the claimant.

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<sup>2</sup> Verified via email exchange with Tim Taulbee, NIOSH, on August 18, 2016.

## Proof of Principle

In order to assure that identification of a sample of claimants that satisfy the above criteria (see the previous section, “Description of Proposed Methodology”) within the captured visitor cards is feasible, SC&A examined the CPP visitor cards captured by NIOSH for portions of 1968–1970; the Site Research Database (SRDB) references that were reviewed are shown in Table 1. Based on its review of these references, SC&A was able to identify 32 claimants who satisfy the criteria described in the previous section. Among the 32 claims, a total of 53 visitor cards were identified that could be used for the V&V study. These claims are summarized in Attachment 1.

As stated previously, it is SC&A’s understanding that NIOSH has captured the visitor cards and temporary badge reports for each year under consideration at CPP. Therefore, it would be important to examine records for the years 1963–1967, as well as any additional reports from 1968 to 1970, to establish a sufficient sample set for use in potential V&V studies.

**Table 1. References Used as a Proof of Principle for V&V Sampling**

<b>SRDB Ref. ID</b>	<b>Title</b>	<b>Page</b>
143032	CPP Area Visitor Badges July 6, 1967–December 4, 1970	221
143040	CPP Area Visitor Badges May 22, 1968–December 31, 1969	223
143045	CPP Area Visitor Badges June 19, 1967–December 31, 1968	219
151596	CPP Visitor Exchange Cards January 2–February 4, 1969 and June 2–7, 1969	275
151598	CPP Visitor Exchange Cards September 9–December 31, 1968	787
151601	CPP Visitor Exchange Cards January 3–June 30, 1969	1,051
151602	CPP Visitor Exchange Cards March 31–August 26, 1969 and November 6–December 12, 1996	1,089
151627	CPP Visitor Exchange and Construction Cards May 8–22, 1968 and August 6–December 14, 1968	1,041

## Conclusion

SC&A examined possible methods for performing a V&V study on the implementation of visitor cards/temporary badges that are currently being coded and indexed by DOE. By using currently captured “hardcopy” records of individual visitor badges and temporary badge reports to identify claimants, a sample of records can be developed to check against radiological dose records received subsequent to the completion of the DOE database. SC&A examined several visitor card records from the 1968-to-early-1970 timeframe and found 32 claimants (representing 53 visitor badges) that met the criteria discussed above in “Description of Proposed Methodology.”

It should be noted that at least two of these claimants had visitor cards with a name spelling that complicated the ability to match a visitor entry with a specific worker based purely on name (see Claims [REDACTED] and [REDACTED]). In addition, one claim contained a visitor card that had transposed two digits of the five-digit security code (see Claim [REDACTED]). These types of discrepancies were of concern to the implementation of the proposed SEC class, and so examination of these specific cases will help understand the validity and potential difficulties of DOE’s complex coding and indexing effort. It is

expected that examination of visitor and temporary badges in other years will yield more examples such as the three discussed above.

**Attachment 1: Overview of 32 Claimants (53 Total Visitor Badges) Identified by SC&A for V&V Sampling**

Claim ID	Relevant Employment Dates	Job Title(s)	Illness(s)	# Visitor Cards Identified	Additional Comments
█	█/1955–█/1992	Laborer, █	█	2	Neither of the visitor cards are reflected in the DOE_Response files currently available for the claimant. The energy employee (EE) was consistently monitored externally from 1963 to 1970; however, none of the badges were associated with CPP. The EE has many badges at CPP starting in 1970 (during the approved SEC period).
█	█/1960–█/1975	█ Administrative Assistant █	█	4	The EE has 250 days of employment and external monitoring in the approved SEC period. █ which had been observed by SC&A in other cases.  According to the DOE_Response records, there is a gap in external monitoring from 1961 to 1970. The identified visitor cards were from May 1968 and February and June 1969.
█	█/1951–█/1978	Machinist, █	█	1	DOE_Response files indicate a gap in external monitoring from 1963 to 1970. Identified visitor card was from December 1968.
█	█/1961–█/1963 █/1965–█/1966 █/1966–█/1967 █/1968–█/1979	Welder, █	█	1	Two other visitor cards were identified; however, they were included in the claimant’s monitoring records (positive exposures). The EE had several additional visitor cards contained in their DOE_Response files, and all showed positive exposures.  The identified visitor card contained a zero exposure and was from December 1968.
█	█/1961–█/1995	Maintenance, █	█	1	DOE_Response files indicate a gap in external monitoring from 1967 to 1970. The identified visitor card was in April 1969.
█	█/1955–█/1969	Maintenance, █	█	1	The last observed external monitoring result in the DOE_Response files was in 1967. The identified visitor card was in December 1968.

Claim ID	Relevant Employment Dates	Job Title(s)	Illness(s)	# Visitor Cards Identified	Additional Comments
█	█/1952-█/1986	Security, █	█	1	The claim file contains one visitor card from October 1969 that recorded a positive exposure. The identified visitor card is from December 1969.
█	█/1956-█/1986	█ Mechanic	█	1	There appears to be a gap in external monitoring records contained in the DOE_Response files from 1962 to 1970. The identified visitor badge is from December 1968.
█	█/1956-█/1969	█	█	2	No external dosimetry was observed for the EE after 1965. The identified visitor badges were for October 1968 and April 1969.
█	█/1951-█/1980	Pipefitter	█	4	While the four visitor cards did not appear in the DOE_Response files, the dates of the visitor cards overlap with “CX Area Exposure Dosimetry” reports that are available for the claim.
█	█/1957-█/1969	█ Technician	█	1	The only indication of assignment to CPP is an in vivo record questionnaire from 1964. The identified visitor card was from May 1968.
█	█/1962-█/1966 █/1968-█/1972 █/1972-█/1972	Laborer, █	█	1	External monitoring for the claimant appears to end in 1966. The identified visitor card was in January 1969.
█	█/1967-█/1984	█ Operator	█	2	There is no indication in the DOE_Response files that the EE was assigned to CPP from 1963 to 1974. The security # for the EE is █; however, on one of the two visitor cards the security # appears as █.
█	█/1958-█/1995	█	█	1	External dosimetry was observed in the DOE_Response files for 1964–1965, and again in 1987. The identified visitor badge was in August 1968.
█	█/1957-█/1974	Laborer, █	█	1	An additional visitor badge was identified and was located in the DOE_Response files for the claimant (positive exposure). The time periods of both visitor badges are covered by routine area exposure monitoring at CPP.

Claim ID	Relevant Employment Dates	Job Title(s)	Illness(s)	# Visitor Cards Identified	Additional Comments
█	█/1968-█/1969 █/1970-█/1976	Pipefitter	█	5	All five badges were not contained in the available DOE_Response files. The EE did have one CX Area Exposure entry, but it is not related to the visitor badges.
█	█/1960-█/1963 █/1963-█/1965 █/1965-█/1968 █/1968-█/1971 █/1971-█/1971	Laborer	█	1	According to currently available DOE monitoring records, external monitoring ended in 1964 for the claimant. NIOSH amended an external dosimetry record for 1985. The identified visitor card was in September 1968.  The claimant's █. The manner in which the middle █ was written on the visitor card could be interpreted as █; however, the security numbers match.
█	█/1968-█/1970	Laborer	█	1	Three other visitor badges were also identified; however, they had positive exposure readings and were included in the current DOE_Response files for the claimant.
█	█/1954-█/1990	█ █ █ Clerk	█	1	While the EE was monitored externally during the approved SEC period and was █, the diagnosis date was less than 5 years from the first exposure.  The identified visitor badge was not found in currently available DOE_Response files.
█	█/1967-█/1971 █/1974-█/1974	█ Operator	█	2	The EE has many area exposure reports for "CX"; however, neither of the identified visitor badges were found in the available DOE_Response files.
█	█/1951-█/1980	█ Chemist	█	1	The EE appears to have a gap in external monitoring from 1964 to 1980.
█	11 distinct employment periods from 1963 to 1974	█ Laborer	█	3	An additional six visitor badges were identified for the claimant; however, they each contained positive doses and so were included in the currently available dosimetry record for the EE.

Claim ID	Relevant Employment Dates	Job Title(s)	Illness(s)	# Visitor Cards Identified	Additional Comments
█	█/1963-█/1964 █/1967-█/1968 █/1968-█/1968 █/1969-█/1971 █/1971-█/1971 █/1973-█/1993	Pipefitter	█	2	The claimant's █; however, the two visitor cards identified by matching security # show the █. The dates of the visitor cards are subsumed into "CX Dosimetry - Area Exposure Reports" available for the claimant; however, the individual visitor cards were not included.  A third visitor card was found for an █; however, the security # did not match the claimant.
█	█/1963-█/1986	█	█	2	Two visitor cards are not reflected in DOE_Response files.  A third visitor card was also identified; however, it reported a positive dose and was found in the EE's monitoring records.
█	█/1955-█/1985	█ Technician	█	2	Neither visitor card was found in the EE's monitoring records.
█	█/1967-█/1968 █/1968-█/1969 █/1969-█/1969	█ Machinist	█	2	Two visitor cards were not reflected in DOE_Response files.  A third visitor card was also identified; however, it reported a positive dose and was found in the EE's monitoring records.
█	█/1956-█/1969 █/1969-█/1971 █/1971-█/1976	█ Engineer	█	2	The EE likely qualifies for the approved SEC based on the █; however, it is assumed that a partial dose reconstruction will also be required for the █.  The visitor badges identified prior to the approved SEC period do not appear in the claimant's DOE_Response files.
█	█/1958-█/1980	Welder	█	1	No evidence of work at CPP is observed in DOE_Response files.
█	█/1958-█/1995	█ Janitor	█	1	Available external monitoring was not observed until 1970 in the DOE_Response file.
█	12 distinct employment periods from 1963 to 1974	█ Operator	█	1	EE was monitored at CPP during the approved SEC period. The visitor badge was in June 1969 and was not included in the records.

Claim ID	Relevant Employment Dates	Job Title(s)	Illness(s)	# Visitor Cards Identified	Additional Comments
[REDACTED]	[REDACTED]/1962-[REDACTED]/1987	[REDACTED]	[REDACTED]	1	DOL Initial Case states that the EE was responsible for [REDACTED] at CPP, with occasional mechanical work. The EE was consistently monitored at [REDACTED] from 1963 to 1970. Beginning in 1970, the EE has multiple internal and external monitoring results associated with CPP.
[REDACTED]	[REDACTED]/1961-[REDACTED]/1963 [REDACTED]/1963-[REDACTED]/1963 [REDACTED]/1963-[REDACTED]/1964 [REDACTED]/1965-[REDACTED]/1967 [REDACTED]/1967-[REDACTED]/1968 [REDACTED]/1969-[REDACTED]/1970	Operator	[REDACTED]	1	The EE has monitoring data associated with CPP during the relevant employment dates; however, the identified visitor card is not included in the DOE_Response files.