

Feed Materials Production Center Subcontractor Bioassay Results (1983-87) and Search Results for Scopes of Work (1984-85)

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BACKGROUND

The issue of subcontractor bioassay sampling for uranium has been examined by NIOSH and the Advisory Board on Radiation and Worker Health's (Advisory Board) Feed Materials Production Center (Fernald) Working Group (WG) over a period of several years. At Fernald, the reason for the bioassay sample was coded with a two-digit "sample type." The sample type was either computer-generated or handwritten on the bioassay cards. The same code was input into a bioassay results table in a database. The HIS-20 database was the final database used at the site for this purpose. Over the years, over 40 different codes were used; but for the purposes of this analysis, only a few need explanation:

- Type 50 (also 5C, etc.) were non-routine samples. Type 50 is central to this analysis because it was used for nearly all subcontractor results, and thus, provides a means of identifying this class of workers. Type 50 was also used for "special" samples from site employees (e.g., taken after a change in process or procedures). For subcontractors, Type 50 bioassay cards frequently (but not always) had a company name written in the upper-right-hand corner.
- Type 20 were annual samples that generally applied only to site employees.
- Type 30 were routine samples that generally applied only to site employees.
- Type 10 samples were pre-hire bioassays and are generally excluded from analyses of site exposures.

During the Verification and Validation (V&V) of the HIS-20 database against the hardcopy records, NIOSH determined that subcontractor bioassay results were not included in HIS-20 until late 1985. Because the Fernald co-worker approach for internal uranium exposure was based on the HIS-20 bioassay data, the WG consequently considered whether a set of data from exclusively prime contractor employees would provide an appropriate bounding exposure estimate for subcontractor employees.

Extensive additional data capture yielded subcontractor bioassay results for the years 1969, 1971, 1972, 1973, 1981, 1983, 1984, and 1985. NIOSH and the WG could not determine whether the lack of data for missing years, and the limited data for available years, was because: (1) subcontractor employees did not perform radiological work; or (2) because there were lax radiological controls for subcontractor employees.

The argument for lax controls was that National Lead of Ohio (NLO), the operating contractor, did not carefully evaluate and control subcontractor exposures because they were expected to be

on site a short time, and therefore, would not exceed exposure limits during their stay. In one instance of subcontractor work, for which there is a reasonable work description and bioassay data, the co-worker approach did not bound the exposures of a few contractor employees. NIOSH concluded that there were not enough subcontractor bioassay samples for the years 1969, 1971, 1972, 1973, and 1981 to generate a subcontractor-specific co-worker approach for those years, but proposed that there were enough subcontractor bioassay samples for a subcontractor-specific co-worker approach for 1983-1985.

SPECIAL EXPOSURE CLASS RECOMMENDATION FOR SUBCONTRACTORS

During the June 17, 2013, Fernald WG meeting in Cincinnati, Ohio, participants discussed potential dates for a subcontractor Special Exposure Cohort (SEC) class. After an exhaustive discussion, 1983 was recommended as the last year of inclusion. Sanford Cohen & Associates' (SC&A) opinion was that 1983 was a "transition" year with most of the subcontractor samples grouped near the end of the year; thus, they were not representative of the entire year. SC&A also said, "Certainly '84 and '85 are, for all intents and purposes, indistinguishable from '86 in terms of the number of personnel and in the samples per person" (WG transcript, p. 51). NIOSH stated that there were sufficient data to construct a subcontractor co-worker study for 1984 and 1985, if desired, but that the results for 1985 were statistically indistinguishable from the results used to develop the site-wide co-worker study. SC&A agreed that there were sufficient subcontractor bioassay samples to construct a separate co-worker study for 1984 and 1985 (p. 157 of transcript). The WG Chairman and the WG agreed. At the Advisory Board meeting on 7/1/2013, the following motion was passed, "add to the SEC all employees of subcontractors who worked at the Feed Materials Production Center in Fernald, Ohio, from January 1st, 1951 through December 31st, 1983."

LETTER FROM FORMER SUBCONTRACTOR

In March 2014, a letter was received from a former Fernald subcontract worker, suggesting that the SEC for subcontractors should be extended from 1983 to 1985, the last two years of site management by National Lead of Ohio (NLO). The main points of the letter are listed below along with NIOSH comments.

1. Construction workers were brought in to do the work that "the house union could not do or did not want."

NIOSH Comment: The letter was written from the perspective of a construction worker. The population added to the SEC through 1983 was all Fernald “subcontractors.”

2. This work was all over the plant.

NIOSH Comment: The statement that the work was all over the plant is true when applied to the entire population of subcontractors. However, this statement is not necessarily true for individual subcontractor- companies.

3. During the NLO days, there were no work permits, no air monitoring, and no coverage by health and safety.

NIOSH Comment: The author alleges problems with the site’s radiation protection programs, some or all of which may have been true for individual jobs. However, the bioassay program at Fernald was extensive. As the data presented below will show, 279 and 307 results were captured for subcontractors in 1984 and 1985, respectively.

4. Most if not all of the bioassay testing in 1984 and 1985 were “Type 50 year end samples.”

NIOSH Comment: As an illustration of his assertion regarding Type 50 year-end samples, the author attached his own bioassay results for 1984 and 1985. However, these were not his only samples during that time period. A separate analysis (“Monthly results&individuals 1983-1985.doc”) shows that hardcopy bioassay results are available throughout these two years for subcontractors. It is true that there was less sampling in the colder months, which is consistent with a seasonal decrease in outdoor construction work.

5. The actual date of the Plant 9 release was 12/14/1984.

NIOSH Comment: The Plant 9 release date refers to the WG meeting on 6/17/2013 where there was speculation that the dust release from Plant 9 may have been the reason for increased sampling in late 1983. This is a moot point since 1983 is included in the SEC.

On 4/15/14, the letter was discussed at a WG meeting. During this meeting, SC&A noted that, although there were enough subcontractor bioassay samples to generate a co-worker model for 1984-1985, almost all the bioassay data were from employees of two subcontractor companies. In summary, they questioned: (1) why more of the 50 or so subcontractor companies apparently working on site were not represented in the hardcopy bioassay results; (2) why there were more samples in one-half of the year than the other; and (3) why there were *in vivo* results for Mobil Chemical. The last item was readily answered because Mobil Chemical was a neighboring facility with well contamination, not a subcontractor working on site. SC&A also gave an example of an incident in late July 1984 in which Langdon Hughes and Johnson Controls

workers were exposed on the roof over the re-melting area; however, these workers were monitored. As a result of this discussion, NIOSH agreed to investigate whether information was available on the scopes of work that the subcontractors were performing.

SUBCONTRACTOR BIOASSAY RESULTS

On a call between DCAS and the ORAUT on 4/18/14, the percentages of Fernald subcontractor results and individuals for 1983-1986 were presented in a table. One action item from the call was to also analyze the 1987 subcontractor results. These results were hand-entered into a workbook from the bioassay cards in SRDB 92450 and 92453. The workbook, which also contains the earlier work, was renamed “Subcontractor data 7-11-14.” The data presented on 4/18/14 for 1985 were adjusted because there were some contractor results for December 1985 that were included in HIS-20. The updated results are presented in Table 1 on this page. The “Percentages” shown in the table represent the fraction of site population represented by the subcontractors.

Table 1: Urine Results and Individuals Monitored by Year						
Year	Site		Subcontractors		Percentages	
	Results	Individuals	Results	Individuals	Results	Individuals
1983	3545	1015	164	38	4.6%	3.7%
1984	4235	1060	279	82	6.5%	7.7%
1985	8098	1003	307	67	3.8%	6.7%
1986	9826	1577	370	79	3.8%	5.0%
1987	9226	1686	580	85	6.3%	5.0%

Notes on Site column totals:

- 1983-1984: HIS-20 plus subs from hardcopy
- 1985: HIS-20 plus subs from hardcopy minus subs in HIS-20
- 1986-1987: HIS-20 only
- Notes on Subcontractor column totals: All results were only those identified in hardcopy less Type 10

The last names and initials on the bioassay cards provide a means of matching the bioassay cards to HIS-20; this was done for 1987. In HIS-20, there were 583 results located for 81 individuals. There were four suspected subcontractors with bioassay results that were not located in HIS-20. They are shown below in Table 2 on the next page. Some results were probably missed in hardcopy since not all subcontractor cards had a subcontractor name written on them. The

differences between HIS-20 and hardcopy represent less than 5% for both results and individuals.

Table 2: 1987 Data Located in Cards But Not in HIS-20			
Name	Company	Results	Comments
[Name redacted]	Unknown	6	Type 50s; "50" in badge No.
[Name redacted]	Unknown	2	Type 50s; "50" in badge No.
[Name redacted]	Rust	2	Rust or "Sub" on card
[Name redacted]	Unknown	13	Type 50s; "50" in badge No.

The annual breakdowns by subcontractor companies based on the hardcopy results are shown in Tables 3 and 4 on this page and tables 5 through 7 on page 7. The number of individuals will not necessarily add up to the values in Table 1 because some individuals had more than one company listed on their bioassay cards in a given year.

Table 3: Urine Results and Individuals Monitored 1983		
Company	Results	Individuals
Hughes	1	1
Legge	158	33
Richter Construction	5	5
Total	164	39

Table 4: Urine Results and Individuals Monitored 1984		
Company	Results	Individuals
Hamilton County	3	3
Johnson Controls	2	2
Kirk & Bloom	5	3
Langdon, Inc.	6	4
Legge	137	28
Quality Scale	1	1
Rust	121	43
Wm. Kramer & Son	2	2
Unknown	2	2
Total	279	88

Table 5: Urine Results and Individuals Monitored 1985		
Company	Results	Individuals
Cincinnati Bell	1	1
Martin Marietta	2	2
Meco Electric	3	2
Rust	295	59
Suspected Rust	2	2
Unknown	4	4
Total	307	70

Table 6: Urine Results and Individuals Monitored 1986		
Company	Results	Individuals
Cincinnati Crane	2	2
Fenton Rigging	3	3
Langdon, Inc.	1	1
Rust	357	71
Unknown	7	6
Total	370	83

Table 7: Urine Results and Individuals Monitored 1987		
Company	Results	Individuals
Ferguson	6	1
Hittman Nuclear*	24	3
Langdon, Inc.	9	4
Rust	439	53
Unknown**	102	28
Total	580	89

* Apparently a contractor for the supercompactor. Some cards show both Hittman and Rust.

** Names were compared to names with 1983-1986 results, but no company could be identified.

PLANT 9-RELATED *IN VIVO* COUNTS

In early 1985, a number of subcontractors as well as members of the public and employees of a neighboring facility were *in-vivo*-counted as a result of the Plant 9 release referred to above. The data for the subs and Mobil Chemical appear in Table 8 on the next page. These data show that employees from 12 subcontractor companies were monitored in 1985, in addition to the ones shown in Table 5 on page 6.

Table 8: In Vivo Counts, 1985 (SRDB 94407)		
Company	Results	Individuals
Allegany Electric*	2	2
Burke	1	1
CG&E	18	18
Cincinnati Bell	11	11
Cincinnati Microwave	1	1
ESI	1	1
J&N Steel	3	3
Kramer Roofing	16	16
Little Hills	1	1
Mobil Chemical**	33	32
Motion Savers	1	1
Nu-Pave, Inc.	4	4
Quality Scale Sales	3	3
Rust	48	44
Saunders & Thomas	4	4
Unknown Sub	2	2
Total	149	141

* Sub to Rust. ** Off-site group; not a subcontractor.

SEARCH RESULTS FOR SUBCONTRACTORS' SCOPES OF WORK

In addition to the analysis of subcontractor bioassay presented above, NIOSH completed a search for data on subcontractors' scopes of work for 1984-1985. A separate data capture trip was performed for this purpose. Sixty-three boxes of documents containing information on subcontractors were identified and reviewed. The review specifically looked for any type of information that would ensure that the work performed by subcontractors would be conducted in a manner that met site radiological safety standards in place at the time. Sixty-eight new documents were captured. Unfortunately, the site operator (NLO) did not keep subcontract documents beyond their retention dates.

Most of the documents recovered were for 1986 and later. The most interesting document located included Job Access Request Forms for 1986 and 1987 (SRDB 133930). These forms sometimes included rudimentary descriptions of the purpose of the visit. These forms were compared to the 1984-1987 contracts in SRDB 99119 to determine if there was information on the type of work the companies typically performed. Unfortunately, there was little overlap between the access forms for 1986-1987 in SRDB 133930 and the contracts in SRDB 99119. Three companies were identified, but only two had contracts during 1984-1985. The remaining

one had a contract in 1986. All three of the companies performed construction or electrical work. However, the access forms were not sufficiently detailed to rule out work in areas that would have required bioassay samples. The following conclusions are consistent with the data:

- By 1984, there was a greater diversity of subcontractor companies being sampled.
- In 1984 and 1985, there are multiple results per individual for Legge and Rust. These companies were likely involved in the most hazardous and intrusive work. There is no reason to believe that there are unmonitored subcontractors who would have been more highly exposed. In 1985, a number of subcontractors have *in vivo* counts in addition to the subs monitored by urine samples.
- Even after 1985 and the end of the NLO tenure, one cannot identify dozens of subcontractors being sampled, as was speculated in the 4/15/14 WG Meeting.
- In 1987, there was at least one subcontractor to Rust brought in (see footnote for Table 7). Perhaps there were other secondary subcontractors who had “Rust” written on their cards; as a result, not every secondary subcontractor may have been directly identified by name on their cards.
- In 1987, number of subcontractors with no company name on the bioassay card (“unknown” category) increased from previous years. This could either be from an increased subcontractor sampling program or from a change in how the information was being recorded on the cards.
- The fact that the number of samples is increasing from 1984-1987 is as consistent with increased workload as it is with under-sampling in the earlier years. The number of subcontractors sampled remained relatively constant.
- There are enough individual samples for 1984 and 1985 to do a valid one-person, one-sample analysis. The fact that these samples were not evenly-distributed over the year is not a requirement and is, in fact, consistent with nature of most subcontract work.
- Subcontractor *in vivo* results from 1985 should not be considered indications of radiological subcontract work, because subcontractors (like members of the general public) were receiving *in vivo* exams upon request in response to the Plant 9 dust collector release.
- NIOSH was unsuccessful in locating information on the subcontractors’ scopes of work for 1984-1985.