



Energy Employees Claimant Assistance Project

Report on Validity of Tritium Bioassay Sample Evidence for Mound Worker S ██████ N ██████

The newest Mound Special Exposure Cohort is defined as:

“All employees of the Department of Energy (DOE), its predecessor agencies, and its contractors and subcontractors who had at least one tritium bioassay sample and worked at the Mound Plant in Miamisburg, Ohio from March 1, 1959 through March 5, 1980, 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 in the Special Exposure Cohort (Sebelius 2010).”¹

Claimant R ██████ N ██████ filed a claim under EEOICPA after the death of his wife, S ██████ N ██████. Mrs. N ██████'s DOE record contains Mound Tritium Exposure Reports for 1973, 1974 and 1975 from the Mound Environmental, Safety and Health (MESH) data base. Her name does not appear on the NIOSH generated list which is currently the only basis DOL uses to pay Mound 1959-1980 SEC claims. This report answers three major questions on the validity of Mound's recording of tritium bioassay data.

1. Were Mound Bioassay Logbooks the only reports used at Mound for recording tritium bioassay samples?

No. Mound recorded tritium bioassay data using many different reports and several computer methods. The tritium bioassay recording system used at Mound was complicated and evolved over time. NIOSH references some of these methods, Radioactive Gas Exposure Evaluation forms², Mound Tritium Exposure Reports³, Annual Monitoring Reports from 1959-1962, Mound Environmental Safety and Health

¹ ORAUT-TKBS-0016-5 Mound Site-Occupational Internal Dosimetry, NIOSH, 2010, page 8

² ORAUT-TKBS-0016-5 Mound Site-Occupational Internal Dosimetry, NIOSH, 2010, page 16

³ ORAUT-TKBS-0016-5 Mound Site-Occupational Internal Dosimetry, NIOSH, 2010, page 17

(MESH) database⁴, External Exposure Analysis System (EXAS)⁵ (XEAS)⁶ and, External Radiation Analysis Data (ERAD)⁷, in Mound's Site Profile documents. Mound documents contain references to the following ways of recording tritium bioassay samples.

This table tracks various non-computer database reports Mound used during the SEC period for which EECAP could find evidence:

Bioassay recoded in	Form #	Date begun	Date ended
Bioassay Group Monthly Reports in brown binders ⁸		1954	1968
Bioassay Group Monthly Reports/tritium		Feb. 1958 ⁹	
Weekly Reports	0-756	March 17, 1958 ¹⁰	
Weekly Reports	revised 0-756 ¹¹	Aug. 1959	
Weekly Reports	Revised 0-756	April/May 1963 ¹²	
Weekly Reports	Revised 0-756	Feb. 25, 1965 ¹³	1978 ¹⁴
Fiche copies made of 1977 data		1978 ¹⁵	
Paper computer tape ^{16, 17}			
Plutonium brown spiral notebook			Oct. 25, 1960
Large green Record book (samples received only-no results) ¹⁸			
Kardex cards		Nov.-Dec. 1959 ^{19, 20}	Dec. 1962 ^{21, 22}

⁴ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 46

⁵ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 45

⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 163

⁷ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 45

⁸ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 447

⁹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 451-453

¹⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

¹¹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

¹² MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

¹³ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

¹⁴ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

¹⁵ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

¹⁶ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 758, 787, 791, 797

¹⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 3 from 7/15/69-11/76, page 208

¹⁸ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

¹⁹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

²⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 927-928

²¹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

²² MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 927-928

Plutonium-238 fiche records			
Form-1011 cards	1011	1961? ²³	1962 ²⁴
IBM cards entered into mainframe ²⁵		Early 1963 ²⁶	
IBM cards used			March 25, 1963 ²⁷
New card system in Kardex file ²⁸		March 24, 1963	Dec. 27, 1963
Form 0-756 revised into	MRC-MLS76 ²⁹	Jan. 1973	
24 hour Urinalysis logbook # 1 ³⁰	MRC-ML-6178	March 1 1977	Sept. 26 1977
24 hour Urinalysis logbook # 2 ³¹		Feb. 16, 1978	Sept. 16, 1980
Blue hardbound urine lab record book ³² (plutonium entered)			
Brown Binders, Labeled "24-Hour Urinalysis Results" ³³			

Additional references found to Mound bioassay reports in Mound documents include:

1. Form 0-124, Rev. April 17, 1959—Bioassay Monthly Report³⁴
2. Form 0-634—Special Personnel Monitoring Report³⁵
3. Form 0-102—Radiation Urinalysis Record 1053³⁶
4. Form 1016—Table of Contents for Personnel Monitoring³⁷
5. Form 0-584—Personnel Internal Exposure Questionnaire³⁸
6. Form 0-689—Radioactive Gas Exposure Evaluation³⁹
7. Form 0-799—Urinalysis Work Sheets⁴⁰

²³ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 40

²⁴ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 41

²⁵ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 41

²⁶ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 41

²⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 259

²⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 259

²⁹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 50

³⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 51

³¹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 52

³² MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 40

³³ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

³⁴ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 242

³⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 180, 219

³⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 216

³⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 194

³⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 217

³⁹ ORAUT-TKBS-0016-5 Mound Site-Occupational Internal Dosimetry, NIOSH, 2010, page 16

⁴⁰ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 216

8. Form 0-755—Hot Gas Urinalysis Results⁴¹
9. Form 0-756—Urinalysis Results⁴²
10. Form 0-374—Request for 24 Hr. Urine Sample⁴³
11. Form 0-318—Bioassay⁴⁴
12. Form 0-129—Notice of Delinquent Urine Sample⁴⁵
13. Form 1011 Kardex cards^{46, 47, 48, 49, 50}
14. Notice of Placement on the Hot Roster⁵¹
15. Notice of Removal from the Hot Roster⁵²
16. Yellow IBM Card Health Physics Urinalysis⁵³
17. Form 721—Summary of Radiation Exposure, Internal, for Year⁵⁴
18. Mound Tritium Exposure Reports⁵⁵
19. Computer tapes⁵⁶
20. Microfiche prints⁵⁷
21. Mound Environmental Safety and Health database (MESH)^{58, 59, 60}
22. External Exposure Analysis System (EXAS, XEAS) computer database^{61, 62, 63, 64}
23. External Radiation Analysis Data (ERAD) computer database^{65, 66, 67, 68}

⁴¹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 223

⁴² MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 50

⁴³ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 225

⁴⁴ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 216

⁴⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 229

⁴⁶ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 40

⁴⁷ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

⁴⁸ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 927-928

⁴⁹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 259

⁵⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 40

⁵¹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 227

⁵² History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 216

⁵³ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992 pages 973

⁵⁴ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 245

⁵⁵ ORAUT-TKBS-0016-5 Mound Site-Occupational Internal Dosimetry, NIOSH, 2010, page 17

⁵⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 3 from 7/15/69-11/76, page 208

⁵⁷ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 357

⁵⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 7 11/18/87to 10/25/93 page 32

⁵⁹ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 12

⁶⁰ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 46

⁶¹ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 45

⁶² History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 163

⁶³ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 5

⁶⁴ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 12

Notes on the above to be considered:

1. "Weekly Reports, Form 756, are missing for the years 1971 through 1976."⁶⁹
2. "We found a package of Weekly Reports which were hand written on Form MRC-ML-756 from 04/04/77 to 09/26/77."⁷⁰
3. "The Brown Spiral Notebook has too many variations and *is* not complete for the year. The Form 0-756 Weekly Reports use the data from the Brown Spiral Notebook. Therefore, work with the Kardex 1011 forms."⁷¹
4. "Primary Records: Urinalysis Lab Log Books: (Green Hardbound Record Books) (All Books Labeled as Plutonium samples): 1966 is Missing... 1977 Ends with February 21."⁷²
5. "1978-There are just four 1978 sample results. Three for January and one for February. These are included in the 1977 year binder."⁷³
6. "All 24 hour urine sample results dating back to 1956 have been placed on IBM cards for record storage."⁷⁴

2. Is the MESH database a valid method of reporting Mound tritium bioassay samples?

Yes. Mound's tritium bioassay records have been computerized for the entire time of the 1959-1980 SEC.

Documents tell us that MESH contains all personnel radiation records from 1947-"present".

Database	Date begun	Date Ended	Data from	Tritium bioassay data included
MESH	Sept. 1989	Post 1993	ERAD	Yes
ERAD	1978	Sept. 1989	EXAS/XEAS	Yes
EXAS/XEAS/IBM cards	May 4 1959	1978		Yes

⁶⁵ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 5

⁶⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 6, 10/11/82 to 2/23/87 pages 54-55, 60

⁶⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 7 11/18/87to 10/25/93 page 32

⁶⁸ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 12

⁶⁹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 50

⁷⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 51

⁷¹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 357-360

⁷² MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 466

⁷³ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 473-474

⁷⁴ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992 pages 973, 974, 976

It is possible to track the progression of how the data was recorded through conversions of various databases and paper reports as the following quotes from Mound documents show.

“Urine sample counting has been automated since the early days of tritium work and the processing of the data has been handled by computer for many, many years.”⁷⁵

“Significant Health Physics Accomplishments During 1963:

2. All 24 hour urine sample results dating back to 1956 have been placed on IBM cards for record storage.

3. All 24 hour urine results, excepting those obtained from personnel being given DTPA, were put through our computer program system for body burden evaluation.

11. Routine Urine Samples Processed: a. Hot Gas-1963-10,100; 1962-6,900; % Increase-46%”⁷⁶

“Mound bioassay uses what I believe is the universal choice because of its simplicity and essential total automation in determining the tritium content of a sample and producing a hard copy of the results....Hundreds of urine samples can be assayed over night in state-of-the-art machines and have a printed report available....The voluminous urine assay data accumulated over the years in support of Mound's many tritium programs, resides in Mound's main frame computer awaiting recall like Mound's other isotope bioassay data.”⁷⁷

“Review with Bill Wood on Bioassay Programs: Records; They used Lab Log Books to enter names etc. in. (the big, hardbound Record Books) The count results were entered on Form 0-1011, in a Kardex File. The forms measured 8 1/2" X 11". Didn't use the Kardex very long. (November, 1959 through December, 1962.) Put the results on computer cards. The data were key-punched by Bigler's Dosimetry Techs and the cards kept on file.”⁷⁸

“Further Discussion with Bill Wood on Bioassay Programs: Sample data were given to one of the techs (Laverne Williams) in W. A. Bigler's External Dosimetry and Records Group. Laverne key punched the data on IBM cards for the computer.”⁷⁹

“Review with Dan Carfagno on Bioassay Procedures: W. Bigler's dosimetry technicians routinely copied the urine sample net counts from the urine lab log books and entered the data into the Mound computer mainframe.”⁸⁰

⁷⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, page 457, Meyer

⁷⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, pages 973-975

⁷⁷ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 16

⁷⁸ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, pages 927-928

⁷⁹ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 931

“IBM CARDS FOR WHOLE BODY EXPOSURES RECEIVED BY MOUND LAB PERSONNEL: An individual IBM card is to be key punched for each year during which a Mound Laboratory employe (MRC or DAO-AEC) was monitored for whole body exposure. Additional IBM cards are also to be punched showing whole body exposures received by our personnel at other sites. This information is to be recorded on our H.P. Employe Cards (G87713)... Card Section-HG-; Card Columns-63-68; Key Punching Instructions- Tritium exposures. Punch positive exposures or zero's if analysis of samples were performed. Leave blank if no samples were processed.”⁸¹

“Mound Laboratory's External Dosimetry Historical Records File -1947 through 1973: This file contains annual summations of individual employe exposures received by all personnel monitored at the two sites and at Mound Laboratory for the years 1947-1973. The computer tape file also includes annual tritium exposure evaluations derived from bioassay samples.”⁸²

“CODING INSTRUCTIONS FOR URINALYSIS RECORDS: The following coding instructions are summarized in Table 5-9 for urinalysis records reported on Urinalysis Cards, Weekly Reports, and 24-hour reports at Mound.”⁸³

3. Did EXAS (XEAS) and ERAD contain internal tritium bioassay data? ERAD and EXAS both have “External” in their names. Why did they contain tritium bioassay sample results?

Yes. EXAS and ERAD contained tritium bioassay data, as well as instructions for printing reports on tritium bioassay samples. The Bioassay department sent data to the Bigler's External dosimetry department and this information was entered into EXAS. This data was imported into ERAD in 1978 and into MESH in 1989.

“External Radiation Analysis Database (ERAD)

Contains exposure history of a radiation worker. Used at Mound from 1978 to 1989.

External Exposure Analysis System (EXAS)

Contains exposure history of a radiation worker. Used at Mound from 1958 to 1978.”⁸⁴

“W. Bigler's dosimetry technicians routinely copied the urine sample net counts from the urine lab log books and entered the data into the Mound computer mainframe.”⁸⁵

⁸⁰ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992 pages 932-933

⁸¹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, pages 146-149

⁸² History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 3 from 7/15/69-11/76, page 208

⁸³ ORAUT-TKBS-001605, Rev. 1 Mound Site Occupational Internal Dosimetry, NIOSH, 2010, page 63

⁸⁴ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 45

⁸⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, page 933

“July 16, 1963, - Dosimetry requested the Dayton Area ABC Office submit personnel information so that monitoring data obtained on their personnel could be incorporated with our Monsanto personnel data in our monitoring records system. Dosimetry agreed to routinely inform the AEC of all monitoring results, external and internal data, obtained on their personnel.”⁸⁶

“Concerning "Quality Assurance" for the original data input or key punching the data. Technician Lavern Williams had the assignment to enter the data. There was no quality program as such. Mrs. Williams was a mature, sincere, careful person trained to carefully enter monitoring data into records. She understood the importance of radiation exposure data. In routine operation, one of the urine lab techs would give the urine count list to Lavern.”⁸⁷

“Form MRC-ML-5430 External Exposure Analysis Personnel Informations (Includes tritium exposure)”⁸⁸

“External Exposure Analysis System-XEAS Job Request Form 4. XEA653RQ In: H3 File (DOS) Extract quarterly H3 data from “Tritium-Analysis Data File””⁸⁹

“14. The Bioassay Group calls and tells us when the tritium is ready for us to run. After he calls Run.....These tritium reports must be run in this order—every quarter and year end.”⁹⁰

Computer tape file description:

“Mound Laboratory's External Dosimetry Historical Records File -1947 through 1973: This file contains annual summations of individual employe exposures received by all personnel monitored at the two sites and at Mound Laboratory for the years 1947-1973. The computer tape file also includes annual tritium exposure evaluations derived from bioassay samples. TRIT-Exposure to tritium.”⁹¹

“EXTERNAL RADIATION DOSIMETRY PROCEDURES, Manual # MD-21766: ERA021Rq Update Tritium Urinalysis ERA?22RQ *Print Tritium Urinalysis*”⁹²

⁸⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page 274, Meyer

⁸⁷ MLM-MU-93-93-0003 History of Mound Bioassay Programs, Meyer, 1992, page 53-54

⁸⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 161

⁸⁹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, page 163

⁹⁰ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 6, 10/11/82 to 2/23/87 page 436

⁹¹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 3 from 7/15/69-11/76, page 208-211

“Urinalysis Job Request:

Tritium

HPHIO3RQ Edit

HPHIO5RQ Update history file and print reports

HPHIO8RQ Print quarterly data

HPH262RQ Clear previous year quarterly figures from history file”⁹³

“July 30, 1980, - Supervisor Bigler had the Mound Management Information Systems Department personnel use the ERAD radiation data base to generate an annual radiation summary on fiche of all Mound personnel who were monitored for whole body radiation exposure for the years 1947 through 1979. The fiche are kept in a small file box in fireproof safe #2 in the M.O.R.E. Center.”⁹⁴

4. Do zeros entered into the MESH database mean that a bioassay was done during the year referenced?

Yes. Zeros were entered into MESH when the amount of tritium in a bioassay sample was less than a certain amount. If no tritium bioassay was performed during the year the field was left blank and no exposure was reported for that year. This explains why S [REDACTED] N [REDACTED] had bioassay results for only the years 1973, 1974 and 1975 although she began work at Mound in 1969. If she had not had tritium bioassay done in those years blanks would have been entered into MESH and the database would not have reported for 1973-1975.

“IBM CARDS FOR WHOLE BODY EXPOSURES RECEIVED BY MOUND LAB PERSONNEL: An individual IBM card is to be key punched for each year during which a Mound Laboratory employe (MRC or DAO-AEC) was monitored for whole body exposure. Additional IBM cards are also to be punched showing whole body exposures received by our personnel at other sites. This information is to be recorded on our H.P. Employe Cards (G87713)... Card Section-HG-; Card Columns-63-68; Key Punching Instructions- Tritium exposures. Punch positive exposures or zero's if analysis of samples were performed. Leave blank if no samples were processed.”⁹⁵

5. What was the progression of Mound’s computer based records system for tritium bioassay samples?

⁹² History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 6, 10/11/82 to 2/23/87 pages 54-76

⁹³ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 6, 10/11/82 to 2/23/87 page110

⁹⁴History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 5 11-2-78 to 6-3-92, Meyer

⁹⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 To 3/22/66, pages 146-149

“September, 1989 - All personnel monitoring data were entered into a new MESH computer program in the Mound mainframe. MESH replaced the old ERAD program and the later Monsanto integrated MBHI program.”⁹⁶

“April/May, 1959 - Keeping of the neutron weekly record on Form 1015-X gave way to computerized record keeping. The Dosimetry technicians key punched IBM cards and entered the data into the main frame computer EXAS program. Started 5/4/59. EXAS Program was converted in 1978 to the ERAD Program, and subsequently, in September, 1989, it was converted to the current MESH program.”⁹⁷

“1989: September, 1989, All personnel monitoring data were entered into a new MESH computer program in the Mound mainframe. MESH replaced the old ERAD program and the later Monsanto integrated MEHI program.”⁹⁸

“The External Radiation Analysis Data (ERAD) program replaced EXAS in 1978, and the Mound Environmental Safety and Health (MESH) program replaced ERAD in September 1989. The MESH database contains all radiation doses since 1947, although only the annual summary dose is available for years before 1974. Some records were missing or destroyed. For example, at the end of 1977, the Dosimetry group was unable to recover any individual monitoring data for the previous years from the mainframe computer. Therefore, the system generated a summary report of the annual exposures of all monitored employees from 1947 through 1977.”⁹⁹

“MESH database: A Mound environmental, safety, and health database that includes radiation exposure history of an individual radiation worker. It has been used at Mound from 1989 to the present.”¹⁰⁰

“1978 • Implemented ERAD ADP system to replace EXAS system.”¹⁰¹

“1977 • ERAD Health Physics computer records system development by MISD and HealthPhysics.”¹⁰²

“1973: EXAS report issued on fiche for personnel radiation annual exposures for 1947-1973.”¹⁰³

⁹⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946-1993, Vol. 7 11/18/87 to 10/25/93, Meyer, 1993, page 57

⁹⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, Meyer, 1992, page 15

⁹⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 7 11/18/87 to 10/25/93, Meyer, 1993, page 32

⁹⁹ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 12

¹⁰⁰ ORAUT-TKBS-001606 Mound Occupational External Dosimetry, NIOSH, 2004, page 46

¹⁰¹ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page 16, Meyer

¹⁰² History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page 16, Meyer

“January 2, 1960, - All Health Physics monitoring film data now recorded on IBM cards instead of 1015-X forms. (See Appendix I and also see April/May 1959 entry above.) At this point in time, I cannot reconstruct the whole system of card punching, etc. which was developed in 1959 to accommodate all the various inputs to generate personnel radiation records by the ADP EXAS program. The write-ups that are available in our present records do not make a complete or coherent record. I have included what write-ups and descriptions we have in Appendix I to preserve the historical procedure changes as they evolved. The EXAS ADP record system was replaced by the ERAD system in 1978 and was replaced in 1989 by the MESH record system which is the current system. MESH is an on-going system that contains all personnel radiation records from 1947 to the present time. In early years, only annual summary data was available.”¹⁰⁴

“January 2, 1960, The EXAS ADP record system was replaced by the ERAD system in 1978 and was replaced in 1989 by the MESH record system which is the current system. MESH is an on-going system that contains all personnel radiation records from 1947 to the present time. In early years, only annual summary data was available.”¹⁰⁵

“1959, May 4: Began recording employee' exposures in terms of rems (roentgen equivalent man). Entered the data into the Mound main frame computer using a new Health Physics computer program -EXAS. Data were entered retroactive to January 1, 1959.”¹⁰⁶

“1959 • All data now on IBM cards for the EXAS ADP program.”¹⁰⁷

“The voluminous urine assay data accumulated over the years in support of Mound's many tritium programs, resides in Mound's main frame computer awaiting recall like Mound's other isotope bioassay data, for recalculation in terms of dose commitment according to DOE Order 5480.11.”¹⁰⁸

¹⁰³ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page16, Meyer

¹⁰⁴ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page 126, Meyer

¹⁰⁵ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, Meyer, 1993, page 15

¹⁰⁶ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page14, Meyer

¹⁰⁷ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol 1, to 3-22-66, page15, Meyer

¹⁰⁸ History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993, Vol. 1 to 3-22-66, page 10, Meyer



Energy Employees Claimant Assistance Project

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March 8, 2011

Mr. Stuart L. Hinnefeld, Director DCAS
National Institute for Occupational Safety and Health
4676 Columbia Parkway, Mailstop C-46
Cincinnati, Ohio 45226

Re: R [REDACTED] N [REDACTED] claim for S [REDACTED] L. N [REDACTED]
NIOSH # [REDACTED]

Dear Mr. Hinnefeld:

As you know, EECAP has been carefully monitoring the problems Department of Labor is having administrating the Mound 1959-1980 SEC.

Ms. Leiton sent you a letter on February 17, 2011 requesting assistance in determining whether the N [REDACTED] data contained in the MESH database is accurate or not. I've prepared a report on this issue which will hopefully help you with this determination. I've enclosed a disk of excerpts from the documents I based the report on.

I would ask that you use this report to help DOL better understand the validity of Mound tritium bioassay reports in various forms. While there is no problem with DOL using the list NIOSH generated from Mound tritium logbooks as part of the evaluation of an SEC claim, this should not be done at the exclusion of other valid evidence.

Could you also please let me know how work on this issue progresses?

Thank you very much for your help and consideration of this important issue.

Sincerely,

Deb Jerison

CC: [REDACTED]