



DEPARTMENT OF HEALTH & HUMAN SERVICES

Memorandum

To: Mound Plant Working Group

From: Peter Darnell, DCAS Health Physicist

Subject: Clarification of Mound Database Use

Date: October 24, 2016

BACKGROUND

During development of the NIOSH responses to the Mound Plant Technical Basis Document (TBD) Issues Matrix, questions arose regarding the validation and verification (V&V) of several databases used in the reconstruction of doses at Mound. During the subsequent Mound Working Group (WG) meeting, the WG requested clarification of the hierarchy of records used when conducting dose reconstruction. This memorandum provides a discussion of how NIOSH uses the PURECON (short for Plutonium [PU] RECONstruction) and PORECON (short for Polonium [PO] RECONstruction) databases.

As discussed during the September 29, 2016, WG meeting, the University of Lowell (Meyer and Reeder 1992) created the PURECON database from primary records (i.e., hand written, Kardex, and logbooks). The MJW Corporation's internal dose reconstruction project at Mound, called the "Pre-1989 Dose Reconstruction" project continued work with Mound dosimetry data. The Mound Site (MJW dose reconstruction project) created the original PORECON database from information recorded on bioassay cards and their sources in the original chemistry logbooks. Essentially, MJW conducted a 100% validation and verification of pre-1989 internal doses

against primary records for both PURECON¹ and PORECON². These combined efforts resulted in the PURECON and PORECON databases as we now use them.

The MJW reports on the project (MJW 2002a, MJW 2002b) provide details of the review of the PURECON database and creation of the PORECON database, including QA/QC methods for data entry. The PURECON and PORECON databases, at this time, exist as reference sources of information for dose reconstruction. DOE records from the employee files provide internal dose monitoring data for individual dose reconstructions.

NIOSH used PURECON and PORECON data for the NIOSH/ORAUT internal coworker dose studies documented in the technical information bulletin, *Internal Dosimetry Coworker Data for the Mound Site, Rev 02* (ORIAUT 2012). NIOSH did not conduct a V&V of these Mound databases for this technical information bulletin. The Technical Basis Document for the Mound Site – Occupational Internal Dosimetry (ORIAUT 2013) addresses use of the databases:

In Section 5.5.1.2, *Polonium*:

Primary and secondary records exist in most Mound claim files for polonium bioassay. The dose reconstructor should typically use the bioassay results listed in the PORECON database as most convenient. However, it is important to review all claim records to ensure the database reflects all listed bioassay results in the primary data.

In Section 5.5.2, *Plutonium*:

Primary and secondary records exist in many Mound claim files for plutonium bioassay. The dose reconstructor should typically use the listed bioassay results in the PURECON database as most convenient. However, it is important to ensure that the database reflects all bioassay results that are listed in the primary data. The dose reconstructor will also need to ensure that PURECON reflects earlier measurements using the gross alpha methodology and ensure that the gross alpha samples were taken as a plutonium intake monitoring program rather than another radionuclide that used the gross alpha bioassay method (ORIAUT 2013).

And again in Section 5.8.2:

The dose reconstructor should keep in mind that both gross alpha and alpha spectrometric programs were used to detect ²³⁸Pu, and that the PURECON database results should be

¹ Pre-1989 Dose Reconstruction Project Phase I Final Report Section II, Part C

² Pre-1989 Dose Reconstruction Project Phase I Final Report Section II, Part D

verified against the primary data in claim files, even though PURECON results are typically listed as gross alpha results when this is the case (ORAUT 2013).

As a general procedure, NIOSH conducts dose reconstruction using the primary records contained in the claimant files. NIOSH may also use the databases as convenient listings of the claimant information but their use is reconciled to the primary records. If variations from the general procedure occur, NIOSH validates – to the extent practical, all information used in dose reconstruction calculations.

[Signature on File]

Peter A. Darnell, CHP, RRPT
Health Physicist

REFERENCES

- Meyer, H.E., and D.L. Reeder, *Plutonium Historical Dose Reconstruction Program*, (unpublished), July 31, 1992. SRDB Reference ID 38267.
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994a), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume I, 1946 to 3/22/66. SRDB Reference ID 3268.
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994b), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume II, 3/28/66 to 7/15/69. [SRDB Ref ID 3276]
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994c), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume III, 7/15/69 to 11/76. SRDB Reference ID 3281.
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994d), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume IV, 1/77 to 9/19/78. SRDB Reference ID 3288.
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994e), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume V, 11/3/78 to 6/3/82. [SRDB Ref ID 3297].
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994f), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume VI, 10/11/82 to 2/23/87. [SRDB Ref ID 3299].
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994g), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume VII, 11/18/87 to 10/25/93. [SRDB Ref ID 3303].
- Meyer, H.E., *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory, 1946 – 1993* (Meyer 1994h), EG&G Mound Applied Technologies, Miamisburg, Ohio, March 1994. Volume VIII, Neutron Film Calibrations. [SRDB Ref ID 3315].

Meyer, H.E., *History of Mound Bioassay Programs, EG&G Mound Applied Technologies*, Miamisburg, Ohio, September 1992. MLM-MU-93-93-0003. SRDB Reference ID 1962.

MJW Corporation, Pre-1989 Dose Assessment Project, Phase I Final Report, Volume I (Non-SUD Version), April 2002, (MJW 2002a) Prepared for BWXT of Ohio, Inc. SRDB Reference ID 8745.

ORAUT (Oak Ridge Associated Universities Team), ORAUT-OTIB-0061, *Internal Dosimetry Coworker Data for the Mound Site, Rev 02*, April 13, 2012, (ORAUT 2012) SRDB Reference ID 111394

ORAUT (Oak Ridge Associated Universities Team), ORAUT-TKBS-0016-5, *Technical Basis Document for the Mound Site – Occupational Internal Dosimetry, Rev 02*, April 18, 2013, SRDB Reference ID 124215