

This page intentionally left blank

Evaluation Report Summary: SEC-00207, Mound Plant

This evaluation report by the National Institute for Occupational Safety and Health (NIOSH) addresses a class of employees proposed for addition to the Special Exposure Cohort (SEC) per the *Energy Employees Occupational Illness Compensation Program Act of 2000*, as amended, 42 U.S.C. § 7384 *et seq.* (EEOICPA) and 42 C.F.R. pt. 83, *Procedures for Designating Classes of Employees as Members of the Special Exposure Cohort Under the Energy Employees Occupational Illness Compensation Program Act of 2000*.

NIOSH-Proposed Class Definition

All employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Mound Plant in Miamisburg, Ohio, from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, 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.

Feasibility of Dose Reconstruction Findings

NIOSH lacks sufficient information, which includes biological monitoring data, air monitoring information, and/or process and radiological source term information, to allow it to estimate with sufficient accuracy the potential internal exposures to radon isotopes associated with radium, actinium, and thorium to which the proposed class may have been subjected. NIOSH finds that it is likely feasible to reconstruct all other internal doses and external doses, including occupational medical doses, for Mound Plant workers with sufficient accuracy during the period under evaluation.

The NIOSH dose reconstruction feasibility findings are based on the following:

- NIOSH previously determined in its evaluation of petition SEC-00090 that Mound workers could have received unmonitored intakes of radium-226, actinium-227, and thorium-228 during the period from October 1, 1949 through February 28, 1959. In 2008, the Department of Health and Human Services (DHHS) designated the following class for inclusion in the SEC:

Employees of the Department of Energy (DOE), its predecessor agencies, and DOE contractors or subcontractors who worked in any areas at the Mound Plant site from October 1, 1949, through February 28, 1959, for a number of work days aggregating at least 250 work days or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.

- Through the course of ongoing research associated with SEC-00090 (after the initial determination and class recommendation), NIOSH determined that residual radioactive material from the radium-actinium-thorium process conducted in the SW Building led to technologically-enhanced emanation of radon-220, radon-222, and radon-219 into Room SW-19 and subsequent distribution through the R and SW Building facility floors, drains, and subjacent soil.

- NIOSH found no bioassay or workplace monitoring records relevant to these radon exposures prior to the time radiological improvements were made in 1979 and 1980. Therefore, NIOSH found it was unable to put an upper bound on the radon exposures in the R and SW Buildings until the point at which a ventilation system was installed in early 1980 (prior to March 5, 1980) to vent SW Building tunnel air.
- Subsequent to the SEC-00090 findings and recommended class, NIOSH determined in its evaluation of petition SEC-00171 that it was not feasible to determine which of the workers in the R and SW Buildings may have frequented Room SW-19; therefore, NIOSH could not reasonably limit the cohort of workers who could have been exposed to radon in SW-19 more narrowly than the cohort of all workers in the R and SW Buildings. NIOSH found that due to extensive tritium operations occurring in these buildings, it was documented policy that everyone who worked in the R and SW Buildings submit periodic urine samples analyzed for tritium. While it was possible that a worker could have occasionally visited the R and SW Buildings without submitting a tritium urinalysis sample, it was not plausible that a worker could have spent 250 days in these buildings without leaving a single tritium urinalysis sample. Therefore, tritium urinalysis results were taken as evidence of potential of potential employment in R and SW Buildings. Conversely, absence of such urinalysis data was evidence that individuals did not have the potential to be employed in R and SW Buildings for 250 days. Mound tritium logbooks were used to confirm personnel participating in this program, and consequently, to identify members of the proposed SEC class. In 2010, the Department of Health and Human Services (DHHS) designated the following class for inclusion in the SEC:

All employees of the Department of Energy, its predecessor agencies, and their 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.

- Subsequent to SEC-00171's class recommendation of all workers "who had at least one tritium bioassay sample and worked at the Mound Plant," NIOSH learned that only workers in the two rows of rooms facing Corridor 2 of the R Building (that were contiguous with the SW Building) were monitored for tritium exposure (the SW Building and the two rows of adjacent rooms in the R Building were known as the SW/R Tritium Complex). To ensure that tritium monitoring status still properly identifies all workers with radon exposure potential, NIOSH conducted a detailed review of the respective R and SW Building ventilation systems to verify that workers who worked inside the R building but outside the Tritium Complex did not have the potential for radon exposure. The review established that the respective ventilations systems were isolated, configured, and controlled in such a manner that radon would have been exhausted to the stacks rather than migrate to the part of the R Building outside the Tritium Complex where workers were not monitored for tritium.

- NIOSH recently identified that tritium logbooks for the periods from September 1, 1972 through December 31, 1972 and from January 1, 1975 through December 31, 1976 are not available to support the identification of personnel who provided tritium bioassays and who may have entered the Tritium Complex. The absence of these logbooks precludes the identification of individuals who fit into the existing SEC-00171 class. Therefore, this SEC-00207 evaluation report initiates a new class that eliminates the tritium bioassay requirement, thus resulting in the inclusion of all workers during the specified time period into the new class definition.
- Pursuant to 42 C.F.R. § 83.13(c)(1), NIOSH determined that there is insufficient information to either: (1) estimate the maximum radiation dose, for every type of cancer for which radiation doses are reconstructed, that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the radiation doses of members of the class more precisely than a maximum dose estimate.

Although NIOSH found that it is not possible to completely reconstruct radiation doses for the proposed class, NIOSH intends to use any internal and external monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Therefore, dose reconstructions for individuals employed at the Mound Plant during the period from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

Health Endangerment Determination

The NIOSH evaluation did not identify any evidence supplied by the petitioners or from other resources that would establish that the class was exposed to radiation during a discrete incident likely to have involved exceptionally high-level exposures, such as nuclear criticality incidents or other events involving similarly high levels of exposures. However, the evidence reviewed in this evaluation indicates that some workers in the class may have accumulated chronic radiation exposures through intakes of radon isotopes originating from residual radioactive material associated with the radium-actinium-thorium source term in soil underlying Room SW-19. NIOSH cannot determine which workers in the SW Building may have frequented Room SW-19; therefore, NIOSH could not narrowly limit the cohort of workers who could have been exposed to radon in SW-19. Therefore, 42 C.F.R. § 83.13(c)(3)(ii) requires NIOSH to specify that health may have been endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

This page intentionally left blank

Table of Contents

Evaluation Report Summary: SEC-00207, Mound Plant.....	3
1.0 Purpose and Scope.....	9
2.0 Introduction	9
3.0 NIOSH-Proposed Class Definition and Petition Basis.....	10
4.0 Radiological Operations Relevant to the Proposed Class	12
4.1 Operations Description.....	12
4.2 Radiation Exposure Potential from Operations.....	16
4.3 Time Period Associated with Radiological Operations.....	17
4.4 Site Locations Associated with Radiological Operations	17
4.5 Job Descriptions Affected by Radiological Operations	18
5.0 Summary of Available Monitoring Data for the Proposed Class.....	18
5.1 Data Capture Efforts and Sources Reviewed	19
5.2 Previous Dose Reconstructions	20
5.3 Worker Interviews.....	21
5.4 Internal Personnel Monitoring Data	21
5.5 External Personnel Monitoring Data	22
5.6 Workplace Monitoring Data.....	23
5.7 Radiological Source Term Data	23
6.0 Feasibility of Dose Reconstruction for the Proposed Class	24
6.1 Feasibility of Estimating Internal Exposures	25
6.2 Feasibility of Estimating External Exposures	26
6.3 Class Parameters Associated with Infeasibility.....	27
7.0 Summary of Feasibility Findings for Petition SEC-00207.....	27
8.0 Evaluation of Health Endangerment for Petition SEC-00207.....	28
9.0 NIOSH-Proposed Class for Petition SEC-00207	29
10.0 Evaluation of an Additional Similar Class.....	29
11.0 References	31
Attachment 1: Chronology of Mound Plant Tritium Logbook Efforts	35

Figure

4-1: Mound Plant circa 1972 13

Table

5-1: No. of Site Name Claims Submitted Under the Dose Reconstruction Rule 20

SEC Petition Evaluation Report for SEC-00207

ATTRIBUTION AND ANNOTATION: This is a single-author document. All conclusions drawn from the data presented in this evaluation were made by the ORAU Team Lead Technical Evaluator: Karin Jessen, Oak Ridge Associated Universities. The rationales for all conclusions in this document are explained in the associated text.

1.0 Purpose and Scope

This report evaluates the feasibility of reconstructing doses for employees who worked at a specific facility at specified times. It provides information and analysis germane to considering a petition for adding a class of employees to the Congressionally-created SEC.

This report does not make any determinations concerning the feasibility of dose reconstruction that necessarily apply to any individual energy employee who might require a dose reconstruction from NIOSH, with the exception of the employee whose dose reconstruction could not be completed, and whose claim consequently led to this petition evaluation. The finding in this report is not the final determination as to whether or not the proposed class will be added to the SEC. This report will be considered by the Advisory Board on Radiation and Worker Health (the Board) and by the Secretary of Health and Human Services (HHS). The Secretary of HHS will make final decisions concerning whether or not to add one or more classes to the SEC in response to the petition addressed by this report.

This evaluation, in which NIOSH provides its findings both on the feasibility of estimating radiation doses of members of this class with sufficient accuracy and on health endangerment, was conducted in accordance with the requirements of EEOICPA and 42 C.F.R. § 83.14.

2.0 Introduction

Both EEOICPA and 42 C.F.R. pt. 83 require NIOSH to evaluate qualified petitions requesting that the Department of Health and Human Services add a class of employees to the SEC. The evaluation is intended to provide a fair, science-based determination of whether it is feasible to estimate, with sufficient accuracy, the radiation doses of the proposed class of employees through NIOSH dose reconstructions.¹

NIOSH is required to document its evaluation in a report, and to do so, relies upon both its own dose reconstruction expertise as well as technical support from its contractor, Oak Ridge Associated Universities (ORAU). Once completed, NIOSH provides the report to both the petitioners and the Advisory Board on Radiation and Worker Health. The Board will consider the NIOSH evaluation report, together with the petition, comments of the petitioner(s) and such other information as the Board considers appropriate, to make recommendations to the Secretary of HHS on whether or not to add one or more classes of employees to the SEC. Once NIOSH has received and considered the advice of the Board, the Director of NIOSH will propose a decision on behalf of HHS. The Secretary

¹ NIOSH dose reconstructions under EEOICPA are performed using the methods promulgated under 42 C.F.R. pt. 82 and the detailed implementation guidelines available at <http://www.cdc.gov/niosh/ocas>.

of HHS will make the final decision, taking into account the NIOSH evaluation, the advice of the Board, and the proposed decision issued by NIOSH. As part of this final decision process, the petitioner(s) may seek a review of certain types of final decisions issued by the Secretary of HHS.²

3.0 NIOSH-Proposed Class Definition and Petition Basis

The NIOSH-proposed class includes all employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Mound Plant in Miamisburg, Ohio, from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, 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. During this period, employees at this facility were involved in research and development, weapons manufacture, and evaluation and maintenance of explosive components for the nuclear defense stockpiles. Other work included tritium recovery, isotope separation methods, development and production of heat sources in support of space programs, support of the fossil fuels program, and nuclear-materials processing.

Three petitions associated with the Mound site requested that NIOSH consider classes for addition to the SEC:

- Petition SEC-00090 was received on June 4, 2007, and qualified on August 17, 2007. NIOSH considered the following class: *All employees who worked in all areas within the boundaries at the Mound Plant from February 1949 through present.*
- Petition SEC-00091 was received on June 14, 2007, and qualified on September 24, 2007. NIOSH considered the following class: *All employees who worked within the boundaries of the Mound Plant from February 1, 1949 through December 31, 1970.*
- Petition SEC-171 was received on April 29, 2010 and qualified on May 3, 2010. NIOSH considered the following class: *All employees who worked in the R and SW Buildings of the Mound Plant from March 1, 1959 through March 5, 1980.*

The information and statements provided by the petitioners qualified the petitions for further consideration by NIOSH, the Board, and HHS. Petition SEC-00091 was qualified based on its timeframe being completely encompassed by Petition SEC-00090. Consequently, NIOSH merged the Petition SEC-00091 into Petition SEC-00090. Petition SEC-00171 qualified based on the inability to estimate radiation doses of the proposed class with sufficient accuracy.

² See 42 C.F.R. pt. 83 for a full description of the procedures summarized here. Additional internal procedures are available at <http://www.cdc.gov/niosh/ocas>.

There is currently a class of Mound Plant workers associated with the previous NIOSH evaluation of SEC Petition SEC-00090, for which the Secretary of DHHS has designated inclusion in the Special Exposure Cohort:

Class added to the SEC effective April 2, 2008 (DHHS, 2008): Employees of the Department of Energy (DOE), its predecessor agencies, and DOE contractors or subcontractors who worked in any areas at the Mound Plant site from October 1, 1949, through February 28, 1959, for a number of work days aggregating at least 250 work days or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort.

Detailed information associated with this worker class added to the SEC in 2008 can be found in the NIOSH evaluation report, *SEC Petition Evaluation Report for Petition SEC-00090, Mound Plant* (NIOSH, 2007). The recommendation to add an SEC class in the SEC-00090 evaluation report was based on NIOSH's inability to reconstruct internal doses from exposures to radium-226, actinium-227, and thorium-228 with sufficient accuracy for the SEC-00090 worker class for the period from October 1, 1949, through February 28, 1959. The associated SEC class designated by DHHS was based on people working at the Mound facility during the time period when employees worked on research and production activities related to nuclear weapons production, as well as a lack of adequate information to conduct accurate individual dose reconstructions for internal doses from exposure to radium-226, actinium-227, and thorium-228 during this period.

There is also another class of Mound Plant workers associated with the previous NIOSH evaluation of SEC Petition SEC-00171, for which the Secretary of DHHS has designated inclusion in the Special Exposure Cohort:

Class added to the SEC effective May 18, 2010 (DHHS, 2010): All employees of the Department of Energy, its predecessor agencies, and their 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.

Detailed information associated with this worker class added to the SEC in 2010 can be found in the NIOSH evaluation report, *SEC Petition Evaluation Report for Petition SEC-00171, Mound Plant* (NIOSH, 2010). The recommendation to add an SEC class in the SEC-00171 evaluation report was based on NIOSH's inability to reconstruct internal doses for individuals employed in the R and SW Buildings from March 1, 1959 through March 5, 1980, due to large uncertainties in the assignment of dose from radon isotopes originating from the residual radioactive material associated with the radium-actinium-thorium (Ra-Ac-Th) source term in soil underlying Room SW-19.

In the course of its ongoing investigations related to SEC-00090, NIOSH has also determined that doses cannot be reconstructed with sufficient accuracy for all workers employed at the Mound Plant from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976 due to the lack of tritium exposure records for anyone that may have entered the Tritium Complex for those periods.

The evaluation responds to Petition SEC-00207 which was submitted by an EEOICPA claimant whose dose reconstruction could not be completed by NIOSH due to a lack of sufficient tritium dosimetry-related information. NIOSH's determination that it is unable to complete a dose reconstruction for an EEOICPA claimant is a qualified basis for submitting an SEC petition pursuant to 42 C.F.R. § 83.9(b).

4.0 Radiological Operations Relevant to the Proposed Class

The following subsections summarize the radiological operations at the Mound Plant from September 1, 1972 through December 31, 1972 and January 1, 1975 through December 31, 1976 and include additional information before and after these dates to provide the reader with a better understanding of Mound operations. The information available to NIOSH characterizes particular processes and radioactive source materials. Using available sources, NIOSH has attempted to gather process and source descriptions, information regarding the identity and quantities of radionuclides of concern, and information describing processes through which the radiation exposures of concern may have occurred and the physical environment in which they may have occurred. The information included within this evaluation report is meant only to be a summary of the available information.

Unless otherwise indicated, information for Section 4.0 and its related subsections was obtained from *SEC Petition Evaluation Report for Petition SEC-00090, Mound Plant* (NIOSH, 2007) and *SEC Petition Evaluation Report for Petition SEC-00171, Mound Plant* (NIOSH, 2010).

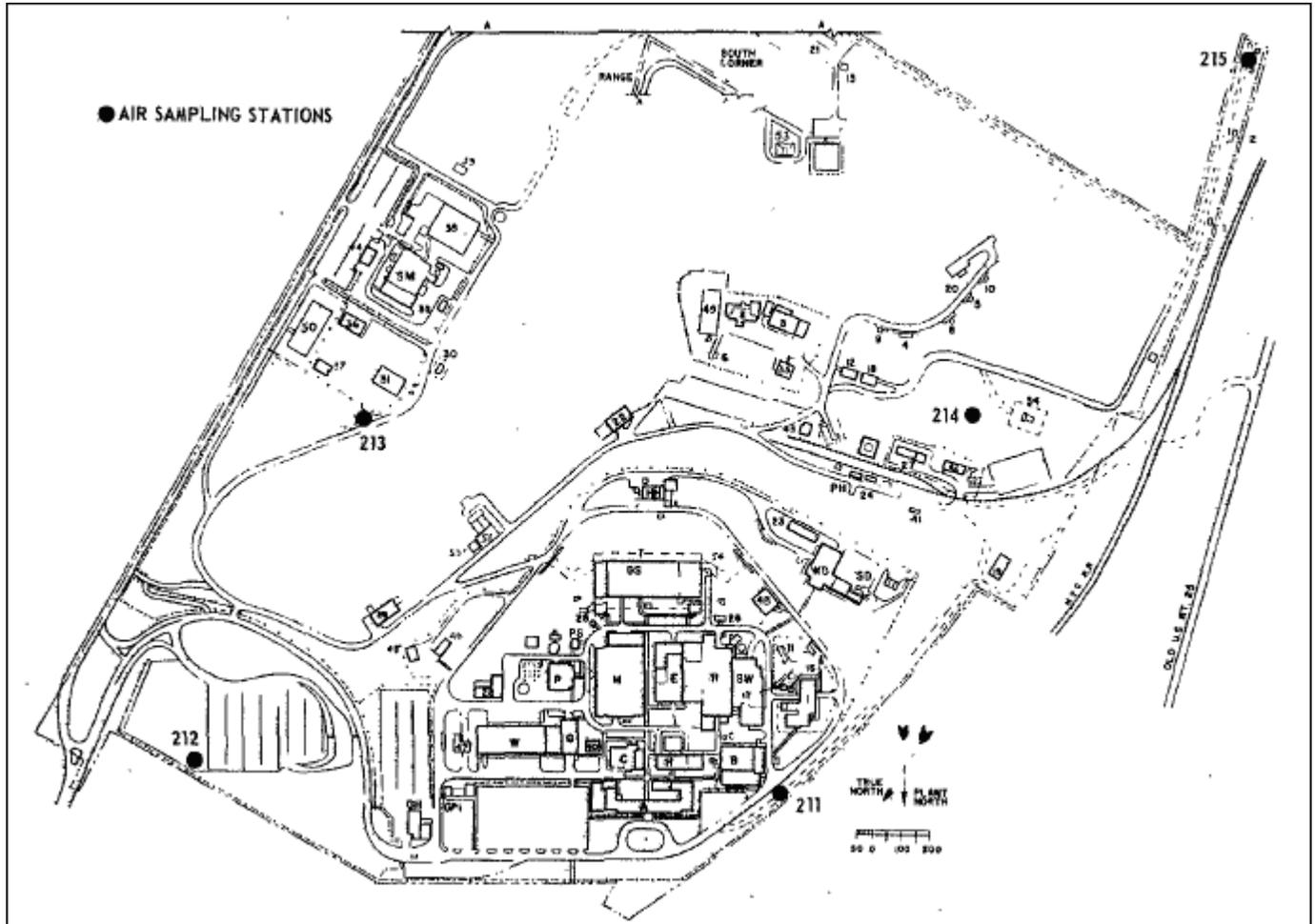
4.1 Operations Description

The Mound Plant was located in Miamisburg, Ohio and encompassed approximately 305 acres, which included an unused south area (Mound Fact Book, 1985). Mound was the nation's first postwar U.S. Atomic Energy Commission (AEC) site to be constructed and was originally established to consolidate and continue the polonium work conducted at the Dayton Project for the Manhattan Project. Construction began in 1946, with polonium processing becoming operational in February 1949. Originally, there were 14 buildings with 360,000 square feet of space. For the periods under evaluation, the Mound Plant workforce consisted of approximately 1800 workers during the latter part of 1972 (Annual Summary, 1972) and approximately 1600-1700 workers during the 1975-1976 time frame (Annual Report, 1976; Monthly Reports, 1977). Figure 4-1 shows the Mound Plant circa 1972.

The buildings of concern for the periods under evaluated include the Research (R) and Semi Works (SW) buildings. The R building was built in 1948 and handled a number of programs involving various radionuclides over the years. Programs included the R&D for Po-210, which extended into the 1970s as well as R&D with tritium. The tritium work included experimentation with metal tritides and deuterides such as uranium tritide and lithium tritide. Pu-238 research began in 1959 and continued through the 1960s (ORAUT-TKBS-0016-2).

The SW building consisted of many laboratories engaged in a variety of research, development, analytic, recovery, and surveillance activities. The "Old Cave" and "New Cave" areas consisted of several rooms that were set up for "hot" work with several types of alpha and gamma radiation and project capabilities. Other major programs were the thorium refinery project, rare isotope program,

neutron source, U-234 separation program, and the tritium programs. The tritium programs included the tritium enrichment, effluent capture, process development, component evaluation, scrap recovery, and tritium waste solidification.



Source: Environmental Report, 1973, pdf p. 12

Figure 4-1: Mound Plant circa 1972

SW building was used in the Cotter Concentrate (St. Louis Airport Cake) process starting in the early 1970s and terminated in the late 1970s. (ORAUT-TKBS-0016-2)

The residual material from the radium-actinium-thorium processes conducted in the SW building led to technologically-enhanced emanation of Rn-220, Rn-222, and Rn-219 into Room SW-19.

Early Mound programs investigated the chemical and metallurgical properties of Po-210 and its applications. Research and development included the fabrication of neutron and alpha sources for weapons use. Po-210 production declined in the 1960s and was phased out in 1971. Mound's narrowly-focused polonium production work expanded to include the development and production of weapons components using Pu-238. Mound's main focus was the support of DOE weapons and

non-weapons programs, especially chemical explosives and nuclear technology. One of its principal missions was the research, development, and manufacture of non-nuclear explosive components for nuclear weapons that were then assembled at other sites.

Much of Mound's Cold War work involved production of the polonium-beryllium (Po-Be) initiators used in early atomic weapons as well as the research and manufacture of radionuclides. In the 1950s, the facility began to manufacture a variety of nuclear weapons parts, including cable assemblies, explosive detonators, and electronic firing sets. Mound work evolved to include stable isotope separation, fossil fuels research, development of radioisotope thermoelectric generators (RTGs) for providing electrical power for space exploration, and other non-nuclear research and development. The Mound Plant ceased non-weapons work in 1971 and stopped production of weapons components in 1995.

Polonium Operations

Polonium research and production activities conducted at the Dayton Laboratory benefited from improved facilities at Mound specifically designed for those processes. These included the encapsulation of the processes with provisions for remote operation. A detailed description of this equipment is included in an unpublished chapter of the book *Polonium* by H. V. Moyer (Moyer, 1956). Po-Be neutron sources were manufactured in the R Building from 1956 to 1961. Po-Be sources were first manufactured at Mound as neutron source initiators to support various weapons programs. Polonium was later used to produce Po-210 heat source generators (Mound, 1995). The SW Building was used for counting Po-210 sources, neutron source measurement, source strength verification, and Po-209 and Po-210 retrieval. Ra-226, Ac-227, and Th-228 were part of the research on Ac-227 as a substitute for polonium in neutron initiators.

Radon

Beginning in 1952, sources of radon (Rn-222), thoron (Rn-220), and actinon (Rn-219) were present at Mound due to radium and thorium processing and separation of Pa-231 and Ac-227. Room SW-19 had elevated radon concentrations emanating from radium and thorium processing wastes. On October 12, 1979, inert gas concentrations in an unoccupied tunnel under Room SW-19 were measured at 88,000 pCi/l Rn-222, 28,000 pCi/l Rn-220, and 640,000 pCi/l Rn-219. A Rn-222 concentration of 88,000 pCi/l would correspond to 352 WL, assuming an ICRP 50 indoor mean radon daughter equilibrium factor of 0.45 (ICRP, 1987). The tunnel was not an occupied work area; however, elevated concentrations of radon were measured in SW-19 work areas. Measurements of Rn-222 near an employee's desk ranged from 67 to 160 pCi/l in 1979.

A ventilation system was installed in early 1980 to vent SW Building tunnel air (Meyer, 1992). This system reduced Rn-222 concentrations in Room SW-19 by a factor of 10 or more.

Plutonium-238 Research and Development

Pu-238 research and development activities began at Mound during the mid-1950s. Pu-238 research programs were transferred from Lawrence Livermore National Laboratory to Mound in 1959. The first production of metallic Pu-238 was achieved in the spring of 1960. The research and development (R&D) activities were directed toward the development and production of stable radioisotope thermoelectric generators (RTGs). More than 500 RTGs were produced for a variety of applications, including electric-power generation for satellites, life-support systems, spacecraft, pacemakers, and an artificial heart. The first Space Nuclear Auxiliary Power (SNAP) provided 2.6 watts of power to the Transit navigation satellite in 1963. Metallic plutonium was initially used in SNAP applications because the devices were designed to disintegrate and burn during reentry. A change in philosophy resulted in the use of plutonium dioxide which was less vulnerable and maintained integrity during reentry.

Reactor fuels research using Pu-239 led to the development of chemically and physically stable microspheres of unique plutonium compounds and alloys using an inductively-coupled plasma torch. These same processes were adapted during the mid-1960s for Pu-238 to produce high-integrity microspheres for heat sources with essentially no transportable or removable activity.

From the early 1960s to the late 1970s, Mound continued to produce both heat sources and complete RTG systems in the SM and PP buildings. Related work with Pu-238 occurred in the R building and Building 50.

Tritium Production

Following some earlier research with small quantities of tritium, production of tritium for nuclear weapon applications began during the mid-1950s. Related activities included tritium enrichment, recovery processes, and control of tritium-contaminated wastes. The tritium recycling and enrichment system had many applications. The technology was further applied to reduce/recover tritium from stack effluents. Tritium processing took place in many of the buildings at Mound.

Thorium-230 and Protactinium-231

Pa-231 was produced in the early 1950s to serve as a Pa-233 surrogate during the study of the physical and chemical properties of the element. In the thorium breeder reactor blankets, 27-day Pa-233 was created in the sequence $\text{Th-232} \rightarrow \text{Pa-233} \rightarrow \text{U-233}$. Production of Pa-231 proceeded intermittently between the 1950s and September 1979, the first campaign occurring from 1954 through 1958. The feed materials were U-235-bearing raffinates from Mallinckrodt, Fernald, and the Cotter Corp. in Canon City, Colorado. Research and development processing activities started in 1954 in Room 167 of the R Building. Following lab-scale pilot tests, Room 145 of the R Building was set up to process five-kilogram batches. A pilot plant was installed in the HH Building in July 1955. During March 1956, the operation was moved into the SW Building and took advantage of some of the thorium refinery equipment. Approximately 20,000 lb. (80 drums) of this Sperry Cake was processed at Mound. This processing consumed approximately half of the material in order to produce the single gram of protactinium requested by the AEC. The remaining drums were to be used to produce another gram, but this work concluded after another 240 mg were produced.

Later efforts to recover Pa-231 used a large amount of material called Cotter Cake, another type of residue from the uranium-refining process. This material had been identified as a useful source of radionuclides during research associated with the Ionium (Th-230) Program. This process ran from 1974 to 1979, during which 22 drums were processed to recover 339 g. of Th-230 and 890 mg of protactinium.

Rare Isotope Programs

The Rare Isotope programs were originally known as the Separation and Purification of Special Heavy Element Isotopes. They began in the mid-1950s and lasted through 1985. Numerous projects were developed during that 30-year period. A variety of radionuclides and separation processes were generally carried out in the SW, SM, and R buildings. Principal processes included:

- Extraction of U-234 from aged Pu-238 (1962-1972);
- Extraction of Pa-231 and Th-230 from uranium ore “tailings” (1954-1957);
- Extraction of Th-229 from U-233 (from irradiated Th-232) from (1966 to mid-1970s); and
- Extraction of Pa-231 from irradiated Th-230 (1974-1979)

Uranium-234 from Plutonium-238

About ten grams per year of U-234 were extracted from Pu-238 from the mid-1950s through the early 1970s. The U-234 oxide was shipped to Oak Ridge for use with U-235 to make neutron flux measurements. U-234 was produced within 13 alpha glove boxes in the R building. An associated solvent extraction system was in Room 1 of the SM building.

4.2 Radiation Exposure Potential from Operations

The potential for external radiation dose, for the purposes of this evaluation, existed in the Tritium Complex (see Section 4.4), depending on operations. Sources of external exposure included beta, gamma, and neutron radiation emitted from a variety of research, development, analytical, recovery, and surveillance activities.

Sources of internal radiation exposure specific to the class proposed in this report include radon (Rn-222), thoron (Rn-220), and actinon (Rn-219) due to the radium and thorium processing and separation of Pa-231 and Ac-227 during a variety of research, development, analytical, recovery, and surveillance activities.

Additional information regarding the radionuclides, work areas, and operations associated with radiation exposures at Mound can be found in the NIOSH evaluation report, *SEC Petition Evaluation Report for Petition SEC-00090, Mound* (NIOSH, 2007).

4.3 Time Period Associated with Radiological Operations

Per the DOE Office of Health, Safety and Security, the time period associated with DOE operations at the Mound Plant is from 1947 to the present. As presented in Section 3.0 of this report, in response to SEC-00090, DHHS designated a class of Mound workers for the period from October 1, 1949 through February 28, 1959.

In response to SEC-00171, DHHS designated a class from March 1, 1959 through March 5, 1980, comprised of Mound workers who worked in the R and SW Buildings, as indicated by the presence of tritium bioassay results.

This SEC-00207 evaluation proposes a class of September 1, 1972 through December 31, 1972 and January 1, 1975 through December 31, 1976, based on the absence of tritium logbooks for those time periods, and as such, is only focused on the evaluation of the proposed class period. The absence of these logbooks precludes the identification of individuals who fit into the existing SEC-00171 class. Therefore, this SEC-00207 evaluation report initiates a new class that eliminates the tritium bioassay requirement, thus resulting in the inclusion of all workers during the specified time period into the new class definition.

4.4 Site Locations Associated with Radiological Operations

The following information describes the R Building, SW Building, and the Tritium Complex. Additional information regarding the work areas associated with radiation exposures at Mound can be found in the NIOSH evaluation report, *SEC Petition Evaluation Report for Petition SEC-00090, Mound* (NIOSH, 2007). The information listed below pertains to the class currently under evaluation.

- R Building (or Research Building)

The R Building was built in 1948, and handled numerous programs involving various radionuclides, including Po-210, H-3, U-238, Ac-227, Pu-238, and Pu-239. The major radionuclide was Pu-238, with research beginning in 1959 and continuing through the 1960s. In addition to the Pu-238 activities, tritium was used for research and development.

- SW Building

The SW Building was similar to the R Building in that it consisted of many laboratories engaged in a variety of research, development, analytical, recovery, and surveillance activities. Pilot plant operations in the SW Building were designed to recover Th-230 and Pa-231.

The “Old Cave” and “New Cave” areas consisted of several rooms set up for “hot” work, with several types of alpha and gamma radiation and project capabilities. Other major programs that took place in the SW Building included the thorium refinery project, rare isotope program, neutron source, U-234 separation program, and various tritium programs. Beginning in the early 1970s and ending later that decade, the SW Building was used for processing Cotter Concentrate (St. Louis airport cake).

There is strong evidence that airborne contamination was produced by the operations in SW-1 from 1949 through 1959, and that this contamination was spread beyond Room SW-19 to other areas in the R and SW Buildings. This situation created significant exposure potential in the R and SW Buildings. From 1959 through 1980, there is a reasonable likelihood that elevated levels of radon isotopes and daughter isotopes were present in Room SW-19.

- Tritium Complex

The Tritium Complex, also known as the SW/R Tritium Complex (SRTC) consisted of the SW Building and the two rows of rooms facing Corridor 2 of the R Building (these rooms were contiguous with the SW Building and were converted for tritium operations). In February 2012, NIOSH conducted a detailed review of the R and SW Building ventilation systems to verify that workers outside the Tritium Complex did not have the potential for radon exposure. This review established that the respective ventilation systems were isolated, configured, and controlled in such a manner that radon would have been exhausted to the stacks rather than migrate to the part of the R Building outside the Tritium Complex where workers were not monitored for tritium.

NIOSH has determined that the site-specific and claimant-specific data available for the time period of this evaluation are insufficient to allow NIOSH to characterize worker movements across the Mound Plant. NIOSH is therefore unable to define individual worker exposure scenarios based on specific work locations within the Mound Plant during the period under evaluation.

Considering all sources of information currently available to NIOSH, there is no evidence suggesting that any other buildings at the Mound Plant were affected by uncontrolled and unmonitored emanations of radon from Ra-Ac-Th materials.

4.5 Job Descriptions Affected by Radiological Operations

NIOSH has determined that the site-specific and claimant-specific data available for the Mound Plant for the time periods under evaluation are insufficient to allow NIOSH to determine that any specific work group assigned at the Mound Plant was not potentially exposed to radon emanations from residual Ra-Ac-Th materials.

NIOSH has insufficient information associating job titles and/or job assignments with specific radiological operations or conditions. Without such information, NIOSH is unable to define potential radiation exposure conditions based on worker job descriptions.

5.0 Summary of Available Monitoring Data for the Proposed Class

The primary data used for determining internal exposures are derived from personal monitoring data, such as urinalyses, fecal samples, and whole-body counting results. If these are unavailable, the air monitoring data from breathing zone and general area monitoring are used to estimate the potential internal exposure. If personal monitoring and breathing zone area monitoring are unavailable, internal exposures can sometimes be estimated using more general area monitoring, process information, and information characterizing and quantifying the source term.

This same hierarchy is used for determining the external exposures to the cancer site. Personal monitoring data from film badges or thermoluminescent dosimeters (TLDs) are the primary data used to determine such external exposures. If there are no personal monitoring data, exposure rate surveys, process knowledge, and source term modeling can sometimes be used to reconstruct the potential exposure.

A more detailed discussion of the information required for dose reconstruction can be found in OCAS-IG-001, *External Dose Reconstruction Implementation Guideline*, and OCAS-IG-002, *Internal Dose Reconstruction Implementation Guideline*. These documents are available at: <http://www.cdc.gov/niosh/ocas/ocasdose.html>.

5.1 Data Capture Efforts and Sources Reviewed

As a standard practice, NIOSH completed an extensive database and Internet search for information regarding the Mound Plant. The database search included the DOE Legacy Management Considered Sites database, the DOE Office of Scientific and Technical Information (OSTI) database, the Energy Citations database, and the Hanford Declassified Document Retrieval System. In addition to general Internet searches, the NIOSH Internet search included OSTI OpenNet Advanced searches, OSTI Information Bridge Fielded searches, Nuclear Regulatory Commission (NRC) Agency-wide Documents Access and Management (ADAMS) web searches, the DOE Office of Human Radiation Experiments website, and the DOE-National Nuclear Security Administration-Nevada Site Office-search.

Attachment 1 provides a chronology of the ORAU Team and NIOSH efforts to locate and assess the Mound Plant tritium logbooks that are central to this petition evaluation.

In addition to the database and Internet searches listed above, NIOSH identified and reviewed numerous data sources to determine information relevant to determining the feasibility of dose reconstruction for the class of employees under evaluation. This included determining the availability of information on personal monitoring, area monitoring, industrial processes, and radiation source materials. The following subsections summarize the data sources identified and reviewed by NIOSH.

5.2 Previous Dose Reconstructions

NIOSH reviewed its NIOSH DCAS Claims Tracking System (referred to as NOCTS) to locate EEOICPA-related dose reconstructions that might provide information relevant to the petition evaluation. Table 5-1 summarizes the results of this review. (NOCTS data available as of August 10, 2012.)

NOTE: The vast majority of the claims for the two periods under evaluation are overlapping (i.e., the employees worked in both time periods).

Table 5-1: No. of Site Name Claims Submitted Under the Dose Reconstruction Rule	
Description	Totals
Total number of claims submitted for dose reconstruction	733
Total number of claims overlapping the two time periods under evaluation	302
Total number of claims submitted for energy employees who worked during the two periods under evaluation:	
• September 1, 1972 through December 31, 1972; or	325
• January 1, 1975 through December 31, 1976	319
Number of dose reconstructions completed for energy employees who worked during the period under evaluation (i.e., the number of such claims completed by NIOSH and submitted to the Department of Labor for final approval)	
• September 1, 1972 through December 31, 1972; or	278
• January 1, 1975 through December 31, 1976	276
Number of claims for which internal dosimetry records were obtained for the identified years in the evaluated class definition	
• September 1, 1972 through December 31, 1972; or	99
• January 1, 1975 through December 31, 1976	96
Number of claims for which external dosimetry records were obtained for the identified years in the evaluated class definition	
• September 1, 1972 through December 31, 1972; or	232
• January 1, 1975 through December 31, 1976	267

NIOSH reviewed each claim to determine whether internal and/or external personal monitoring records could be obtained for the employee. Although 733 claims were submitted, 302 of these claims overlap the two time periods under evaluation. There are 23 non-overlapping claims in the period from September 1, 1972 through December 31, 1972; there are 17 non-overlapping claims during the period from January 1, 1975 through December 31, 1976. The dose reconstruction claimant telephone interviews (CATIs) provided some detailed information regarding work locations, hours worked, and hazards encountered. The interviews also identified conditions for which there would have been potential for either internal or external exposures.

5.3 Worker Interviews

To obtain additional information in support of its 2007 evaluation of Petition SEC-00090, NIOSH interviewed 21 former Mound employees. Details regarding these interviews may be found in the *SEC Petition Evaluation Report for Petition SEC-00090, Mound* (NIOSH, 2007). Additional interviews for the specific purpose of supporting this evaluation were not deemed necessary, and therefore, were not conducted.

5.4 Internal Personnel Monitoring Data

Summaries of the available *in vitro* and *in vivo* data, as well as general overviews of sampling and analytical protocols, are provided in *SEC Petition Evaluation Report for Petition SEC-00090, Mound* (NIOSH, 2007). Additional details, including analytical methods, detectable activities, and reporting protocols can be found in *Technical Basis Document for the Mound Site-Occupational Internal Dosimetry* (ORAUT-TKBS-0016-5); *Technical Manual: MD-22153, Issue I Mound Site Radionuclides by Location* (Mound, 1995); and *History of Mound Bioassay Programs* (Meyer, 1992).

As noted in ORAUT-TKBS-0016-5, radionuclides were categorized by Mound staff as either primary or secondary based on the potential extent of use and the amount of bioassay data available. Primary radionuclides included Po-210, plutonium isotopes (Pu-238, Pu-239), and tritium. These radionuclides were identified as primary because they were present in larger quantities and were more widespread at the site, often in multiple buildings and facility processes. Correspondingly, compared to secondary radionuclides, there are more monitoring data and site documentation available for evaluating internal doses associated with these primary radionuclides.

Secondary radionuclides included those that were of limited use at the site or involved limited worker exposures. Often referred to as “other” radionuclides in Mound documents, they were part of smaller programs involving relatively few people. Many of the programs were relatively short-term research projects and brief production runs, and source material was received intermittently (MJW, 2002b, Appendix C). Fewer internal dosimetry data are available for these radionuclides than for the primary radionuclides. Available data for secondary radionuclides were collected from several sources during the Pre-1989 Dose Assessment Project and combined into two Excel spreadsheets: *Database of Radium, Actinium, and Thorium Excretion Data* (Excretion Data, 1953-1959) and the *Database of Excretion Data for Other Radionuclides* (Excretion Data, 1955-1988). Data sources included logbooks, cards, and non-plutonium data extracted from the Mound Plutonium Reconstruction (PURECON) database. Unlike the plutonium database (PURECON) or the polonium and tritium databases (PORECON), which were created from fairly well-organized individual dosimetry records, the information for other radionuclides was generally very poorly documented and the interpretations of the bioassay results were often scientific approximations. It appears that because the activities involving the other radionuclides were not large-scale operations, the documentation of associated bioassay sample information was secondary to the larger plutonium, polonium, and tritium sampling and analysis programs.

Difficulties encountered in attempting to interpret available bioassay records are described within a position paper on dose assessments for other radionuclides, contained within *Pre-1989 Dose Assessment Project Phase II Final Report* (MJW, 2002b, Appendix C). Some of the results were not associated with a name, social security number, or health physics number. Often, there were no units

associated with a result. In many cases, there were results for an element such as radium or thorium, but it was unclear which isotope was intended. There was no information on the age, solubility, or chemical form of the elements. In some cases, it appears bioassay results were repeatedly reported for two, or sometimes three, different radionuclides. For example, a person may have identical results for protactinium and Th-232. In other cases, urine samples may have been analyzed for radium, actinium, and thorium by differential decay analysis of the radium fraction. The same urine sample may have also been analyzed for Th-232 by doing a Ra-Th separation. The results of the differential decay analysis appeared to conflict with the Th-232 analysis in that the dominant radium isotope is Ra-223, whereas Ra-224 would be expected. This would seem to indicate that the thorium results should have been interpreted as Th-227.

Descriptions of radiation protection activities in periodic health physics reports demonstrate that the health physics program was considering short-lived air activity to the extent that this activity was routinely reported through the era of radium and thorium processing as well as protactinium and actinium separation. However, residual radioactive material from the Ra-Ac-Th process resulted in the technologically-enhanced emanation of three isotopes of radon (Rn-220, Rn-222, and Rn-219) into Room SW-19. As discussed, no bioassay monitoring records relevant to radon exposures are available from 1955 until the measurements made in 1979-1980.

Due to the extensive tritium operations occurring in the SW building and the adjacent two rows of rooms of the R building, it was documented policy that everyone who worked in those facilities submit periodic urine samples to be analyzed for tritium. Mound Plant tritium logbooks were used to confirm those personnel who participated in the tritium urinalysis program, which was subsequently used to identify SEC class members.

5.5 External Personnel Monitoring Data

The Mound Plant had a continuous external dose monitoring program that developed policies and made programmatic corrections as necessary. Mound used a film badge external dosimetry monitoring system from 1946 to 1977. From 1977 until site closure, Mound used a thermoluminescent dosimeter (TLD) system. Records of radiation exposures from personnel dosimeters worn by workers and co-workers are available for all years. The Mound Environmental, Safety, and Health system (MESH) database serves as the primary electronic repository of these records. It contains all radiation doses measured for Mound employees from 1947 to 2005. Periodic health physics reports contain summaries of the number of dosimeters read for each period, as well as the number of results in each of several dose ranges. When individual doses cannot be reconstructed more precisely, maximum doses can be based on these reported results.

Details regarding the dosimeters used at the Mound Plant are presented in ORAUT-TKBS-0016-6. Additional information regarding the external dosimetry equipment, methodologies, and techniques in use during most of the proposed class time period is provided in the various volumes of the document, *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993* (Meyer, 1994).

5.6 Workplace Monitoring Data

To support dose reconstruction and its evaluation of SEC-00090, NIOSH obtained routine air monitoring data from the beginning of Mound operations. Room SW-19 was the only location at Mound identified as an area of potential occupational exposure to Rn-222 and Rn-220 (King, 1995). Rn-220 and Rn-219 measurement results were very limited despite the high concentrations observed in the unoccupied tunnel. The only Rn-219 measurements were made in Building 21 at 0.3 to 0.7 pCi/l, but the holding time before analysis was excessive compared to the four-second half-life of Rn-219. The only Rn-220 measurement in SW-19 was below detection. Rn-220 and Rn-219 exposures would not be detectable in excreta by bioassay due to very short half-lives (ORAUT-TKBS-0016-5).

As discussed in Section 4.1, Room SW-19 had elevated radon concentrations emanating from radium and thorium processing wastes. A ventilation system was installed in early 1980 (prior to March 5, 1980) to vent SW Building tunnel air (Meyer, 1992). This system reduced Rn-222 concentrations in Room SW-19 by a factor of 10 or more. This result was confirmed with continuous measurements from 7.7 pCi/l to 13.4 pCi/l. A WL measurement by the employee's desk following ventilation system installation was 0.03 WL or 0.03 (12 month/year) = 0.4 working level month (WLM), compared with an occupational limit of 4 WLM/year (King, 1995).

The use of facility ambient air monitoring data for the purpose of assessing internal radiation dose was evaluated. With the exception of some data for airborne radon and tritium, the data were not considered a viable approach due to unknown factors impacting the representativeness of actual breathing zone air concentrations.

NIOSH has found no workplace monitoring records relevant to these radon exposures in the Tritium Complex until air measurements were made in 1979 and 1980. Additional information available to NIOSH regarding the quantity and condition of Mound Plant workplace monitoring data as well as the NIOSH evaluation of such data can be found in the related Mound evaluation report for SEC-00090 (NIOSH, 2007).

5.7 Radiological Source Term Data

Descriptions of radiation protection activities in periodic health physics reports demonstrate that the health physics program was considering short-lived air activity to the extent that this activity was routinely reported through the era of radium and thorium processing as well as protactinium and actinium separation. However, residual radioactive material from the Ra-Ac-Th process resulted in the technologically-enhanced emanation of three isotopes of radon, Rn-220, Rn-222, and Rn-219. These radon isotopes represent an occupational radon exposure. As previously described, no monitoring records are available from 1955 until the measurements made in 1979-1980 (which were associated with ventilation improvements in the related facility).

The operations would have generated Rn-219 from the decay of Ac-227; Rn-222 from the decay of Ra-226; and Rn-220 from the decay of Th-232. The mix of these radionuclides is difficult to measure in the field and only one datum is currently known to exist, as reported in ORAUT-TKBS-0016-5. This single estimate of the proportion of inert gases gives the relative concentrations of the three isotopes of radon of interest in the SW Building. The measurement was taken in a tunnel under SW-2

(HP Monthly, 1953; HP Monthly, 1954) in an area that was not routinely occupied (having a depth of 2'3" according to a drawing dated January 8, 1952) (HP Quarterly, 1955); thus, the measurement is related to the proportions present in the workplace to an unknown degree. As of the date of this evaluation report, NIOSH has not discovered any other source term information other than this single data point.

NIOSH lacks activity data for the residual Ra-Ac-Th source term affecting Room SW-19. Consequently, in the absence of workplace monitoring data, NIOSH is unable to calculate upper-bound radon concentrations for the R and SW Buildings. Additional information regarding the Mound Plant source term data available to NIOSH can be found in the related Mound evaluation report for SEC-00090 (NIOSH, 2007) and the Mound site profile documents (ORAUT-TKBS-0016).

6.0 Feasibility of Dose Reconstruction for the Proposed Class

42 C.F.R. § 83.14(b) states that HHS will consider a NIOSH determination that there was insufficient information to complete a dose reconstruction, as indicated in this present case, to be sufficient, without further consideration, to conclude that it is not feasible to estimate the levels of radiation doses of individual members of the class with sufficient accuracy.

In the case of a petition submitted to NIOSH under 42 C.F.R. § 83.9(b), NIOSH has already determined that a dose reconstruction cannot be completed for an employee at the DOE or AWE facility. This determination by NIOSH provides the basis for the petition by the affected claimant. Per § 83.14(a), the NIOSH-proposed class defines those employees who, based on completed research, are similarly affected and for whom, as a class, dose reconstruction is similarly not feasible.

In accordance with § 83.14(a), NIOSH may establish a second class of co-workers at the facility for whom NIOSH believes that dose reconstruction is similarly infeasible, but for whom additional research and analysis is required. If so identified, NIOSH would address this second class in a separate SEC evaluation rather than delay consideration of the claim currently under evaluation (see Section 10). This would allow NIOSH, the Board, and HHS to complete, without delay, their consideration of the class that includes a claimant for whom NIOSH has already determined a dose reconstruction cannot be completed, and whose only possible remedy under EEOICPA is the addition of a class of employees to the SEC.

This section of the report summarizes research findings by which NIOSH determined that it lacked sufficient information to complete the relevant dose reconstruction and on which basis it has defined the class of employees for which dose reconstruction is not feasible. NIOSH's determination relies on the same statutory and regulatory criteria that govern consideration of all SEC petitions.

6.1 Feasibility of Estimating Internal Exposures

NIOSH has evaluated the available personnel and workplace monitoring data and source term information and has determined that there are insufficient data for estimating internal exposures, as described below.

NIOSH determined in its evaluation of petition SEC-00171 that it was not feasible to determine which of the workers in the R and SW Buildings may have frequented Room SW-19; therefore, NIOSH could not reasonably limit the cohort of workers who could have been exposed to radon in SW-19 more narrowly than the cohort of all workers in the R and SW Buildings. NIOSH found that due to extensive tritium operations occurring in these buildings, it was documented policy that everyone who worked in the R and SW Buildings would submit periodic urine samples analyzed for tritium. While it was possible that a worker could have occasionally visited the R and SW Buildings without submitting a tritium urinalysis sample, it was not plausible that a worker could have spent 250 days in these buildings without leaving a single tritium urinalysis sample. Therefore, tritium urinalysis results were taken as evidence of potential employment in R and SW Buildings. Conversely, the absence of such urinalysis data was evidence that individuals did not have the potential to be employed in R and SW Buildings for 250 days.

NIOSH has recently identified that tritium logbooks for the periods from September 1, 1972 through December 31, 1972 and from January 1, 1975 through December 31, 1976 are not available to support the identification of personnel who provided tritium bioassays. The absence of these logbooks precludes the identification of individuals who fit into the existing SEC-00171 class.

As discussed in Section 5.4, no bioassay monitoring records relevant to radon exposures in the R and SW Buildings are available for the period from 1955 until 1979-1980. NIOSH has determined that, for the periods under evaluation, radon dose resulting from radioactive material associated with the separation activity in the R and SW Buildings cannot be reconstructed with sufficient accuracy prior to the measurements taken in 1979 and 1980, and prior to the completion of the installation of a ventilation system to vent the SW Building.

As discussed in Sections 5.6 and 5.7, NIOSH has found no workplace monitoring records after February 1955 relevant to the radon exposures in the R and SW Buildings until air measurements were made in 1979 and 1980. NIOSH also lacks activity data for the residual Ra-Ac-Th source term affecting Room SW-19 and its subsequent distribution through the R and SW building facility floors, drains, and subjacent soil. Therefore, NIOSH has concluded that it lacks sufficient monitoring data and source term information to perform adequate individual dose reconstructions for workers during the periods under evaluation.

In light of the above factors, NIOSH has determined that it lacks sufficient personnel identification information, personnel monitoring data, workplace monitoring data, and source term data to perform adequate individual dose reconstructions for workers potentially exposed to radon working at the Mound Plant from September 1, 1972 through December 31, 1972 or from January 1, 1975 through December 31, 1976. This SEC-00207 evaluation report initiates a new class that eliminates the tritium bioassay requirement specified in the class definition for SEC-00171, thus resulting in the inclusion of all workers during the specified time period into the new class definition for SEC-00207.

NIOSH does not have access to sufficient personnel monitoring, workplace monitoring, or source term data to estimate potential internal exposures to radon during the period of DOE operations. Consequently, NIOSH finds that it is not feasible to estimate, with sufficient accuracy, internal exposures to radon and resulting doses for the class of employees covered by this evaluation.

Although NIOSH found that it is not possible to completely reconstruct internal radiation doses for the periods of September 1, 1972 through December 31, 1972 and January 1, 1975 through December 31, 1976, NIOSH intends to use any internal monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Dose reconstructions for individuals employed at the Mound Plant during the periods from September 1, 1972 through December 31, 1972 or January 1, 1975 through December 31, 1976, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

6.2 Feasibility of Estimating External Exposures

This evaluation responds to a petition based on NIOSH determining that internal radiation exposures to radon isotopes originating from residual radioactive material associated with the Ra-Ac-Th source term in soil underlying Room SW-19 could not be reconstructed for a dose reconstruction referred to NIOSH by the Department of Labor (DOL). As noted above, DHHS will consider this determination to be sufficient without further consideration to determine that it is not feasible to estimate the levels of radiation doses of individual members of the class with sufficient accuracy. Consequently, it is not necessary for NIOSH to fully evaluate the feasibility of reconstructing external radiation exposures for the class of workers covered by this report.

In its previous evaluation of petition SEC-00090, NIOSH concluded that for the period from February 1949 to present, it has access to sufficient information to either: (1) estimate the maximum external radiation dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the external radiation doses to members of the class more precisely than a maximum dose estimate. This current evaluation has found no evidence to the contrary.

Adequate reconstruction of medical dose is likely to be feasible by using bounding assumptions in the technical information bulletin, *Dose Reconstruction from Occupational Medical X-Ray Procedures* (ORAUT-OTIB-0006), and Mound technical basis documents, collectively referred to as ORAUT-TKBS-0016.

Although NIOSH found that it is not possible to completely reconstruct radiation doses for the periods from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, NIOSH intends to use any external monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Dose reconstructions for individuals employed at Mound during the periods from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

6.3 Class Parameters Associated with Infeasibility

Through the course of ongoing research, NIOSH has determined that no radon monitoring records are available from 1955 until measurements were made in 1979-1980.

In response to SEC-00171, DHHS designated a class from March 1, 1959 through March 5, 1980, comprised of Mound workers who worked in the R and SW Buildings, as indicated by the presence of tritium bioassay results. It was documented policy that everyone who worked in the R and SW Buildings submitted a tritium bioassay due to the extensive tritium operations in those buildings. The absence of these logbooks for the time periods under evaluation precludes the identification of individuals who fit into the existing SEC-00171 class. Therefore, NIOSH has concluded that no approved method exists to support bounding radon dose during the periods under evaluation. Consequently, NIOSH recommends an additional class that includes all workers for the periods from September 1, 1972 through December 31, 1972 or January 1, 1975 through December 31, 1976.

Mound workers in Room SW-19 could have received potential intakes of radon isotopes originating from residual radioactive material associated with the Ra-Ac-Th source term in soil underlying Room SW-19. NIOSH concluded that it was not feasible to determine which of the workers in SW Building may have frequented Room SW-19. It is not plausible that a worker could have spent 250 days in the R and SW building without submitting a tritium sample. In the absence of such urinalysis data, NIOSH cannot support the identification of personnel who provided tritium bioassays during the periods under evaluation. NIOSH has no evidence suggesting that any other buildings at the Mound Plant were affected by uncontrolled and unmonitored emanations of radon from residual Ra-Ac-Th materials. NIOSH recommends that the class definition include all workers who worked at the Mound Plant during the time periods under evaluation.

NIOSH has insufficient information associating job titles and/or job assignments with specific radiological operations or conditions within the Tritium Complex. NIOSH concluded that it was not feasible to identify personnel who may have frequented the Tritium Complex during the time periods for which tritium logbooks are absent. Without such information, NIOSH is unable to define potential radiation exposure conditions based on worker job descriptions. NIOSH therefore recommends that the class include all workers who worked at the Mound Plant during the specified time periods.

7.0 Summary of Feasibility Findings for Petition SEC-00207

This report evaluates the feasibility for completing dose reconstructions for employees at the Mound Plant from September 1, 1972 through December 31, 1972, and from January 1, 1975 through December 31, 1976. NIOSH determined that members of this class may have received radiation exposures from radon isotopes originating from residual radioactive material associated with the Ra-Ac-Th source term in soil underlying Room SW-19. NIOSH lacks sufficient information, which includes bioassay, source term data, and workplace monitoring data that would allow it to estimate the potential radon exposures to which the proposed class may have been exposed.

NIOSH has documented herein that it cannot complete the dose reconstructions related to this petition. The basis of this finding demonstrates that NIOSH does not have access to sufficient information to estimate either the maximum radiation dose incurred by any member of the class or to estimate such radiation doses more precisely than a maximum dose estimate.

Consistent with its findings associated with SEC-00090, NIOSH has established that it has access to sufficient information to: (1) estimate the maximum external radiation dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the class; or (2) estimate the external radiation doses to members of the class more precisely than a maximum dose estimate.

Although NIOSH found that it is not possible to completely reconstruct radiation doses for the proposed class, NIOSH intends to use any internal and external monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures). Therefore, dose reconstructions for individuals employed at Mound Plant during the periods from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976, but who do not qualify for inclusion in the SEC, may be performed using these data as appropriate.

8.0 Evaluation of Health Endangerment for Petition SEC-00207

The health endangerment determination for the class of employees covered by this evaluation report is governed by EEOICPA and 42 C.F.R. § 83.14(b) and § 83.13(c)(3). Pursuant to these requirements, if it is not feasible to estimate with sufficient accuracy radiation doses for members of the class, NIOSH must determine that there is a reasonable likelihood that such radiation doses may have endangered the health of members of the class. The regulations require NIOSH to assume that any duration of unprotected exposure may have endangered the health of members of a class when it has been established that the class may have been exposed to radiation during a discrete incident likely to have involved levels of exposure similarly high to those occurring during nuclear criticality incidents. If the occurrence of such an exceptionally high-level exposure has not been established, then NIOSH is required to specify that health was endangered for those workers who were employed for a number of work days aggregating at least 250 work days within the parameters established for the class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

NIOSH has determined that members of the class were not exposed to radiation during a discrete incident likely to have involved levels of exposure similarly high to those occurring during nuclear criticality incidents. However, the evidence reviewed in this evaluation indicates that some workers in the class may have accumulated chronic radiation exposures through intakes of radon. Consequently, NIOSH is specifying that health was endangered for those workers covered by this evaluation who were employed for a number of work days aggregating at least 250 work days within the parameters established for this class or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

9.0 NIOSH-Proposed Class for Petition SEC-00207

The evaluation defines a single class of employees for which NIOSH cannot estimate radiation doses with sufficient accuracy. This class includes all employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at the Mound Plant, in Miamisburg, Ohio, from September 1, 1972 through December 31, 1972, or from January 1, 1975 through December 31, 1976 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.

10.0 Evaluation of an Additional Similar Class

In accordance with § 83.14(a), NIOSH may establish a second class of co-workers at the facility, similar to the class defined in Section 9.0, for whom NIOSH believes that dose reconstruction may not be feasible, and for whom additional research and analyses is required. If a second class is identified, it would require additional research and analyses. Such a class would be addressed in a separate SEC evaluation rather than delay consideration of the current claim. At this time, NIOSH has not identified an additional similar class of employees at the Mound Plant for whom dose reconstruction may not be feasible.

This page intentionally left blank

11.0 References

42 C.F.R. pt. 81, *Guidelines for Determining the Probability of Causation Under the Energy Employees Occupational Illness Compensation Program Act of 2000*; Final Rule, Federal Register/Vol. 67, No. 85/Thursday, p 22,296; May 2, 2002; SRDB Ref ID: 19391

42 C.F.R. pt. 82, *Methods for Radiation Dose Reconstruction Under the Energy Employees Occupational Illness Compensation Program Act of 2000*; Final Rule; May 2, 2002; SRDB Ref ID: 19392

42 C.F.R. pt. 83, *Procedures for Designating Classes of Employees as Members of the Special Exposure Cohort Under the Energy Employees Occupational Illness Compensation Program Act of 2000*; Final Rule; May 28, 2004; SRDB Ref ID: 22001

42 U.S.C. §§ 7384-7385 [EEOICPA], *Energy Employees Occupational Illness Compensation Program Act of 2000*; as amended; DCAS website

Annual Report, 1976, *1975 Mound Laboratory Annual Report*, R. K. Flitcraft and J. R. McClain; MLM-MU-76-63-0001; Monsanto Research Corporation; March 1, 1976; SRDB Ref ID: 79271

Annual Summary, 1972, *1972 Annual Summary Report*, R. K. Flitcraft; MLM-ML-72-52-0003; Monsanto Research Corporation; 1972; SRDB Ref ID: 2329

DHHS, 2008, *HHS Designation of Additional Members of the Special Exposure Cohort Designating a Class of Employees from Mound Plant, Miamisburg, Ohio*; Department of Health and Human Services (DHHS); March 3, 2008; SRDB Ref ID: 80513

Environmental Report, 1973, *Annual Environmental Monitoring Report: Calendar Year 1972*, D. G. Carfagno and W. H. Westendorf; MLM-2028 TID-4500 UC-41; March 15, 1973; SRDB Ref ID: 12621

Excretion Data, 1953-1959, *Database of Radium, Actinium, and Thorium Excretion Data*; results for various dates between 1953 and 1959; SRDB Ref ID: 8754

Excretion Data, 1955-1988, *Database of Excretion Data for Other Radionuclides*; results for various dates between 1955 and 1988; SRDB 8757

HP Monthly, 1952, *Health Physics Monthly Information Reports – 1952*; Mound Laboratory; various authors and dates in 1952; SRDB Ref ID: 12433

HP Monthly, 1953, *Health Physics Monthly Information Reports – 1953*; Mound Laboratory; various authors and dates in 1953; SRDB Ref ID: 12434

HP Monthly, 1954, *Health Physics Monthly Information Reports – 1954*; Mound Laboratory; various authors and dates in 1954; SRDB Ref ID: 12436

HP Quarterly, 1955, *Quarterly Health Physics Reports - 1955*, Mound Laboratory; various authors and quarterly dates in 1955; SRDB Ref ID: 12438

HP Quarterly, 1957, *Quarterly Health Physics Reports - 1957*, Mound Laboratory; various authors and quarterly dates in 1957; SRDB Ref ID: 12447

ICRP, 1987, *Lung Cancer Risk from Indoor Exposure to Radon Daughters*, Publication 50; International Commission for Radiological Protection (ICRP); Pergamon Press; Oxford, England; 1987; SRDB Ref ID: 36898

Jenkins, 1980, *Elevated Radon Levels in SW-19*, correspondence to R. T. Brashear; Phillip H. Jenkins; October 24, 1980; SRDB Ref ID: 8713

Mead, 1955, *Development of the Monex Thorium Refining Process Through the Pilot Plant Stage*, Final Report; F. C. Mead, Jr. and other contributors; December 31, 1955; SRDB Ref ID: 12798

Meyer, 1979, *Thorium-232 Program at the Mound Facility*; H. E. Meyer; October 3, 1979; SRDB Ref ID: 12700

Meyer, 1992, *History of Mound Bioassay Programs*; Herbert E. Meyer, EG&G Mound Applied Technologies; September 1992; SRDB Ref ID: 1962

Meyer, 1994, *History of Personnel External Dosimetry Program at the Dayton Project and Mound Laboratory 1946-1993*, Volumes I, II, III, V, VI, VII, & VIII; H. E. Meyer; 1994; SRDB Ref IDs: 3268, 3276, 3281, 3297, 3299, 3303, 3315

MJW, 1998, *Pre-1989 Dose Assessment Project, Phase I Interim Report*, Volume I; MJW Corporation Inc.; June 15, 1998; SRDB Ref ID: 8667

MJW, 2002a, *Pre-1989 Dose Assessment Project Phase I Final Report*; MJW Corporation Inc.; April 2002; SRDB Ref ID: 8745

MJW, 2002b, *Pre-1989 Dose Assessment Project Phase II Final Report*; MJW Corporation Inc.; June 2002; SRDB Ref ID: 8738

Monthly Reports, 1977, *Mound Laboratory Monthly Reports, January 1977 – December 1977*, R. K. Flitcraft; Mound Laboratory; SRDB Ref ID: 100674

Mound, 1995, *Technical Manual: MD-22153, Issue I Mound Site Radionuclides by Location*; EG&G Mound Applied Technologies (Mound); June 22, 1995; SRDB Ref ID: 3240

Mound Fact Book, 1985, *Mound Fact Book*, Monsanto Research Corporation; MLM-ML-85-44-0001; April 1985; SRDB Ref ID: 47247

Moyer, 1956, *Polonium*, Harvey V. Moyer with Ohio State University for the U.S. Atomic Energy Commission; July 1956; SRDB Ref ID: 12703

NIOSH, 2007, *SEC Petition Evaluation Report for Petition SEC-00090, Mound Plant*; National Institute for Occupational Safety and Health (NIOSH); December 19, 2007; SRDB Ref ID: 80459

ORAUT-OTIB-0006, *Dose Reconstruction from Occupational Medical X-Ray Procedures*, Rev. 04; ORAU Dose Reconstruction Project for NIOSH; June 20, 2011; SRDB Ref ID: 98147

ORAUT-TKBS-0016-1, *Technical Basis Document for the Mound Site-Introduction*, Rev. 00 PC-1; ORAU Team Dose Reconstruction Project for NIOSH; March 13, 2009; SRDB Ref ID: 64999

ORAUT-TKBS-0016-2, *Technical Basis Document for the Mound Site-Site Description*, Rev. 00 PC-2; ORAU Team Dose Reconstruction Project for NIOSH; March 13, 2009; SRDB Ref ID: 65000

ORAUT-TKBS-0016-3, *Technical Basis Document for the Mound Site-Occupational Medical Dose*, Rev. 01 PC-3; ORAU Team Dose Reconstruction Project for NIOSH; March 2, 2009; SRDB Ref ID: 60989

ORAUT-TKBS-0016-4, *Technical Basis Document for the Mound Site-Occupational Environmental Dose*, Rev. 00 PC-1; ORAU Team Dose Reconstruction Project for NIOSH; March 13, 2009; SRDB Ref ID: 65001

ORAUT-TKBS-0016-5, *Technical Basis Document for the Mound Site-Occupational Internal Dosimetry*, Rev. 00 PC-1; ORAU Team Dose Reconstruction Project for NIOSH; March 13, 2009; SRDB Ref ID: 65002

ORAUT-TKBS-0016-6, *Technical Basis Document for the Mound Site-Occupational External Dosimetry*, Rev. 00; ORAU Team Dose Reconstruction Project for NIOSH; August 11, 2004; SRDB Ref ID: 19791

Unknown, 1979, *Radon SW-19 Monitoring Notes*, handwritten notes; unknown author; various dates from June 1979 through October 1979; SRDB Ref ID: 8715

This page intentionally left blank

Attachment 1: Chronology of Mound Plant Tritium Logbook Efforts

04/12/2012 – Received a G2K request for the ORAU Team to initiate an 83.14 SEC evaluation for the Mound facility for September 1, 1972 through December 31, 1972, and January 1, 1975 through December 31, 1976.

09/30/2011 – As requested by NIOSH, provided a review of each Mound tritium logbook for 1957 to 1981 and located time spans between logbooks and missing dates within each logbook. The gaps are 1975, most of 1976, and some of 1972.

09/29/2011 – Received an e-mail from ORAU Team Mound Technical Lead asking for a status on the Mound logbook review for NIOSH. Provided a spreadsheet with two tabs, one identifying every missing day for each year including weekends, and the second identifying missing days (workdays M-F).

09/26/2011 – Received an e-mail from ORAU Team Mound Technical Lead asking for a phone meeting to discuss Mound tritium logbooks.

09/20/2011 – Provided NIOSH a list of Ref IDs which had SPEDELite data entry and linking performed on the issue of Tritium bioassay logbooks. These are logbooks that NIOSH selected and DOE Legacy Management provided. There are gaps found in the date ranges.

09/20/2011 – E-mailed the ORAU technical team for guidance on responding to NIOSH and began conducting internal searches to locate information. The ORAU technical team will check with site experts on the 1976 issue.

09/20/2011 – NIOSH e-mailed a sample from a DR highlighting that there are no tritium logbooks for 1975 and a limited number for 1976. NIOSH would like the ORAU Team to research this because 1975 logbooks were thought to be the only gap.

07/20/2011 – Sent an e-mail to NIOSH confirming the name of the individual who could not be reconciled from the Mound tritium logbooks list provided to NIOSH on 08/19/2010 as part of a G2K request.

03/28/2011 – Received and processed the Mound Historical Radiation Exposure Information and Reporting System (REIRS) database.

03/20/2011 – The ORAU Team provided DCAS with an estimate of ~15 months on the MESH database project.

03/15/2011 – Submitted Data Capture Strategy Mound-FY11-003, requesting a search of all DOE Legacy Management's Mound Laboratory holdings for radiological data from the Old Cave and New Cave areas in the Semi-Works (SW) Building.

03/14/2011 – DCAS requested that ORAUT provide an estimate of the amount of effort required to code the Mound tritium bioassay data prior to its inclusion in the MESH database (before approximately 1980) and to develop a Mound tritium co-worker model using these data and the later (1980 and following years) tritium bioassay data contained in the MESH database.

03/03/2011 – Provided NIOSH with two Excel spreadsheets pertaining to the Mound tritium bioassay logbooks. One is the original list of Ref IDs chosen on 05/26/2010 (yellow & green highlighted), and the second is just the yellow highlighted names which were used to develop the logbook name listing.

12/08/2010 – Requested by NIOSH to research employee information/identification on a specific individual. After a review of Mound tritium logbooks, NOCTS claim files, and the SRDB, no additional identifiable information was located.

11/24/2010 – NIOSH directed the ORAU Team to contact DOE Legacy Management about locating 1975 tritium logbooks if we haven't already done so.

11/02/2010 – Received and disseminated search results for box review and selection.

10/20/2010 – Submitted DOE Legacy Management a Data Capture Activity Request (Mound-FY11-001) for the following data:

- 1) All documents containing the keywords tritium and SW Building for the years 1968 through 1975 inclusive.
- 2) All documents containing the keywords tritium and R Building for the years 1968 through 1975 inclusive.
- 3) All documents containing the keywords tritium and SW/R Building for the years 1968 through 1975 inclusive.

10/04-10/7/2010 – Performed data capture at DOE Legacy Management – Morgantown for contamination surveys in the SW and R buildings from the mid 1970s to 1993. A total of 71 documents were captured.

09/21/2010 – E-mailed SC&A and NIOSH a list of 29 boxes selected by the ORAU Team and NIOSH to be review at DOE Legacy Management – Morgantown the first week of October, 2010.

09/17/2010 – Received the search results on the 09/02/2010 swipe data request. The results were disseminated for box review and selection.

09/17/2010 – Received a letter from DOE Legacy Management stating that they were unsuccessful in locating any tritium urinalysis records from 1975. Contacted DOE Legacy Management who confirmed they ran the search using all the keywords requested and compared the results to the previous results and no new boxes or information were identified.

09/15/2010 – Sent DOE Legacy Management a copy of all the re-scanned images from the eight boxes of tritium bioassay logbooks.

09/11/2010 – Sent DOE Legacy Management a revision of the Data Capture Activity Request sent on 09/02/2010 to include additional dates.

09/08/2010 – Submitted to DOE Legacy Management an urgent request to search all DOE/LM resources for any documents, log books, computer printouts dated from 1974 through 1976 containing the following keywords in their titles:

- S-262
- Tritium results
- Tritium bioassay
- Tritium urinalysis
- Bioassay for tritium
- Urinalysis for tritium
- Internal deposition of tritium

09/08/2010 – Performed a complete review of the SRDB and confirmed that all of the logbooks provided by DOE Legacy Management were captured. Staff confirmed that the logbook for 1975 is missing from the collection. Management approved an urgent request to DOE Legacy Management.

09/07/2010 – The tritium review is completed and results submitted.

09/02/2010 – Sent DOE LM a Data Capture Activity Request for the following data:

- 1.1) Health Physics (H.P.) Trend Sheets with tritium swipe and air sample data for SW and R Buildings for all years except 1976-1978. These sheets may be identified as Health Physics Trend Sheets or H.P. Trend Sheets.
- 1.2) Room SW-13 swipe data*, 1968-1975, 1980, 1981, 1991, 1992, 1995, and 1996.
- 1.3) Room SW-150 swipe data*, 1968-1975, 1980, 1981, 1991, 1992, 1995, and 1996.
- 1.4) Room R-108 swipe data*, 1968-1975, 1983, 1991, 1992, 1995, and 1996.

09/02/2010 – Notified the ORAU technical staff that the review of the logbooks for the five claimant's information will not be complete until mid-day on Tuesday 09/07/2010 (working with Data Ready staff).

09/01/2010 – Received information for five claimants (each with different types of employment/monitoring) from technical staff and was requested to go through the logbooks for these individuals for the years of employment prior to 1982 and indicate if there are tritium samples during each year.

09/01/2010 – Discussed with technical staff about the tritium issue (0.000 rem on a report with no entry in the logbooks) and the idea of looking through the logbooks for specific people based on years the technical staff thinks there were no results.

08/27/2010 – E-mailed management that the ORAU Team reviewed the Mound tritium bioassay logbooks (all of the logbooks within the date ranges listed [redacted] exposure report) and found no data pertaining to him, by name or by HP number.

08/27/2010 – E-mailed the ORAU Data Ready Group Manager to request assistance to review documents in the SRDB for [redacted] to make sure nothing was overlooked. Also provided the redacted MESH printout. No data were found pertaining to the individual.

08/26/2010 – NIOSH asked why an individual [redacted] has a tritium bioassay record without appearing on the tritium bioassay logbooks.

08/19/2010 – Provided NIOSH a file containing the revised listing of names contained in the Mound tritium logbooks called “Mound Tritium Final Name List,” as requested in the G2K received on 05/25/2010. The review of the logbooks for clarification of illegible entries resulted in the addition of 265 variations of names. The ORAU Team was able to identify and eliminate 1,968 entries as duplicates. Only one name could not be fully reconciled.

08/09-08/12/2010 – Performed data capture at DOE Legacy Management – MoundView to re-scan the illegible logbook pages.

08/04/2010 – Received confirmation from DOE Legacy Management that the eight boxes of tritium logbooks have been delivered to the DOE Legacy Management – MoundView. The ORAU Team requested a review date of August 9, 2010.

07/30/2010 – Provided to management the ORAU Team projected action items for data capture and resolution of illegible logbook entries.

07/22/2010 – Submitted a request to DOE Legacy Management to have eight boxes containing 58 tritium bioassay logbooks previously reviewed shipped from Morgantown, WV to MoundView. Many of the scanned images contained illegible entries.

07/19/2010 – Submitted to NIOSH four tritium logbook Ref IDs which contain missing pages. The date range was added for each notebook. NIOSH looked into these logbooks and did not believe any data were missing and provided charted notes as to why. It was agreed to continue research to resolve the illegible names.

07/08/2010 – Provided the Project Director information and status on existing tasks and proposed the addition of five new tasks to complete the ORAU Team review of tritium logbooks and to capture names of workers who gave samples.

07/06/2010 – NIOSH requested input to DCAS and the Project Director regarding re-viewing the original logbooks.

07/02/2010 – Provided NIOSH five PDF files as examples of illegible pages. When compiling the list of names for the final list, the ORAU Team deleted name entries that were illegible and ones that were exact duplicates. NIOSH asked if there was any chance the hard copies still exist. It was explained that the ORAU Team originally scanned them at the Dayton Federal Records Center, but Mound records have been moved to the DOE Legacy Management Office in Morgantown, WV. The ORAU Team agreed to investigate how long it will take to generate a list of pages containing illegible information.

06/29/2010 – Received and reviewed a draft letter from NIOSH to be sent to DOL. NIOSH also requested the list of Mound tritium bioassay results.

06/29/2010 – Sent a copy of the “Mound Tritium Review Final” spreadsheet to NIOSH.

06/28/2010 – NIOSH requested the spreadsheet again to review in preparation to draft a letter to DOL.

06/25/2010 – NIOSH reviewed the spreadsheet provided and approved to send the information in a letter to DOL.

06/23/2010 – Provided NIOSH an Excel spreadsheet titled “Mound Tritium Review Final” containing a list of all names entered including Employee HP#, if provided, and a list of names that fall into the recommended radon SEC class period of March 1, 1959-March 5, 1980. This completes SPEDELite for 58 SRDB Ref IDs identified by NIOSH, resulting in a total of 204,646 name entries.

06/22/2010 – Sent an e-mail to NIOSH confirming there are four documents left to complete data entry for the “ORAU review of tritium logbooks and capture names of workers who gave samples” which was listed as an open item on the Gantt for Mound SEC-00171. The ORAU Team will provide a list of names by noon 06/23/2010.

06/21/2010 – NIOSH requested a status on the G2K received on 05/25/2010.

06/01/2010 – A completion date was set for 06/18/2010 on the Gantt for the assignment.

05/26/2010 – Management responded that action items of the G2K could be a Task Integration Item to be discussed. The Data Capture Team gave an update of what was provided to NIOSH and a status of Action Item #2. Expressed concern about who was to perform Action Items #1 and #3.

05/26/2010 – Sent an e-mail to management to clarify the Data Capture Team’s responsibilities of the G2K. Listed the request in three actions. The Data Capture Team is responsible for Item #2 which is to capture the names of individuals who gave samples, and to make this information available for use in dose reconstruction.

05/25/2010 – Received a G2K requesting that the ORAU Team evaluate the tritium bioassay logbooks associated with the Mound Site covering the time period when individual urinalysis results are not provided by the MESH database (>1980). The ORAU Team is requested to capture the names of individuals who gave samples and make this information available for use in dose reconstruction.