SEC Petition Evaluation Report
Petition SEC-00161

Report Rev #: 0 Report Submittal Date: January 20, 2010

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Site Expert(s):	Pete Darnell

Petitioner Administrative Summary			
Petition Under Evaluation			
Petition #	Petition Type	Petition A Receipt Date	DOE/AWE Facility Name
SEC-00161	83.14	December 28, 2009	General Electric Company (Ohio)

NIOSH-Proposed Class Definition
All employees of the Department of Energy, its predecessor agencies, and their contractors and subcontractors who worked at General Electric Company in Evendale, Ohio, from January 1, 1961 through June 30, 1970, 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.

Related Petition Summary Information			
SEC Petition Tracking #(s)	Petition Type	DOE/AWE Facility Name	Petition Status
N/A	N/A	N/A	N/A

Related Evaluation Report Information	
Report Title	DOE/AWE Facility Name
N/A	N/A

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Peer Review Completed By:	[Signature on file] *Pete Darnell*	1/20/2010 *Date*
SEC Petition Evaluation Reviewed By:	[Signature on file] *J. W. Neton*	1/21/2010 *Date*
SEC Evaluation Approved By:	[Signature on file] *Stuart L. Hinnefeld*	1/22/2010 *Date*

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Evaluation Report Summary: SEC-00161, General Electric Co. (Ohio)

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 General Electric Company in Evendale, Ohio, from January 1, 1961 through June 30, 1970, 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, sufficient air monitoring information, and sufficient process and radiological source information, to allow it to estimate with sufficient accuracy the potential internal and external exposures to uranium, thorium, and fission product radionuclides to which the proposed class may have been subjected.

NIOSH finds that it is likely feasible to reconstruct occupational medical dose for General Electric Company (Ohio) workers with sufficient accuracy.

- Principal sources of internal and external radiation for members of the proposed class included exposures to uranium, thorium, and fission product radionuclides during operations such as high-temperature testing of refractory metals and alloys, reactor components, and fuel element materials, as well as the treatment of thorium-oxide in high-temperature furnaces.

- NIOSH has obtained uranium and thorium urinalysis results for both 1965 through 1968 and 1970, but has determined that the data are insufficient for development of coworker dose distributions. NIOSH has found no fission product bioassay monitoring data for the period from January 1, 1961 through June 30, 1970.

- NIOSH has obtained individual external monitoring data for approximately twenty-five percent of the claims referred to NIOSH for dose reconstruction. NIOSH has found insufficient external monitoring data to allow for estimation of external dose for unmonitored energy employees.

- A majority of workplace monitoring and source term information obtained by NIOSH pertains to periods outside the 1961-1970 Atomic Energy Commission operations period being evaluated. NIOSH has obtained source term information for some specific projects or experiments, but lacks the specific information from which to identify the operations with the highest exposure potential. Such information is required to enable NIOSH to bound potential exposures in the absence of personnel monitoring data.

- 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 (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures) for an individual claim. Therefore, dose reconstructions for individuals employed at General Electric Company (Ohio) during the period from January 1, 1961 through June 30, 1970, 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 uranium, thorium, and fission products, and from direct exposure to these radioactive materials. 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.

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SEC Petition Evaluation Report for SEC-00161

ATTRIBUTION AND ANNOTATION: This is a single-author document. All conclusions drawn from the data presented in this evaluation were made by the Oak Ridge Associated Universities (ORAU) Team Lead Technical Evaluator: Michael Kubiak, MJW Technical Services, Inc. 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 the General Electric Co. facility in Evendale, Ohio, from January 1, 1961 through June 30, 1970. It provides information and analysis germane to considering a petition for adding a class of employees to the Congressionally-created Special Exposure Cohort (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

[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.

advice of the Board, the Director of NIOSH will propose a decision on behalf of HHS. The Secretary 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 General Electric Company in Evendale, Ohio, from January 1, 1961 through June 30, 1970, 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 with high-temperature testing of refractory metals and alloys, reactor components, and fuel element materials, as well as the treatment of thorium-oxide in high-temperature furnaces.

The evaluation responds to Petition SEC-00161 which was submitted by an EEOICPA claimant whose dose reconstruction could not be completed by NIOSH due to a lack of sufficient 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 General Electric Company facility in Evendale, Ohio (GE-Ohio) from January 1, 1961 through June 30, 1970 and the information available to NIOSH to characterize 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.

4.1 Operations Description

General Electric's Aircraft Nuclear Propulsion (ANP) Project began in 1951 at the facility in Evendale, Ohio. The ANP work was performed in a facility known as Air Force Plant 36, a 68-acre portion of the larger General Electric Aircraft Engine Plant (EPA, 2008). The ANP Project was terminated in 1961; however, the use of radioactive materials continued under other Atomic Energy Commission (AEC) contracts (Murphy, 1988, p. 9). From 1961 through June 30, 1970, the AEC contract work occupied buildings C and D and certain other smaller auxiliary structures, under a use

[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.

permit from the Air Force. Custody of the facilities was returned to the Air Force on June 30, 1970 (General Electric, 1974).

AEC operations at GE-Ohio during the Department of Energy (DOE) operations period from January 1, 1961 through June 30, 1970 included:

- testing fuel element materials and high-temperature reactor materials (Rice, 1966, p. 110);
- testing the effects of radiation on refractory metals and alloys (Rice, 1966, p. 110);
- examining radiation effects in beryllium oxide (Rice, 1966, p. 110);
- examining fission product transport processes in reactor fuels (Rice, 1966, p. 110);
- testing the effects on clad uranium-oxide fuels in meltdown environments (Rice, 1966, p. 110);
- developing a process for densification of thoria (Herries, 1966, p. 5); and
- calcination of thorium-oxide in high-temperature furnaces (Rennich, 1965, p. 53).

NIOSH has been unable to collect detailed data describing the processes or equipment associated with the operations listed above. A majority of the operations and monitoring data obtained by NIOSH are relevant only to the ANP Project years at GE-Ohio, prior to the covered period under evaluation in this report. NIOSH data capture efforts also failed to produce detailed source term information related to DOE/AEC operations at GE-Ohio during the 1961-through-1970 period. Review of the available data indicates the onsite existence of thorium and fission product residues (Karl, 1969). The potential for uranium and thorium exposures is also evidenced by the inclusion of elemental uranium, enriched uranium, and thorium in the GE-Ohio bioassay program through the 1960s (Boback, 1965; General Electric, 1964; General Electric, 1967).

4.2 Radiation Exposure Potential from Operations

The potential for internal and external radiation dose existed in Buildings C and D and surrounding support areas, including a fenced and locked outside radioactive waste storage area north of Building D. Based on the site operations outlined in Section 4.1, sources of exposure included uranium and fission product radionuclides from fuel and reactor component testing, and thorium from the calcination operations with thorium-oxide.

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 GE-Ohio is from 1961 through 1970. NIOSH has found no data to identify a specific start date in 1961, and therefore assumes January 1, 1961 for the start of DOE operations. NIOSH has found evidence that DOE/AEC operations ceased on June 30, 1970 when the facilities were returned to the Air Force (General Electric, 1974. Therefore, NIOSH assumes that the DOE operations period at GE-Ohio ended on June 30, 1970.

4.4 Site Locations Associated with Radiological Operations

Although Buildings C and D are specifically noted for the use of AEC-related radiological materials, documentation available to NIOSH does not indicate any definite boundaries between radiological and non-radiological areas for the period being evaluated. Given the lack of information to completely describe the source term and operations processes, especially in support areas outside of Building C

and D, NIOSH is unable to define individual worker exposure scenarios based on specific work locations within the GE-Ohio facility.

4.5 Job Descriptions Affected by Radiological Operations

Given the general lack of process knowledge, workplace surveys, or detailed source term information, it is not possible to determine that any specific work group was not potentially exposed to radioactive material during DOE operations at the GE-Ohio facility. NIOSH has found no documentation associating job titles and/or job assignments with specific radiological operations or conditions and is, therefore, 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

In addition to examining its Site Research Database (SRDB) to locate documents supporting the evaluation of the proposed class, NIOSH identified and reviewed numerous data sources to locate information relevant to determining the feasibility of dose reconstruction for the class of employees proposed for this petition. This included determining the availability of information on personnel monitoring, workplace monitoring, and radiological source term data.

NIOSH data capture efforts for GE-Ohio focused on the General Electric Co., the Ohio Department of Health, DOE (including OpenNet repository; and Office of Scientific and Technical Information [OSTI]), and the National Archives record centers. Attachment One contains a summary of GE-Ohio documents. The summary specifically identifies specific data capture details for each document retrieved.

5.2 Worker Interviews

To obtain additional information, NIOSH interviewed one former GE-Ohio employee on two different occasions.

- Personal Communication, 2008, *Personal Communication with Retired GE Evendale Health & Safety Manager*; Telephone Interview by ORAU Team; April 1, 2008; SRDB Ref ID: 43509

- Personal Communication, 2009, *Personal Communication with Retired GE Evendale Health & Safety Manager*; Telephone Interview by ORAU Team; August 18, 2009; SRDB Ref ID: 73138

5.3 Internal Personnel Monitoring Data

As of December 10, 2009, one of the 140 GE-Ohio claims referred to NIOSH for dose reconstruction has individual internal monitoring data available to NIOSH. NIOSH has found insufficient data to allow for the estimation of internal dose for unmonitored GE-Ohio energy employees. NIOSH has obtained GE-Ohio documents from DOE Legacy Management that contain uranium and thorium urinalysis results for 1965 through 1968 and 1970. The uranium and thorium urinalysis results are listed by sample number only (with no work identifiers), and NIOSH has determined that the data are insufficient for development of a coworker dose distribution. NIOSH has found no fission product bioassay monitoring data for GE-Ohio for the period being evaluated.

5.4 External Personnel Monitoring Data

As of December 10, 2009, 32 of the 127 GE-Ohio claims referred to NIOSH for dose reconstruction have individual external monitoring data available to NIOSH. Although some claimant files contain external monitoring data, NIOSH has found insufficient external data to allow for estimation of external dose for unmonitored GE-Ohio energy employees.

5.5 Workplace Monitoring Data

NIOSH has found insufficient workplace surface or air monitoring data to allow sufficiently accurate dose reconstruction in the absence of personnel internal or external monitoring data. A majority of the workplace monitoring data obtained by NIOSH pertains to the pre-1961 ANP project at GE-Ohio. NIOSH has also obtained U.S. Nuclear Regulatory Commission Decontamination Reports for the release of Buildings C and D in 1984 and 1986, respectively (General Electric, 1984; General Electric, 1986), but the data are insufficient to bound potential exposures in the diverse fuel production and laboratory environments during the 1961-1970 AEC period of operations.

5.6 Radiological Source Term Data

NIOSH has found insufficient source term information to allow sufficiently accurate dose reconstruction in the absence of personnel internal or external monitoring data. As with the workplace monitoring data in Section 5.5 of this report, a majority of source term data obtained by NIOSH pertains to periods outside the 1961-1970 AEC operations period being evaluated. NIOSH has obtained source term information for some specific projects or experiments during the period from January 1, 1961 through June 30, 1962, but lacks the specific information from which to identify the

operations with the highest exposure potential. Such information is required to enable NIOSH to bound potential exposures in the absence of personnel monitoring data.

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 coworkers 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 has identified insufficient personnel and workplace monitoring data from which to draw conclusions regarding the potential magnitude of any internal doses from exposure to uranium, thorium, or fission products at GE-Ohio for the entire DOE operations period. The uranium and thorium bioassay data available to NIOSH do not represent potential exposures during the entire period under evaluation and are insufficient to support development of an internal dose coworker distribution.

NIOSH has not identified sufficient documentation to define and quantify the total source term for GE-Ohio during the DOE operations period. Available documentation indicates that GE-Ohio worked with uranium, thorium, and fission product radionuclides throughout the entire DOE operations

period. Without additional documentation, NIOSH can make no assumptions about the relative amounts of these materials that would have been encountered at the site during the period from January 1, 1961 through June 30, 1970. Therefore, there is insufficient source term information available to NIOSH to bound internal exposures to uranium, thorium, and fission products for the period from January 1, 1961 through June 30, 1970.

NIOSH does not have access to sufficient personnel monitoring, workplace monitoring, or source term data to estimate potential internal exposures to uranium, thorium, or fission product radionuclides during the period of DOE operations at GE-Ohio from January 1, 1961, through June 30, 1970. Consequently, NIOSH finds that it is not feasible to estimate, with sufficient accuracy, internal exposures and resulting doses for the class of employees covered by this evaluation.

Although it is not possible to completely reconstruct internal radiation doses for the period from January 1, 1961 through June 30, 1970, 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 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 uranium, thorium, and fission product radionuclides could not be reconstructed for a dose reconstruction referred to NIOSH by the Department of Labor (DOL). As noted above, HHS 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.

External dosimetry data are scarce for the GE-Ohio energy employees for the period January 1, 1961 through June 30, 1970. Lacking information on the nature and extent of the radiological source term and monitoring practices at GE-Ohio, it is not feasible to fully reconstruct with sufficient accuracy the external doses that may have been received from potential external exposures during the operational period from January 1, 1961 through June 30, 1970.

Adequate reconstruction of medical dose for GE-Ohio workers is likely to be feasible by using claimant-favorable assumptions in the complex-wide Technical Information Bulletin, *Dose Reconstruction from Occupationally Related Diagnostic X-Ray Procedures* (ORAUT-OTIB-0006).

Although it is not possible to completely reconstruct external radiation doses for the period from January 1, 1961 through June 30, 1970, 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 who do not qualify for inclusion in the SEC may be performed using these data as appropriate.

6.3 Class Parameters Associated with Infeasibility

As presented in Section 4.3, NIOSH has found no data to identify a specific start date in 1961, and therefore assumes January 1, 1961 for the start of DOE operations. NIOSH has found evidence that DOE/AEC operations ceased on June 30, 1970, when the facilities were returned to the Air Force (General Electric, 1974). NIOSH therefore recommends that the class be defined within the period from January 1, 1961 through June 30, 1970.

As presented in Section 4.4, NIOSH is unable to define individual worker exposure scenarios based on specific work locations within the GE-Ohio facility. NIOSH therefore recommends that the class definition include all areas of the GE-Ohio facility during the specified time period.

As presented in Section 4.5, NIOSH has found insufficient documentation associating job titles and/or job assignments with specific radiological operations or conditions. Without such information, NIOSH is unable to define the proposed SEC class based on worker job descriptions. NIOSH therefore recommends that the proposed class definition include all employees of DOE, its predecessor agencies, and their contractors and subcontractors who worked at GE-Ohio during the specified time period.

7.0 Summary of Feasibility Findings for Petition SEC-00161

This report evaluates the feasibility for completing dose reconstructions for employees at GE-Ohio from January 1, 1961 through June 30, 1970. NIOSH determined that members of this class may have received radiation exposures from uranium, thorium, and fission product radionuclides. NIOSH lacks sufficient information, which includes biological monitoring data, sufficient air monitoring information, or sufficient process and radiological source information that would allow it to estimate the potential internal exposures to which the proposed class may have been exposed. Reconstruction of external dose for individuals for whom personal monitoring records are not available is also not feasible. NIOSH considers the adequate reconstruction of medical dose for GE-Ohio workers to be feasible.

NIOSH has documented herein that it cannot complete the dose reconstruction 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.

Although NIOSH found that it is not possible to completely reconstruct radiation doses for the proposed class, NIOSH intends to use any available 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 GE-Ohio during the period from January 1, 1961 through June 30, 1970, but 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-00161

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 uranium, thorium, and fission product radionuclides, as well as from direct exposure to radioactive materials. 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-00161

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 General Electric Company in Evendale, Ohio, from January 1, 1961 through June 30, 1970, 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.

10.0 Evaluation of Second Similar Class

In accordance with § 83.14(a), NIOSH may establish a second class of coworkers 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 are required. 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 a second similar class of employees at GE-Ohio for whom dose reconstruction may not be feasible.

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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; OCAS website

Boback, 1965, *Bio-Assay Department Monthly Report for November 1965,* correspondence to J. A. Quigley; M. W. Boback; December 7, 1965; SRDB Ref ID: 44783

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Murphy, 1988, *Confirmatory Radiological Survey of the Building D Laboratory Area General Electric Company, Evandale* [sic], *Ohio*, Final Report; G. L. Murphy and A. D. Luck; August 1988; SRDB Ref ID: 40240

ORAUT-OTIB-0006, *Dose Reconstruction from Occupationally Related Diagnostic X-Ray Procedures*, Rev. 03 PC-1; Oak Ridge Associated Universities (ORAU) Team Dose Reconstruction Project for NIOSH; December 21, 2005; SRDB Ref ID: 20220

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Personal Communication, 2009, *Personal Communication with Retired GE Evendale Health & Safety Manager*; Telephone Interview by ORAU Team; August 18, 2009; SRDB Ref ID: 73138

Rennich, 1965, Minutes of September 8, 1965 Thorium Operations Review and Planning Meeting, Memorandum to Files; George Rennich; September 21, 1965; SRDB Ref ID: 43017, pp. 48-55

Rice, 1966, *Summaries of Fuels and Materials Development Programs*, draft copy; William L. R. Rice; March 1966; SRDB Ref ID: 21847

Attachment 1: Data Capture Synopsis

Table A1-1: Summary of Holdings in the SRDB for General Electric Company (Ohio)			
Data Capture Information	**Data Capture Description**	**Completed**	**Uploaded into SRDB**
Primary Site/Company Name: General Electric-Evendale BE 1951-1970; AWE/DOE 1961-1970; Residual Radiation 1971-1994 Company contacts are Troy Ochs, IH, and Susanne Herald, Environmental Counsel Other Site Names: GE Evendale GE Cincinnati GE Lockland Air Force Plant 36	Radiation and contamination surveys, decontamination reports, air sample results, instrument calibration and performance records, and source calibration records.	07/06/2009	116
State Contacted: Ohio Department of Health, physical data capture conducted on 11/19 and 11/20/2007	State registrations and license, description of ANP work, reactor safety determination, and a site survey.	11/20/2007	26
Comprehensive Epidemiologic Data Resource (CEDR)	No relevant documents identified.	04/10/2008	0
Department of Energy (DOE)	AEC documents regarding the application of the AEC indemnity provision to the ANP Program.	06/19/2008	25
Department of Labor/Paragon	Uranium scrap evaluations, nuclear safety inspections, industrial hygiene inspections, process descriptions, and FUSRAP documentation and review.	12/30/2008	10
DOE EM FUSRAP Files	FUSRAP elimination recommendation, license applications, and a database report.	07/22/2003	2
DOE Hanford Declassified Document Retrieval System (DDRS)	Hanford monthly reports.	10/15/2008	6
DOE Headquarters, Germantown, MD	Thorium research and development, beryllium data, and safety recommendations.	07/22/2003	2
DOE Legacy Management Considered Sites	Tonawanda area progress report.	10/25/2007	1
DOE Legacy Management - MoundView (Fernald Holdings, includes Fernald Legal Database)	Health & Safety Division annual report, thorium process information, contamination survey of thorium handling equipment, laundering contaminated clothing, calcining thorium oxalate to thorium oxide for the FMPC Bettis Project, FUSRAP report, request for spectrographic analysis of thorium oxide, thoria powder progress reports, procurement documents, removal of equipment from GE, and accountability documents.	04/03/2008	78
DOE Office of Scientific and Technical Information (OSTI)	Summary hazards reports, tensile strength of irradiated material, parameters of beryllium moderated critical assemblies, and proceedings of a nuclear propulsion conference.	09/05/2008	5

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Data Capture Information	**Data Capture Description**	**Completed**	**Uploaded into SRDB**
DOE OpenNet	Human radiation studies oral history, AEC semiannual reports, and NYOO monthly status reports.	04/04/2008	7
DOE OSTI Energy Citations	No relevant documents identified.	04/12/2008	0
DOE OSTI Information Bridge	Fuels, materials, and reactor component reports and a radioactive waste evaluation.	04/12/2008	8
Federal Records Center, Chicago, IL	Plant air sampling records, film badge reports, exposure reports, urinalysis results, contamination surveys, nuclear safety records, and stack sampling results.	10/02/2008	67
Federal Records Center, Lee's Summit, MO	Film badge reports.	11/04/2008	1
Federal Records Center, San Bruno, CA	Summaries of high temperature reactor research programs.	01/31/2006	1
Google	Physics Division progress report, ORNL ceramics information meeting, DOD report on Air Force Plant 36, news report of toxic leak, health hazard evaluation reports, and reactor component research reports.	05/27/2008	17
Idaho National Engineering Laboratory Library	Report of heat transfer reactor experiment No. 3.	10/30/2006	1
Lawrence Berkeley National Laboratory	History of GE contract with LBNL.	02/06/2007	1
NARA - Atlanta	Annual health protection status report, neutron source transfer records, material transfer records, material transfers to ORNL, and ANP fuel and core experiment reports.	05/21/2008	22
NARA - Kansas City	Site decontamination history.	03/03/2005	1
National Academies Press (NAP)	No relevant documents identified.	04/13/2008	0
National Nuclear Security Administration (NNSA) - Nevada Site Office	No relevant documents identified.	04/10/2008	0
New York State Department of Environmental Conservation	Report on carbon reduction of uranium oxide.	02/25/2008	1
NOCTS	Organizational chart, job descriptions, process information, U-235 process information, shielding information, building 700 ventilation grievance, and radium chip exposure grievance.	07/10/2008	20
NRC Agencywide Document Access and Management (ADAMS)	No relevant documents identified.	04/13/2008	1
ORAU Team	Project spreadsheets and process knowledge expert documented communications.	04/01/2008	8
Robert Kispert, FMPC Process Knowledge Expert	History of FEMP thorium process operations.	03/28/2007	1
SAIC	Annual whole body exposure summaries.	09/02/2004	3
Savannah River Site	Dosimetry visitor cards.	08/26/2008	8
Southern Illinois University, Edwardsville, IL	GE waste disposed in the St. Louis area and an ERDA report citing need for obtaining GE dosimetric data.	10/18/2008	2

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Data Capture Information	**Data Capture Description**	**Completed**	**Uploaded into SRDB**
Unknown	Fernald area and Lockland trip reports, technical report on GE ANP Program, exposure information, beryllium reports, NYOO air dust survey, and material transfers from Fernald.	08/04/2003	10
Washington State University (U.S. Transuranium and Uranium Registries)	No relevant documents identified.	04/13/2008	0
Total			**451**