

## SEC Petition Evaluation Report Petition SEC-00099

Report Rev # 0

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<b>Petitioner Administrative Summary</b>			
<b>Petition Under Evaluation</b>			
Petition #	Petition Type	Petition A Receipt Date	DOE/AWE Facility Name
SEC-00099	83.14	October 9, 2007	Combustion Engineering

<b>Proposed Class Definition</b>
All AWE employees who were monitored, or should have been monitored, for exposure to ionizing radiation while working at the Combustion Engineering site in Windsor, Connecticut, for a number of work days aggregating at least 250 work days from January 1, 1965 through December 31, 1972, or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

<b>Related Petition Summary Information</b>			
SEC Petition Tracking #(s)	Petition Type	DOE/AWE Facility Name	Petition Status
None			

<b>Related Evaluation Report Information</b>	
Report Title	DOE/AWE Facility Name
None	

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## **Evaluation Report Summary: SEC-00099, Combustion Engineering**

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

The NIOSH-proposed class includes all Atomic Weapons Employer (AWE) employees who were monitored, or should have been monitored, for exposure to ionizing radiation while working at the Combustion Engineering site in Windsor, Connecticut, for a number of work days aggregating at least 250 work days from January 1, 1965 through December 31, 1972, or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

### Feasibility of Dose Reconstruction

Per EEOICPA and 42 C.F.R. § 83.14(b), NIOSH has established that it does not have sufficient information to complete dose reconstructions for individual members of the class with sufficient accuracy. NIOSH lacks sufficient dosimetry data, workplace monitoring data, and source term data, making reconstruction of total internal and external doses infeasible.

### Health Endangerment Determination

The NIOSH evaluation did not identify evidence supplied by the petitioners or from other sources that would establish 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 and direct exposure to 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-00099

### 1.0 Purpose and Scope

*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 Domal, MJW Corporation, Inc. These conclusions were peer-reviewed by the individuals listed on the cover page. The rationales for all conclusions in this document are explained in the associated text.*

This report evaluates the feasibility of reconstructing doses for employees who worked at a specific facility during a specified time. 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 the final decision concerning whether 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 the Department of Health and Human Services to 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.<sup>1</sup>

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. 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

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<sup>1</sup> 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>.

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 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.<sup>2</sup>

### **3.0 NIOSH-Proposed Class Definition and Petition Basis**

The NIOSH-proposed class includes all AWE employees who were monitored, or should have been monitored, for exposure to ionizing radiation while working at the Combustion Engineering site in Windsor, Connecticut, for a number of work days aggregating at least 250 work days from January 1, 1965 through December 31, 1972, or in combination with work days within the parameters established for one or more other classes of employees in the SEC. During this period, employees at this facility were involved with research activities, uranium processes, and shipments of uranium to the Fernald Site.

The evaluation responds to Petition SEC-00099, 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. This claimant was employed as a Test Project Engineer at the Combustion Engineering site from 1968 through 1972. 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 Combustion Engineering site from January 1, 1965 through December 31, 1972 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.

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<sup>2</sup> 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>.

## 4.1 Operations Description

Combustion Engineering (CE) sent shipments of uranium to Fernald between 1965 and 1972 for use in nuclear weapons production. It is because of these shipments that the CE site qualifies as an Atomic Weapons Employer for these years. The Fernald site was a uranium processing facility designed to provide high-purity uranium metal products in support of the nuclear weapons production program (ORAUT-TKBS-0017-1). No documentation describing the Combustion Engineering on-site operations related to uranium shipments to Fernald has been located.

In addition to the AWE work described above, Combustion Engineering has a history of non-weapons-related radiological activities. For example, during the 1950s and 1960s, the Combustion Engineering site was used for nuclear research, fabrication of nuclear fuel from highly-enriched uranium (HEU), and construction of naval reactor prototypes for the Atomic Energy Commission (AEC). Combustion Engineering performed HEU fuel fabrication (using 5% to 93% U-235) from 1955 through 1967. Since the 1960s, the facility has been licensed by the Nuclear Regulatory Commission (NRC) to fabricate low-enriched uranium assemblies for light-water moderated commercial power reactors, and to conduct research and development using light-water fuel.

## 4.2 Radiation Exposure Potential from Operations

The potential for internal and external radiation dose from uranium compounds existed at the Combustion Engineering site, based on weapons-related uranium shipments made between 1965 and 1972. NIOSH does not know either what activities were performed with uranium compounds or the processing involved in uranium shipping operations. NIOSH has located documentation regarding the Combustion Engineering shipments to Fernald, including dates, quantities, weight, and enrichment classification (NMMSS); however, NIOSH has no indication as to the completeness of the documentation. The earliest shipment date listed is December 1967; NIOSH has been unable to verify whether additional shipments of AEC-related uranium were or were not made from Combustion Engineering. The documentation available to NIOSH does not describe the work processes or exposure conditions associated with the Combustion Engineering handling of the AEC shipments.

Table 4-1 lists uranium shipments known by NIOSH to have been sent from Combustion Engineering to the Fernald Feed Center (NMMSS).

<b>Table 4-1: Uranium Shipments from Combustion Engineering to Fernald Feed Center</b>				
<b>Date</b>	<b>Material</b>	<b>Element Weight</b>	<b>Isotope Weight</b>	<b>Units</b>
12-31-67	DU	1	0	Kilograms
12-31-67	EU	60,075	1,033	Grams
07-23-69	EU	608,486	10,150	Grams
07-25-69	EU	127,142	2,536	Grams
10-03-69	EU	404,798	11,042	Grams
10-20-69	EU	397,418	10,676	Grams
12-01-69	EU	346,903	5,766	Grams
12-01-69	EU	36,729	769	Grams
12-01-69	EU	125,318	3,187	Grams
12-01-69	EU	88,462	2,831	Grams
12-04-69	EU	17,405	290	Grams
12-04-69	EU	34,799	1,111	Grams
12-11-69	EU	48,412	1,015	Grams
12-11-69	EU	219,683	5,572	Grams
12-29-69	EU	236,396	3,974	Grams
12-29-69	EU	93,321	2,372	Grams
12-29-69	EU	457,261	14,616	Grams
01-12-71	EU	40,479	820	Grams
01-17-71	EU	40,003	807	Grams
01-20-71	EU	35,892	723	Grams
01-20-71	EU	1,225	25	Grams
01-28-71	EU	28,029	570	Grams
10-28-71	EU	76,710	1,284	Grams

In addition to AWE work activities, many commercial operations were occurring simultaneously, including fuel fabrication and research. Indications are that, with the exception of one building, all of buildings used for AWE-related work were also used for commercial work (CE, 1991). During the covered period, radiological exposures from AWE related work and commercial activities must be included for dose reconstruction.

### **4.3 Time Period Associated with Radiological Operations**

Per the DOE Office of Health, Safety and Security, the time period associated with the uranium shipments from Combustion Engineering to the Fernald site is between 1965 and 1972 (<http://www.hss.energy.gov/healthsafety/fwsp/advocacy/faclist/findfacility.cfm>). This evaluation assumes the period of potential AWE radiological exposures to be the period from January 1, 1965 through December 31, 1972.

#### 4.4 Site Locations Associated with Radiological Operations

Locations on the Combustion Engineering site that are known to have been used for AWE work included Buildings 1-6, the Prototype Reactor, the Waste Storage Area, the Drum Burial Site, and the Creekbed (FUSRAP, 1994). Commercial nuclear work was also conducted in all of these areas, with the exception of Building 3 where fuel fabrication involving highly-enriched uranium was performed for the AEC. A Combustion Engineering site map is shown in Figure 4-1 (CE, 1996, pdf page 61). Table 4-2 summarizes the information available to NIOSH regarding AEC-related work locations and their operations (CE, 1991; CE, 1996; FUSRAP, 1994). There was on-going work being performed in other buildings from 1965 to 1972; however, Combustion Engineering did not seek FUSRAP designation for these buildings (CE, 1991). Therefore, NIOSH concludes that these buildings hosted non-AEC activities.

<b>Building Number/Facility</b>	<b>Activities</b>
1	AEC contract activities and commercial activities
2	AEC contract activities and commercial activities
3	Used exclusively for AEC fuel fabrication and enrichment
4	AEC contract activities and commercial activities
5	AEC fuel manufacturing, radioactive material storage, and commercial work
6	Liquid waste dilutions and pumping from Buildings 3 and 5
Waste Storage Area	Stored barrels and equipment from both AEC and non-AEC sources
Drum Burial Site (located next to Waste Storage area)	Onsite burial
Prototype Reactor Building	Developed and used for AEC projects; transferred in 1971 to GE (Knolls Atomic Power Lab)
Building 17	Commercial fuel fabrication (FUSRAP, 1994, pdf page 19)
All other buildings	Unknown commercial activities or administrative support

Because NIOSH lacks any information regarding on-site operations, NIOSH has no insight into Combustion Engineering control of radioactive materials being transported between work areas. Without such information, given the proximity of AWE and non-AWE work on site, and NIOSH's inability to rule out cross-contamination of work areas, NIOSH is unable to limit the SEC class based on work location within the Combustion Engineering site. Consequently, all Combustion Engineering areas are included in the proposed SEC class.

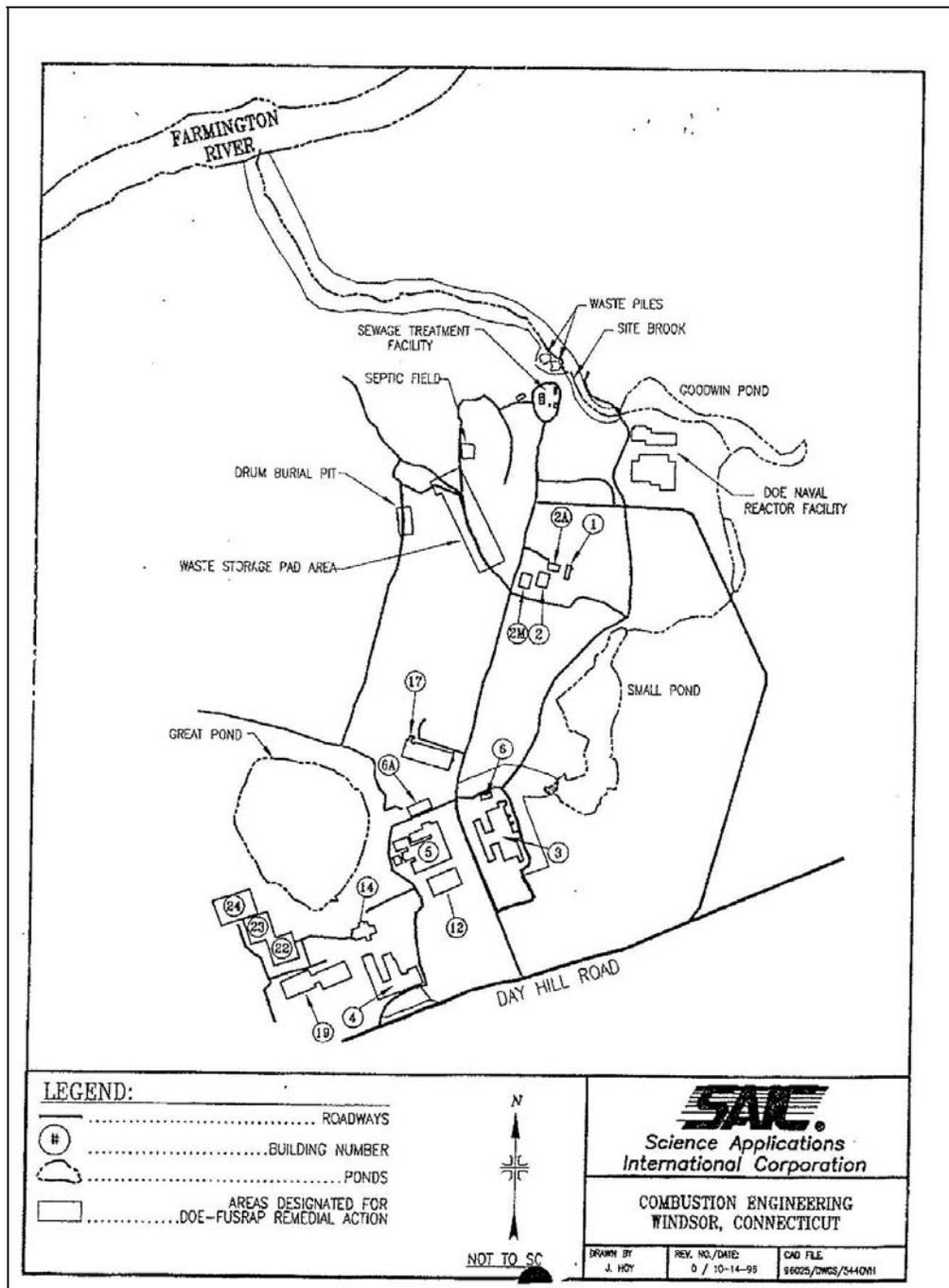


Figure 4-1: Combustion Engineering Site Map

## 4.5 Job Descriptions Affected by Radiological Operations

No documentation on the job descriptions or operations associated with uranium shipments to Fernald has been located. Due to the lack of information regarding worker job descriptions, and lack of knowledge concerning worker movements within the Combustion Engineering site, NIOSH is unable to rely solely on worker job descriptions to determine the potential for AWE radiological exposure.

## 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>.

NIOSH has searched the Site Research Database (SRDB), the claimant data stored in its NIOSH OCAS Claims Tracking System (NOCTS), and documents available on the Internet. NIOSH has also completed data capture efforts with the successor company, Asea Brown Boveri, and with both state and federal regulators. There are approximately 30 claimants in the NOCTS database who worked for Combustion Engineering during the 1965-72 timeframe. Of these claimants, only one had internal monitoring data for this time period, which consisted of two bioassay results. Four claimants had limited external dose records during this time period. The available bioassay results were for natural uranium and were less than the detection limits for urinalysis at the Fernald Site for this time period (ORAUT-TKBS-0017-5). The highest recorded external cumulative whole-body dose for a claimant for the period 1965-72 was approximately 5 rem.

There were no workplace monitoring records, area monitoring, or air sampling data found for the time period 1965-72. No documentation on the work activities or processes associated with the uranium shipments to Fernald has been located. Although other sites supplied uranium to the Fernald site, there is no way to determine if their work activities were similar to Combustion Engineering given the limited Combustion Engineering data currently available. Based on available information, NIOSH can make no reasonable assumptions regarding the possible source term during Combustion Engineering's AWE operational period.

## 5.1 Internal Personnel Monitoring Data

Only one of the approximately 30 NIOSH claimants has records of internal monitoring during the 1965 to 1972 time frame; these consist of two uranium urinalysis results. Three other claimants have bioassay records (lung counts or chest counts); however, none of their measurements are before 1982. Due to the lack of source term and material type information for pre-1973 Combustion Engineering AWE and commercial operations, and the lack of internal monitoring results for the majority of the claimants, it is not possible to use these four *in vivo* results to bound doses for all workers for the period 1965 through 1972.

NIOSH also attempted to locate other internal monitoring records, including fecal monitoring, breathing zone results, and nasal swabs, but none was found. NIOSH also could not locate any records describing urinalysis practices. One report (HASL, 1964) cited workplace monitoring practices in 1964 that consisted of general air sampling and breathing zone air sampling for groups of workers; however, NIOSH has located no air sampling results. Ventilation effluents were also sampled by Combustion Engineering. Average and high values were given in the 1964 report, but no individual data or sampling analysis descriptions were provided (HASL, 1964). No similar reports could be found for the time period 1965-1972.

## 5.2 External Personnel Monitoring Data

External monitoring data were found for four claimants for the period 1965 through 1972. None of the other 25 claimants had dosimetry records of any kind. Of the four with external dose records, two of the claimants had only summary data on an annual basis or longer, and two had monthly results. It appears that film badges were used. Records included whole-body, skin, and some neutron doses.

Area monitoring and radiological surveys were sought but not found. NIOSH was unable to locate any radiological incident or personnel contamination records.

## 5.3 Workplace Monitoring Data

No workplace monitoring records were found. Types of records that NIOSH sought include general air sampling, area air samples, area radiation monitoring, radiological surveys, and annual radiological reports. No such records were found for the time period 1965-1972.

## 5.4 Radiological Source Term Data

NIOSH has been unable to locate documentation on the work processes associated with the uranium shipments to Fernald, and has located only limited data on the materials involved in the shipments, as presented in Table 4-1. Some historical information pertaining to the non-weapons-related radiological work may be useful in describing both the types of activities that occurred during the time period under evaluation, and some of the known radionuclides. According to a 1999 FUSRAP Characterization Report, as many as 20 out of 100 Combustion Engineering contracts with the AEC from 1955 through 1965 specified the use of HEU and other special nuclear material (FUSRAP, 1999). A 1965 special nuclear materials license was located indicating the presence of U-235 at various levels of enrichment (License, 1965). A 1960 Quarterly Progress Report describes the

development and testing of homogeneous ceramic fuels (Quarterly, 1960). A 1967 memo describes the shipment of scrap depleted uranium (Request, 1967). The 1999 Characterization Report focused on three uranium isotopes of concern (U-234, U-235, and U-238), and also indicated the presence of Co-60, which may have been associated with Combustion Engineering research and development (FUSRAP, 1999).

Many projects took place at the Combustion Engineering site during the 1965-72 timeframe and for many years thereafter. However, given the limited data currently available, NIOSH can make no assumptions about quantities of particular isotopes or source materials that may have been used on site during the AWE operational period.

## **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**

As indicated in Section 5.0, NIOSH does not have access to sufficient personnel monitoring data, area monitoring data, or source term data to estimate internal exposures at Combustion Engineering for the period January 1, 1965 through December 31, 1972. The two available urinalysis results were for natural uranium. No information exists on the analytical methodology. There were no lung counts or fecal analyses results. Furthermore, neither the work activities nor the source terms are known. Therefore, it is not possible to determine which radionuclides employees should have been monitored

for, or the magnitude of any potentially unmonitored internal doses. It is also not possible to reasonably bound potential internal doses. Based on the lack of relevant data, NIOSH is unable to estimate with sufficient accuracy the potential internal exposures at the Combustion Engineering site during the period from January 1, 1965 through December 31, 1972.

## **6.2 Feasibility of Estimating External Exposures**

As indicated in Section 5.0, NIOSH does not have access to sufficient personnel monitoring data, area monitoring data, or source term data to estimate external occupational exposures at Combustion Engineering for the period January 1, 1965 through December 31, 1972. Of the approximately 30 claimants, four individuals had limited dosimetry records. Dose records results were given for shallow dose and deep dose. One neutron result was also given. No other external monitoring data could be found for any of the other employees. No information could be found regarding personnel monitoring practices, work activities, or possible source terms. No survey records or area monitoring data were available. It is not known which individuals should have been monitored, or the magnitude of their potentially-unmonitored external dose. Based on the lack of relevant data, NIOSH is unable to estimate with sufficient accuracy the potential total external exposures at the Combustion Engineering site during the period from January 1, 1965 through December 31, 1972.

NIOSH considers the adequate reconstruction of medical dose for Combustion Engineering likely to be feasible by using claimant-favorable assumptions as well as the applicable protocols in the complex-wide Technical Information Bulletin *Dose Reconstruction from Occupationally Related Diagnostic X-Ray Procedures* (ORAUT-OTIB-0006).

## **7.0 Summary of Feasibility Findings for Petition SEC-00099**

This report evaluates the feasibility for estimating the dose, with sufficient accuracy, for all AWE employees at the Combustion Engineering site from January 1, 1965 through December 31, 1972. NIOSH has determined that it lacks sufficient dosimetry data, workplace monitoring data, and source term data to reconstruct the total internal and external exposures at the facility during this time period. Consequently, NIOSH finds that it is not feasible to estimate with sufficient accuracy the radiation doses resulting from exposures received by members of this class of employees.

NIOSH has documented herein that it cannot complete the dose reconstruction related to this petition. The basis of this finding is specified in this report, which 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.

Members of this class at the Combustion Engineering site may have received internal and external radiation exposures from covered AEC work and commercial activities at the plant. This work would involve any AWE covered or commercial activities associated with uranium that was on site and subsequently shipped to Fernald and research involving radioactive material. NIOSH lacks sufficient information, which includes dosimetry data, workplace monitoring data, and source term data that would allow it to estimate the potential internal and external exposures to the proposed class.

Occupational medical exposures may be reasonably estimated by using claimant-favorable assumptions as well as the applicable protocols in the complex-wide Technical Information Bulletin *Dose Reconstruction from Occupationally Related Diagnostic X-Ray Procedures* (ORAUT-OTIB-0006).

## **8.0 Evaluation of Health Endangerment for Petition SEC-00099**

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(c) 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 radionuclides and 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-00099**

The evaluation defines a single class of employees for which NIOSH cannot estimate radiation doses with sufficient accuracy. This class includes all AWE employees who were monitored, or should have been monitored, for exposure to ionizing radiation while working at the Combustion Engineering site in Windsor, Connecticut, for a number of work days aggregating at least 250 work days from January 1, 1965 through December 31, 1972, or in combination with work days within the parameters established for one or more other classes of employees in the SEC.

## **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, but for whom additional research and analyses are required. Such a class would be addressed in a separate SEC evaluation, so as not to delay consideration of the current claim. At this time, NIOSH has not identified a second similar class of employees at the Combustion Engineering site for whom dose reconstruction may not be feasible.

## 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 22296; 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

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