SEC Petition Evaluation Report
Petition SEC-00100

Report Rev #: 0 Report Submittal Date: February 19, 2008

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Site Expert(s):	N/A

Petitioner Administrative Summary			
Petition Under Evaluation			
Petition #	Petition Type	Petition A Receipt Date	DOE/AWE Facility Name
SEC-00100	83.14	October 22, 2007	Kellex/Pierpont

Proposed Class Definition
All AWE employees who worked at the Kellex/Pierpont facility in Jersey City, New Jersey from January 1, 1943 through December 31, 1953, 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 SEC.

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
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Evaluation Report Summary: SEC-00100, Kellex/Pierpont

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 worked at the Kellex/Pierpont facility in Jersey City, New Jersey from January 1, 1943 through December 31, 1953, 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 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 personal internal exposure monitoring, area monitoring, and source term data, making reconstruction of total internal radiation 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 received radiation exposures through intakes of various radionuclides and from 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-00100

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: Monica Harrison-Maples, ORAU. 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 Kellex/Pierpont, located in Jersey City, New Jersey, 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 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 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.[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

[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.

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 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 AWE employees who worked at the Kellex/Pierpont facility in Jersey City, New Jersey from January 1, 1943 through December 31, 1953, 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 SEC. During this period, employees at this facility were involved in the design and construction of the first gaseous diffusion uranium enrichment facility, basic research and development related to fuel reprocessing, component testing, and the development of barrier technology for gaseous diffusion. Through such work, employees may have been exposed to various forms of uranium, various transuranics radionuclides, and fission and activation products associated with fuel reprocessing research.

The evaluation responds to the Petition designated SEC-00100, 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 at Kellex/Pierpont from September 1943 through January 1946. 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 Kellex/Pierpont from January 1, 1943 to December 31, 1953 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.

Data capture efforts for Kellex/Pierpont have included a visit to the DOE Germantown Office and multiple visits to the National Archive and Records Administration (NARA) facilities in Atlanta, Georgia and Kansas City, Missouri. NIOSH has also queried the Fernald Legal Database, the OpenNet database, the Nuclear Regulatory Commission (NRC) Agency-wide Documents Access and Management System (ADAMS) database, and the Office of Scientific & Technical Information

[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.

(OSTI) database in an effort to locate relevant records. Additionally, inquiries were made to the state of New Jersey. Kellex, the company that operated Kellex/Pierpont, no longer exists and could not be contacted to request any records. All records relevant to the Kellex/Pierpont petition have been uploaded into the NIOSH Site Research Database (SRDB).

4.1 Operations Description

In 1943, the M.W. Kellogg Company established the Kellex Corporation to design and construct the first gaseous diffusion uranium enrichment facility, the K-25 Plant, in Oak Ridge, Tennessee. This work was conducted under contract to the Manhattan Engineer District (MED) and later to the Atomic Energy Commission (AEC). The project contract initially called for designing, engineering, and assisting with the construction of the K-25 Plant. The Kellex/Pierpont facility was originally operated by the Kellex Corporation (later known as Vitro Corporation) for the AEC.

In support of the K-25 effort, pilot plant activities were carried out at the Kellex/Pierpont facility on Danforth Avenue in Jersey City. The Kellex/Pierpont facility consisted of 43 acres, with approximately 20 buildings across the property. In 1947, the contract with Kellex was modified to include research and development of a solvent extraction process to recover uranium from reactor wastes stored at the Hanford Nuclear Reservation in Richland, Washington. These solvent extraction operations spanned from June 1, 1947 through July 7, 1948.

On January 31, 1950, the AEC also contracted with Kellex for research and development of new solvent processing techniques for the purification of uranium and the recovery of any other valuable components (i.e., radium) from low-grade wastes. The basic refinery process work ended in July 1951. Contract documentation located by NIOSH indicates radiological work at Kellex/Pierpont ended in 1952 (Kellex, date unknown; ORNL, date unknown), but radiological monitoring continued into 1953. Building 11, the Kellex Laboratory building, was demolished in 1953 (Author unknown, 1979; ORNL-DWG-77-12105).

NIOSH has been able to locate only a very limited amount of documentation regarding the specific research activities and materials used at Kellex/Pierpont. The documentation located by NIOSH states that radiological work at Kellex/Pierpont occurred in Building 11, also known as the Kellex Laboratory (Author unknown, 1979; ORNL-DWG-77-12105; Kaye, 1979), but does not provide information regarding radiological work or storage at other locations on the Kellex/Pierpont site. The documents mention a fenced-in waste disposal area that was used to store two drums of uranium ore (Piccot, 1950); however, the documents do not provide the location of the disposal area, which may have been outdoors.

The primary mission of the Kellex/Pierpont facility was to develop barrier technology for gaseous diffusion. Kellex/Pierpont also conducted basic research and development on fuel reprocessing and component testing using uranium hexafluoride; this indicated that bench quantities of materials other than uranium were present. The presence of fission products in the Kellex/Pierpont laboratories is supported by the *Guide to Special Chemicals Handling* (undated, but post-1955), which references procedures for removing fission products and provides permissible levels for radioactive substances in air (Author unknown, date unknown). A material inventory included in the Health Physics report for December 1950 (Bain, 1950) from Kellex/Pierpont to the AEC confirms the onsite presence of

radioactive materials including: radium, carbon-14, chlorine-36, nickel-59, cesium-137, strontium-90, and thallium-204, and uranium materials such as K-65 residue.

4.2 Radiation Exposure Potential from Operations

The potential for external radiation dose existed at all locations where radioactive materials were handled or stored. Based on the site operations described in Section 4.1, sources of exposure included alpha, beta, photon, and neutron radiation emitted from materials containing uranium, transuranics, fission products, and other radionuclides used in materials research.

The potential for internal radiation exposure existed at Building 11, where materials were handled in the laboratories for research purposes. These laboratories were monitored, by routine smear surveys and air monitoring, suggesting a potential inhalation and ingestion pathway. Section 5.3 includes additional detail regarding workplace monitoring documentation. There also appears to have been a waste storage area at the site. NIOSH is unable to rule out the transport of radioactive materials across the site, and possible contamination spread beyond the Kellex Laboratory building (Building 11), given the limited documentation of facility and site operations available to NIOSH.

4.3 Time Period Associated with Radiological Operations

Per the DOE Office of Health, Safety and Security, the time period associated with AWE operations at the Kellex/Pierpont site is from 1943 through 1953 (DOE, 2007). NIOSH has been unable to locate information to support a more specific determination of start and end dates for radiological AWE work at Kellex/Pierpont. As stated in section 4.1, the Kellex Corporation was established for AEC work in 1943 and all information indicates that AEC work did not proceed beyond 1953. This evaluation therefore assumes the period of potential AWE radiological exposures at Kellex/Pierpont to be the period from January 1, 1943 through December 31, 1953.

4.4 Site Locations Associated with Radiological Operations

The Kellex/Pierpont site consisted of approximately 43 acres with approximately 20 buildings onsite. As described in Section 4.1, Building 11, also known as the Kellex Laboratory, is the only referenced location of radiological work at Kellex/Pierpont (Author unknown, 1979; ORNL-DWG-77-12105). Building 11 contained labs, offices, weighing facilities, change rooms, and a shielded counting room (ORNL-DWG-77-12105). NIOSH is unable to determine if any other locations were associated with the radiological research operations conducted at Kellex/Pierpont. NIOSH has not found information that either details or restricts the use of radionuclides in the other 19 buildings located at Kellex/Pierpont. While NIOSH does have access to information indicating that radionuclides other than uranium nuclides were used in research in the Kellex Laboratory building (see Section 4.1), NIOSH does not have information regarding the receipt, transport, or storage of these materials. NIOSH also lacks adequate data to determine if exposures to particular radionuclides were limited to any specific areas. Without such information, NIOSH is unable to limit the SEC class based on work location within the Kellex/Pierpont site. Consequently, all Kellex/Pierpont areas are included in the proposed SEC class.

4.5 Job Descriptions Affected by Radiological Operations

Very little is known about job titles, job descriptions, and/or job assignments related to radiological operations and research at Kellex/Pierpont. Film badge reports for the late 1940s and early 1950s (see Section 5.2) include the following job titles: chemists, technicians, porters, health physicists, stock room managers, physicists, chemical engineers, engineers, machinists, service managers, and receiving department. NIOSH has minimal documentation regarding which job titles and/or job assignments were associated with specific radiological operations or work locations at Kellex/Pierpont. Without additional information that links known worker job descriptions with specific work locations, it is not feasible to narrow listed job descriptions to only those workers with potential exposures to AWE radiological operations. Therefore, it is not possible to determine that any work group was not potentially exposed to the AEC-related exposures defined in this report, nor is it possible to use job descriptions to define the proposed SEC class.

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.

As stated in Section 4.0 above, data capture efforts for Kellex/Pierpont have included visits to DOE offices and the NARA facilities. In its search for monitoring data, NIOSH has also queried various DOE and NRC databases to locate relevant records. Inquiries were made to the state of New Jersey as well. Kellex, the company that operated Kellex/Pierpont, no longer exists and could not be contacted to request any records.

5.1 Internal Personnel Monitoring Data

As of January 7, 2008, there are four Kellex/Pierpont claimants in the NIOSH claimant tracking system. None of the NIOSH claimant files have internal exposure monitoring records associated with employment at Kellex/Pierpont. There are indications that urinalysis was performed on a limited

basis on the Kellex/Pierpont site, but NIOSH has located only 25 fluorimetric uranium urinalysis results, for a few individuals (Kellex, 1950-1951; Kellex, May 10, 1951-June 28, 1951). These urinalysis results were reported in mg/L of uranium. None of the four claimants in NIOSH's database is included in these urinalysis reports.

NIOSH has located the results of two breath samples, for one individual sampled in July 1951. The samples were analyzed for radon and the results were reported in pci/L.

The existence of a bioassay monitoring program at Kellex/Pierpont, as indicated by urinalysis results from 1944 and 1951, suggests that Kellex believed that there was a potential for occupational intake of radioactive materials. NIOSH has not identified *in vivo* counting, fecal monitoring, or other bioassay monitoring results for Kellex/Pierpont, other than the urine results indicated above.

5.2 External Personnel Monitoring Data

NIOSH has located film badge reports for 1948 through 1953 (Kellex, 1951; Kellex, 1952; Kellex, February 1950-January 1951; Kellex, May 1951-January 1952; Kellex, November 1948-December 1949; Kellex, January 1952-August 1953). These reports indicate the last name of the employee and any result greater than the minimum detection level of 50 mrep beta/gamma with a weekly exchange frequency. The reports document film badge results for approximately 20 individuals in 1948 and up to a maximum of 38 individuals in 1950 and 1951. The results include 75 beta results greater than 50 mrep, and 135 gamma results greater than 50 mrep for the five years of weekly exchanges (approximately 7,000 results total). The highest result found by NIOSH is for March 1950, for a researcher who received 270 mrep beta and 400 mrep gamma. The majority of the results were less than 50 mrep beta and gamma.

NIOSH has identified one of the four claimants in the NIOSH claimant tracking system as having external monitoring data included in the Kellex/Pierpont film badge reports. These claimant data are film badge results for 1950 and 1953 (Kellex, January 1952-August 1953). The other three NIOSH claimants have work histories at Kellex/Pierpont that end before the earliest film badge report available to NIOSH.

5.3 Workplace Monitoring Data

Health Physics reports refer to routine laboratory contamination surveys and air monitoring performed in the laboratories. NIOSH has found only summary results for these workplace monitoring efforts. These summaries provide results for "positive" smear readings, but no detailed isotopic data are provided. A representative example of the entries in the summary reports states "one of twenty smears yielded a positive result (200 B d/m off chemical bench)" (Mezzina, 1951). The summaries generally provide a rough location and a range of contamination levels found. The area radiation level survey results are given in units of mrep/hour. Frequently, the summary also includes a description of some determination as to the source of the radiation detected by the lab survey, such as "…caused by a spill of purex type activity onto diaper paper." The survey results generally were less than 75 mrep/hour.

No air monitoring data prior to 1950 have been located. Of 149 air sample results from 1951 forward, approximately 70% indicated that the analyte was radon (Lazur, 1951; Kellex, 1950-1951; Kellex,

October 1950-August 1951; Kellex, October –December 1950; Kellex, December 1950). While no information is given specifying the analyte(s) for the other 30% of the air samples, the Health Physics Survey reports indicate all air samples may have been for radon (Mezzina, 1951; Rezzia, 1951).

5.4 Radiological Source Term Data

While the Health Physics reports provide some indication of what radiological materials may have been at Kellex/Pierpont, these summaries are not comprehensive. NIOSH has been unable to locate substantial quantitative information about the radiological materials used in the research and development work at Kellex/Pierpont.

The original mission of the Kellex/Pierpont facility, the development of barrier technology for gaseous diffusion enrichment of uranium, involved research using uranium and uranium-bearing ores. NIOSH has not been able to quantify the uranium source term at Kellex/Pierpont, but the barrier work would have involved various forms of uranium in different degrees of enrichment as the primary source term at Kellex/Pierpont.

Kellex/Pierpont was also involved in research and development associated with the reprocessing of uranium sludge from the Hanford reactors (Miller, unknown date; Author unknown, 1978). This work would involve the handling of fission products and other reactor source term constituents. Wastes collected from the labs at Kellex/Pierpont included liquids referenced as containing millicurie quantities of “purex-type activity” (Mezzina, 1951; Rezzia, 1951). The PUREX (plutonium-uranium extraction) process experimented with at Kellex/Pierpont is undefined in the site documentation found by NIOSH, but the PUREX process at Hanford is known to involve transuranic, uranium, and fission product radionuclides.

Several documents examined by NIOSH indicate a site concern with handling and storing uranium and radium bearing Congolese ores (Various authors, 1950; Piccot, 1950). The associated radon and thoron exposures associated with such sources would have been of significance to the estimation of internal doses. NIOSH considers it unlikely that the experimental nature of the work by Kellex would support any assumptions regarding a long-term steady-state inventory of radiological materials, such as would be found at a production facility.

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, NIOSH has access to limited internal monitoring data. The twenty-five uranium urinalysis results and two radon breath sample results located do not provide enough information (e.g., processes involved and location), nor do they span enough of the time period to ensure the exposure model would be bounding. In addition, no *in vivo* counting, fecal monitoring, or other bioassay monitoring results have been located. The available data are insufficient to support conclusions regarding the potential magnitude of any internal dose. Without more internal monitoring data and better information to characterize the monitoring data quality, the bioassay data available are inadequate to estimate, with sufficient accuracy, the potential internal exposure to the many potential sources of internal exposures associated with the research conducted by Kellex/Pierpont. Consequently, NIOSH is unable to estimate internal exposures based on available bioassay data.

As indicated in Section 5, NIOSH has access to limited workplace monitoring and source term information. NIOSH has laboratory survey summary information with gross alpha beta and gamma readings but no isotopic analyses, only references to fission products, uranium, and purex-type wastes. Air sampling reports for 1950 and 1951 are available, but samples were analyzed only for radon. The available data indicate a potential for internal exposure to uranium, ores, byproducts, fission products and transuranic radionuclides. NIOSH lacks source term and process information relevant to the research conducted at the Kellex/Pierpont laboratories. As indicated in section 4.2, NIOSH is unable to define the probable transport procedures for radioactive materials across the site or the possible contamination spread beyond the Kellex Laboratory building (Building 11); therefore NIOSH is unable to define the SEC class based on work location within the Kellex/Pierpont site. NIOSH lacks sufficient source term, personal air monitoring, and programmatic information for Kellex/Pierpont to develop an exposure matrix using the limited workplace air monitoring and contamination survey data that have been located. Thus, NIOSH finds that it is not feasible, in the absence of bioassay data, to adequately estimate internal exposures using workplace monitoring data.

Based on the lack of sufficient relevant bioassay, workplace, and source term data, NIOSH is unable to reconstruct with sufficient accuracy the potential total internal doses that may have been received from potential exposures to radionuclides at the Kellex/Pierpont site during the covered operational period from January 1, 1943 through December 31, 1953.

6.2 Feasibility of Estimating External Exposures

This evaluation responds to a petition based on NIOSH determining that internal radiation exposures 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 evaluate the feasibility of reconstructing external radiation exposures in this case.

External monitoring data available to NIOSH suggest that workers were potentially exposed to beta and photon radiation during the course of employment at Kellex/Pierpont from January 1, 1943 through December 31, 1953. While NIOSH is unaware of any documentation regarding the methods used for monitoring, or the quality control procedures used to audit the results, it may be possible to estimate the external dose for the periods of operation for which film badge reports are available. Given the lack of more specific documentation on the processes and source term data, it is not feasible to reconstruct with sufficient accuracy the external doses that may have been received from potential exposure to radionuclides during periods for which monitoring results are not available at Kellex/Pierpont.

NIOSH considers the adequate reconstruction of medical dose for Kellex/Pierpont 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-00100

This report evaluated the feasibility for estimating the dose, with sufficient accuracy, for all AWE employees at the Kellex/Pierpont site from January 1, 1943 through December 31, 1953. NIOSH determined that it lacks the necessary bioassay data, personal air monitoring data, source term data, and process information to reconstruct the total internal 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 internal radionuclide 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 Kellex/Pierpont may have received alpha, beta, photon, or neutron exposures from multiple radionuclides used as part of the research conducted at the Kellex/Pierpont facility. NIOSH lacks sufficient information, which includes biological monitoring data, sufficient air monitoring information, process information, and radiological source term information to allow NIOSH to estimate the potential internal radiological exposure(s) to which the proposed class may

have been exposed. NIOSH may be able to estimate external dose for the periods of operation for which film badge monitoring data are available.

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-00100

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 not obtained evidence from any source that indicates that members of the class were 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-00100

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 worked at the Kellex/Pierpont facility in Jersey City, New Jersey from January 1, 1943 through December 31, 1953, 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 SEC.

10.0 Evaluation of Second 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 a second similar class of employees at Kellex/Pierpont for whom dose reconstruction may not be feasible.

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11.0 References

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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

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