SEC Petition Evaluation Report
Supplement to Petition SEC-00028

Report Rev # 0 Report Submittal Date: 6-9-2006

Subject Expert(s):	N/A
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Independent Technical Reviewer:	N/A

Petition Administrative Summary

Petition Under Evaluation

Petition #	Petition Type	Qualification Date	DOE/AWE Facility Name
SEC-00028	83.13	April 29, 2005	Y-12 Plant

Feasible to Estimate Doses with Sufficient Accuracy?

Single Class				Multiple Classes				Determination Established for All Classes			
Yes		No	X	Yes		No	X	Yes	X	No	

Petitioner Class Definition

All Steamfitters, Pipefitters, and Plumbers who worked at Y-12 from October 1944 through December 1957.

Proposed Class Definition

Employees of the DOE or DOE contractors or subcontractors who were monitored or should have been monitored for:

1) thorium exposures while working in Building 9201-3, 9202, 9204-1, 9204-3, 9206, or 9212 at Y-12 for a number of work days aggregating at least 250 work days during the period from January 1948 through December 1957 or in combination with work days within the parameters established for one or more other classes of employees in the SEC; or
2) radionuclide exposures associated with cyclotron operations in building 9201-2 for a number of work days aggregating at least 250 work days during the period from January 1948 through December 1957 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
SEC-00018	83.13	Y-12 Plant	Designation Completed
SEC-00026	83.13	Y-12 Plant	Designation Completed

Related Evaluation Report Information

Report Title	DOE/AWE Facility Name
SEC Petition Evaluation Report SEC-00018	Y-12 Plant

Completed By:	Signature on file *Lavon Rutherford*	June 8, 2006 *Date*
Reviewed By:	Signature on file *Jim Neton*	June 8, 2006 *Date*
Approved By:	Signature on file *Larry Elliott*	June 8, 2006 *Date*

Supplement to Y-12 SEC Petition Evaluation Reports
SEC-00028
June 9, 2006

Discussion of Issues Related to the Advisory Board on Radiation and Worker Health's (ABRWH) Review of the Y-12 Evaluation Report

Introduction

During the May 18, 2006 meeting of the ABRWH Y-12 Working Group, discussions were held on two SEC issues that NIOSH believed warranted further evaluation. This supplement to the evaluation report for petition SEC-00028 identifies the issues raised at this meeting and provides an evaluation of the effect these issues have on the proposed class designation.

Issue 1

A thorough review of the (thorium) material balance ledgers at the Y-12 facility for all applicable years needs to be completed and a determination made if the thorium in these buildings and areas created an exposure hazard that can not be bounded using existing process knowledge.

As an accountable nuclear material, the receipt and movement of thorium at the Y-12 facility was closely monitored by site personnel. The quantities of thorium present on site at any given time were tracked in documents called mass balance ledgers which assigned each movement a unique account number. To evaluate the potential locations where thorium exposure may have been a concern at Y-12, the mass balance ledgers covering the years 1949 through 1957 were examined.

Table 1 provides a listing of the additional accounts found that are not associated with the buildings currently proposed in the class definition for SEC-00028. The account numbers listed are provided for identification purposes only and are not the account numbers assigned in the ledgers. The first six of these accounts can be directly tied to four buildings (9201-3, 9203, 9213, and 9995); while the remaining two account are not building specific. Account 7, with a location/activity description of the "control" account, was a master list of the total site thorium inventory at any given time. As such, it is not associated with production activities at the site. Account 8 records the disposal of a small quantity of thorium in a waste pit and is also not associated with production activities.

Of the six accounts tied to buildings, the only ones with quantities of thorium of sufficient magnitude to be considered production operations are the three accounts associated with activities in Building 9201-3 While NIOSH is unaware of the nature of these activities, the titles of the account numbers seem to indicate experimentation related to reactor technology. The quantities of thorium present during the SEC period were of sufficient magnitude to generate significant amounts of airborne activity. As there are no air sampling or bioassay data to reconstruct doses for these activities, NIOSH does not believe that plausible upper bounds can be placed on the internal doses for these workers.

NIOSH did not, however, identify evidence that would establish that workers in Building 9201-3 were exposed to radiation during discrete incidents likely to have involved exceptionally high levels of exposure. Consequently, NIOSH has determined that health was endangered for those workers

covered by this evaluation who were employed for at least 250 aggregated work days either solely under the employment or in combination with work days within the parameters established for other SEC classes (excluding aggregate work day requirements). Based on the above analysis, NIOSH amends the original proposed class definition to include workers in Building 9201-3.

The account numbers associated with the remaining three buildings (9203, 9213 and 9995) had small quantities of thorium that do not appear to be related to production activities. The quantities were discrete amounts that most likely were related to the production of calibration sources and solutions. Since these are small discrete quantities of thorium, NIOSH believes that internal exposures can be bounded using source term information combined with the airborne dispersion factors described in NUREG-1400.[1] As a consistency check, these bounded values could be compared with the exposures estimated from the air sampling and bioassay data that were collected during thorium production operations starting in 1959. Because NIOSH believes that plausible upper bound internal doses can be established for exposure to this source term, we do not propose to add workers in these buildings to the class definition.

Issue 2

There is insufficient bioassay or air sampling data in the available Y-12 databases to allow for the reconstruction of internal exposures to cyclotron workers. In light of the fact that NIOSH has been unable to locate incident reports for cyclotron workers during the SEC period, a determination needs to be made if internal doses for these workers can be reconstructed with sufficient accuracy.

Because NIOSH could not locate sufficient bioassay or air monitoring data to evaluate internal exposures at the 86 inch cyclotron, the approach to reconstructing internal doses at this facility relied on the capture and review of a number of incident related documents from the Y-12 Delta View database. It was believed that, among the 800,000 plus pages of archived images in Delta View, there were a large number of reports that contained detailed descriptions of internal exposure related incidents. This belief was, to a large extent, based on the review of several cyclotron incident reports that were discovered in Department of Energy responses to NIOSH requests for claimant exposure information. After discussion with Y-12 records personnel, it was discovered that claimant specific incident reports of this type were automatically provided with NIOSH's request for exposure information. A key word search of the Delta View database indicated the existence of approximately 800 potentially incident related documents. Based on this, it was NIOSH's belief that the Delta View database had a large collection of incident related data that could be used in dose reconstructions.

Subsequent to the release of the Y-12 evaluation report on April 7, 2006, NIOSH conducted a thorough review of the incident related reports in the Delta View database and has not been able to locate any documents that would be useful in reconstructing internal exposures to workers at the 86 inch cyclotron located in Building 9201-2. Although it is believed that these documents might exist at other storage locations within the Oak Ridge complex, NIOSH does not have any firm evidence that would help locate the records at this time. Because NIOSH is unable at this time to identify any

[1] NUREG-1400, Air Sampling in the Workplace, U.S. Nuclear Regulatory Commission, Office of Regulatory Research, Washington, DC (1993).

documentation that would support the reconstruction of internal doses to cyclotron workers, NIOSH is amending the class definition to include cyclotron workers in building 9201-2 from January 1948 through December 1957.

NIOSH did not identify any evidence that cyclotron workers were internally exposed to radioactive materials during discrete incidents likely to have involved exceptionally high levels of exposure. However, there is evidence that some workers in the proposed class may have accumulated substantial chronic exposures through episodic intakes of a variety of radionuclides that were produced during the operating period of the cyclotron. Consequently, NIOSH has determined that health was endangered for those cyclotron workers covered by this evaluation who were employed for at least 250 aggregated work days either solely under the employment or in combination with work days within the parameters established for other SEC classes (excluding aggregate work day requirements).

Table 1
Summary of Thorium Quantities Present at Y-12 from 1949-1957
Not Included in the Proposed Class Definition
(as noted in Ledgers)

Building	Account #	Location / Activity Description	Quantity or Min - Max Range
9201-3	1	ORNL Reactor Tech Division	Up to thousands of kg
	2	Aircraft Reactor Experiment	
	3	Control, "SF Control Dept"	
9203	4	Assay Lab.	<<1 kg
9213	5	"Prod Exp"	<<1 kg
9995	6	Analytical Lab.	<1 kg
No Building Identified	7	Control	Up to thousands of kg
"	8	"Discarded salvage sent to S-2 Pit"	<<1kg