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Technical Basis for PNNL Beryllium Inventory

July 2014

ML Johnson

U.S. DEPARTMENT OF ENERGY

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Pacific Northwest National Laboratory
Richland, Washington 99352

Summary

The Department of Energy (DOE) issued Title 10 of the Code of Federal Regulations Part 850, "Chronic Beryllium Disease Prevention Program" (the Beryllium Rule) in 1999 and required full compliance by no later than January 7, 2002. The Beryllium Rule requires the development of a baseline beryllium inventory of the locations of beryllium operations and other locations of potential beryllium contamination at DOE facilities. The baseline beryllium inventory is also required to identify workers exposed or potentially exposed to beryllium at those locations. Prior to DOE issuing 10 CFR 850, Pacific Northwest Nuclear Laboratory (PNNL) had documented the beryllium characterization and worker exposure potential for multiple facilities in compliance with DOE's 1997 Notice 440.1, "Interim Chronic Beryllium Disease." After DOE's issuance of 10 CFR 850, PNNL developed an implementation plan to be compliant by 2002.

In 2014, an internal self-assessment (ITS #E-00748) of PNNL's Chronic Beryllium Disease Prevention Program (CBDPP) identified several deficiencies. One deficiency is that the technical basis for establishing the baseline beryllium inventory when the Beryllium Rule was implemented was either not documented or not retrievable. In addition, the beryllium inventory itself had not been adequately documented and maintained since PNNL established its own CBDPP, separate from Hanford Site's program. This document reconstructs PNNL's baseline beryllium inventory as it would have existed when it achieved compliance with the Beryllium Rule in 2001 and provides the technical basis for the baseline beryllium inventory.

Acknowledgments

Preparation of this report required access to extensive sets of historical records, many of which pre-dated electronic records systems. Several individuals were instrumental in locating these records and assisting in their interpretation. Kathy Ertell and Abby Nicholson, PNNL, had many of the records in their personal files. Danny Wharton provided a copy from his personal files of one of the most elusive references, the Stone and Webster report. Lois Pedersen obtained numerous boxes of records from Records Storage in an effort to locate historical sampling plans and analysis reports.

Silvette Boyajian and Robert Gilmore, Missions Support Alliance (MSA), were generous in their efforts to locate historical documents in the MSA archives. Completion of this report would not have been possible without guidance from Cindy Caldwell who provided extensive background on the development and management of PNNL's Chronic Beryllium Disease Prevention Program.

Lastly, a special thank you goes to Susan Ennor who assembled the many pieces of this puzzle into a coherent report.

Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
AIHA	American Industrial Hygiene Association
CBDPP	Chronic Beryllium Disease Prevention Program
cm^2	square centimeter(s)
CFR	Code of Federal Regulations
BRSW	Battelle Receiving and Shipping Warehouse (aka 6th Street Warehouse)
DOE	Department of Energy
EDL	Engineering Development Laboratory
µg	microgram(s)
HFBFS	Hanford Facility Beryllium Fact Sheet
ICP/AES	inductively coupled plasma atomic emission spectroscopy
ICP/MS	inductively coupled plasma/mass spectroscopy
LSLA	Life Science Laboratory Annex
MSA	Mission Support Alliance
MSL	Marine Sciences Laboratory
PDL-E	Process Development Laboratory East
PHMC	Project Hanford Management Contractor
PNNL	Pacific Northwest National Laboratory
PSL	Physical Science Laboratory
RDL	Reporting Detection Limit
RL	Richland Operations Office
RTL	Research Technology Laboratory
UW	University of Washington
WHC	Westinghouse Hanford Company
WSCF	Waste Sampling and Characterization Facility (Hanford Site Facility)

Terminology

This intent of this list is to provide additional context for how terms associated with PNNL's Chronic Beryllium Disease Prevention Program are used in this technical basis document. Other terms related to the Chronic Beryllium Disease Prevention Program are used as defined under DOE's Chronic Beryllium Disease Prevention Program (10 CFR 850).

baseline beryllium inventory. The baseline beryllium inventory is the *beryllium inventory* in 2001, when PNNL implemented 10 CFR 850.

beryllium facility. A facility that is known to have beryllium contamination is referred to in this document as a *beryllium facility* and is included in the *beryllium inventory*.

beryllium inventory. The beryllium inventory identifies all PNNL facilities and/or areas within facilities that are beryllium operational areas, areas suspected to have beryllium contamination, and areas where the potential for worker exposure to beryllium exists. Outdoor areas are not included in the beryllium inventory. The beryllium inventory includes the most recent beryllium characterization information for the facilities and/or areas. A facility may have one or more areas contaminated by beryllium, and the beryllium characterization may be limited to only those areas. Facilities included in the beryllium inventory are referred to as *beryllium facilities*.

characterize/characterization. To characterize the beryllium contamination in a facility is to document beryllium-contaminated locations within the facility, and to quantify the beryllium surface contamination or airborne concentrations in those locations.

wipe sample. In this report, a wipe sample is a surface sample taken over an area of 100 cm^2. Results are reported by the analysis laboratory in units of micrograms. Because the sample area is 100 cm^2, the analysis result can be compared to DOE limits, which are stated in micrograms per 100 cm^2. Although 500-cm^2 composite wipe samples may be used at PNNL, composite samples were not used when establishing the baseline beryllium inventory.

suspect facility. A facility that is suspected of having beryllium contamination is a *suspect facility* until it is characterized. Based on the results of the characterization, it may be added to the *beryllium inventory*. In practice, all *suspect facilities* were included in the *baseline beryllium inventory*, regardless of the sample results.

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1.0 Introduction

In 1999, the Department of Energy (DOE) published Title 10 of the Code of Federal Regulations Part 850 (10 CFR 850), "Chronic Beryllium Disease Prevention Program." It required all DOE contractors to establish a Chronic Beryllium Disease Prevention Program (CBDPP) no later than January 7, 2002. One element of the required CBDPP involved documenting the baseline beryllium inventory (10 CFR 850.20). In 2014, a Pacific Northwest National Laboratory (PNNL) self-assessment (ITS #E-00748) identified that its baseline beryllium inventory was not retrievable, and the technical basis for establishing the baseline beryllium inventory was not known.

1.1 Purpose and Scope

The purpose of this document is to retrospectively reconstruct the technical basis for the baseline beryllium inventory for facilities managed by PNNL. This document describes how PNNL accomplished the following:

- identified facilities to be considered for the baseline beryllium inventory
- characterized the beryllium contamination in each facility
- identified the potential for worker exposure in beryllium contaminated areas.

Lastly, this document provides PNNL's baseline beryllium inventory as it existed in 2001 when PNNL's implementation of 10 CFR 850 was approved by DOE.

No attempt is made in this technical basis document to determine whether the 2000 baseline beryllium inventory was adequate; the intent is only to document what was known about baseline beryllium inventory when PNNL initially implemented 10 CFR 850.

2.0 PNNL's Beryllium Program History

In July 1997, under Notice 440.1 (N 440.1 [DOE 1997a]), DOE published DOE Guide 440.1-7, *Interim Chronic Beryllium Disease Prevention Program* (DOE 1997b), which directed each DOE site where beryllium exposure was possible to prepare a CBDPP within 6 months of the effective date of the Notice. Included was a requirement for "identifying facilities where beryllium has previously been used and assessing the potential for exposure." Hanford Facility Beryllium Fact Sheets (HFBFSs) were prepared for numerous facilities in March 1998, likely in response to the DOE Notice. The HFBFSs summarized past beryllium operations and sampling results for Hanford facilities, including those managed by PNNL.

In 2000, DOE Richland Operations (DOE-RL) was the sole DOE office for DOE contractors at Hanford and in Richland. All DOE-RL contractors, including Battelle, which managed the Pacific Northwest National Laboratory (PNNL), were referred to jointly as Hanford contractors. As a Hanford contractor, PNNL coordinated with other Hanford contractors to implement first DOE N 440.1 and, later, 10 CFR 850.

When the final rule for 10 CFR 850, "Chronic Beryllium Disease Prevention Program" (Beryllium Rule), was published in 1999, DOE required that each DOE site have a single CBDPP. The Project Hanford Management Contractor (PHMC), at that time Fluor Daniel Hanford, was charged with managing the Hanford site-wide program (Klein 2000), and PNNL participated as a Hanford contractor. Each contractor, including PNNL, was responsible for documenting its CBDPP implementation in an appendix to the Hanford CBDPP. The Hanford CBDPP, containing each contractor's implementing document, was submitted to DOE-RL for approval (Hanson 2000). DOE-RL approved the Hanford CBDPP with PNNL's appendix in 2001 (Klein 2001). PNNL's implementing document is provided in Appendix A.

Implementation of the Beryllium Rule included developing a baseline beryllium inventory. PHMC maintained the Hanford Site baseline beryllium inventory for all Hanford contractor facilities, including PNNL facilities. Facilities that were part of PNNL but not Hanford facilities (e.g., 2400 Stevens, Marine Sciences Laboratory) were within the scope of the Hanford baseline beryllium inventory. The baseline inventory consisted of a list of buildings suspected of having beryllium operations or contamination and the beryllium characterization of each. Each contractor was responsible for providing PHMC with the relevant information for its facilities so the facilities could be included in the Hanford Site baseline beryllium inventory. The Hanford Site baseline beryllium inventory was maintained on the Hanford Beryllium Program website (http://www.hanford.gov/page.cfm/BerylliumFacilitiesAreas), which was managed by PHMC. The characterization information was documented in HFBFSs, which were linked to the website.

The beryllium characterization conducted in 1998 to implement DOE N 440.1 relied on historical beryllium sampling data. In 2000, an effort was initiated to update the beryllium characterization with current sample results to meet the requirements of the Beryllium Rule. After sampling, the HFBFSs were updated with the more recent beryllium sampling results and published on the Hanford Beryllium Program website. PNNL's beryllium inventory was maintained on the Hanford Beryllium Program website until approximately 2003 when DOE-RL released Fluor Daniel Hanford from its obligation to manage the CBDPP on behalf of all contractors, recognizing that by that time, three DOE offices had oversight responsibilities at Hanford (DOE-RL, DOE Office of River Protection, and DOE Office of Science). Although PNNL facilities continued to be listed on the Hanford Beryllium Program website, the website noted that PNNL maintained a separate list and the Hanford information may be outdated. At some point in time, the HFBFSs for PNNL facilities were removed from the Hanford Beryllium Program website.

3.0 Process for (Re)Establishing the Baseline Beryllium Inventory

This section reconstructs the steps taken to establish PNNL's baseline beryllium inventory when PNNL implemented the Beryllium Rule.

The baseline beryllium inventory is required to include the locations of beryllium operations and other locations of potential beryllium contamination. The baseline beryllium inventory is also required to identify workers exposed or potentially exposed to beryllium at those locations (10 CFR 850). DOE G 440.1-7A, *Implementation Guide for Use with 10 CFR Part 850, Chronic Beryllium Disease Prevention*

Program (DOE 2001), clarifies the requirement to identify workers exposed or potentially exposed to beryllium. It states that the inventory should identify activities that may generate hazardous exposures and provide a list of potentially exposed workers.

As of the date of this technical basis document, the process used by PNNL in 2000 to establish the baseline beryllium inventory is not explicitly known. However, a review of historical documents indicates that the following process was used:

1. Identify suspect facilities (Section 4.0).
2. Characterize beryllium contamination in suspect facilities (Section 5.0).
    a. Develop a statistically based sampling plan.
    b. Conduct sampling.
    c. Analyze samples.
3. Review current activities in the facility for the potential for staff to be exposed to beryllium.
4. Update the Hanford Facility Beryllium Fact Sheets (Appendix B) as follows:
    a. Provide current sampling results.
    b. Indicate the estimated potential for beryllium exposure.

No objective evidence is available to reconstruct the decision process used to decide if a sampled building was included or excluded in the 2000 baseline beryllium inventory. Because every building included in the sample plan also had a HFBFS, regardless of the sampling results, it appears that all suspect facilities were included in the baseline beryllium inventory even if sampling results were below detection limits.

The basis for the past and current potential for beryllium exposure is documented on the HFBFSs.

4.0 Identifying Suspect Beryllium Facilities

Facilities that are candidates for inclusion in the baseline beryllium inventory are all facilities occupied or managed by PNNL in 2000 (Appendix C) regardless of physical location (Richland, Sequim) or landlord (leased facility, Battelle-owned facility, DOE-owned facility). Some facilities managed by PNNL in 2000 have since been transferred to other contractors; some transferred facilities have been demolished. Although no longer PNNL facilities, and perhaps no longer in existence, these facilities were managed by PNNL in 2000, so they were candidates for inclusion in PNNL's baseline beryllium inventory.

The first step in establishing the baseline inventory was to identify facilities suspected of containing beryllium contamination. To identify suspect facilities, staff involved from 1998 through 2001 obtained historical process knowledge by interviewing facility staff and reviewing available reference documents. The source documents used to identify suspect beryllium facilities are discussed in this section.

Many of the facilities included in the 2000 baseline beryllium inventory were previously identified as beryllium facilities in compliance with DOE N 440.1, *Interim Chronic Beryllium Disease* (DOE 1997). The documents described in this section were likely used to identify those facilities.

The consolidated list of suspect facilities is provided in Section 4.2.

4.1.1 Stone and Webster Report

In 1988, DOE-RL contracted with Stone and Webster Engineering Corporation to provide an independent assessment of available reports, lists, and pertinent data covering a variety of topics related to DOE's Beryllium Disease Notification Program, including beryllium facilities. Stone and Webster issued its report in December 1988 (Savage 1988).[1] Of particular interest for this technical basis document is an attachment in the Stone and Webster report that summarized the identified beryllium facilities (Savage 1988, Attachment 1).

The PNNL facilities identified in the Stone and Webster report (Savage 1988) as areas of past beryllium operations are listed in Table 4.1

Table 4.1. PNNL Managed Buildings with Historical Beryllium Operations as Identified in the Stone and Webster Report (Savage 1988)

326	306W
231 Z[(a)]	3720
520RTL (sic)/RTL Building, Rm 520	3731A

(a) The Stone and Webster report (Savage 1988) identified PNNL's "Interval of use" as being from 1962 to 1980, so the beryllium baseline characterization of 231 Z is outside the scope of this document.

4.1.2 University of Washington Needs Assessment

In 1997, the University of Washington (UW) completed a needs assessment (Barnhart et al. 1997) to identify the population of Hanford workers who may have been exposed to beryllium. The needs assessment included two lists of buildings used to identify workers who may have been exposed to beryllium. The first was generated by a UW research industrial hygienist. It was compiled using information about historical process locations and air sampling reports. The second list was compiled by personnel at DOE-RL in response to the draft DOE 440.1 Notice (at the time referred to as the Interim Worker Protection Program Notice for Review and Comment). Each PNNL building listed on the DOE and UW lists was evaluated for inclusion in PNNL's baseline beryllium inventory (Nicholson 1998).

The buildings or spaces listed in the UW report are listed in Table 4.2.

[1] Note that the Hanford Facility Beryllium Fact Sheets have a section titled, "Basis for Above Information" and the "Stone and Webster report" (rather than "Savage 1988") appears on most of the Fact Sheets.

Table 4.2. PNNL-Managed Buildings from Beryllium Building List (Barnhart et al. 1997)

306E	326	3720	MSL5
306W	329	3731A	RTL Rm 520 (sic)
314	331	3745B	
325	3708		

4.1.3 Past Practices Technical Characterization Study – 300 Area – Hanford Site

Westinghouse Hanford Company (WHC) published a compilation of historical information related to the 300 Area activities and facilities since its beginning (Gerber 1992). This report is identified in HFBFSs as a source of information about past facility operations.

The report includes several buildings managed by PNNL in 2000. Descriptions of past activities include known beryllium activities as well as activities that indicate the potential for involvement of beryllium (e.g., hazardous waste handling facilities). The only facility mentioned by Gerber (1992) as potentially containing beryllium, and that was not also identified in the UW report (Barnhart et al. 1997), is the 305B Building.

4.1.4 Hanford CBDPP 1999

The 1999 revision of the Hanford CBDPP includes a list titled "Possible Beryllium Facilities at Hanford" (Hanford CBDPP 1999). The 1999 CBDPP-listed PNNL buildings are identified in Table 4.3.

Table 4.3. PNNL Suspect Beryllium Facilities Listed in the Hanford CBDPP (1999)

MSL-5	RTL-520	303-J
305-B	306-W	314
318	325	326
329	331	3708
3720	3731-A	3745-B
EDL	PSL	2400 Stevens

4.2 PNNL Suspect Beryllium Facilities, 2000

This section provides a consolidated list of all PNNL facilities known to have past beryllium operations or suspected of having beryllium contamination in 2000 (Table 4.4). The source document that identified each building is indicated. These facilities were included in the PNNL Beryllium Sampling Plan (Section 5.1.1).

Table 4.4. PNNL Suspect Beryllium Facilities in 2000

Facility	Source	Facility	Source
303C	Interviews with site personnel	3708	Barnhart et al. 1997
303J	Hanford CBDPP 1999	3720	Barnhart et al. 1997
305B	WHC-MR-0338	3731A	Barnhart et al. 1997
306W	Barnhart et al. 1997	3745-B	Barnhart et al. 1997
314	Barnhart et al. 1997	2400 Stevens	Hanford CBDPP 1999
318	Hanford CBDPP 1999	BRSW (6th St.)	Stone and Webster
323 (equipment only)		EDL	Hanford CBDPP 1999
325	Barnhart et al. 1997	MSL5	Barnhart et al. 1997
326	Barnhart et al. 1997	PSL	Hanford CBDPP 1999
329	Barnhart et al. 1997	RTL[(a)]	Barnhart et al. 1997
331	Barnhart et al. 1997		

5.0 Facility Characterization

The beryllium contamination present in each suspect facility was characterized based on knowledge of past beryllium operations, beryllium sampling conducted prior to 2000, and beryllium wipe sampling conducted in 2000. The characterization was documented in HFBFSs.

Knowledge of past beryllium operations and sampling were derived from the source documents described in Section 4.0. A summary of this information and results of staff interviews were documented on HFBFSs.

A statistically based sampling plan was developed to characterize current (as of 2000) beryllium contamination levels in PNNL facilities (see Section 5.1.1). After completion of the sampling plan, HFBFSs were updated to include the more recent sampling information.

5.1 Sampling and Analytical Methods

PNNL's beryllium sampling plan and its sample collection analysis process are described below.

5.1.1 Sampling Plan

10 CFR 850 requires the employer to conduct air, surface, and bulk sampling when developing a baseline inventory. To meet this requirement, PNNL prepared a sampling plan, *Beryllium Sampling Plan* (Piatt 2000 [included in this report as Appendix D]), to characterize the beryllium contamination in its beryllium facilities and suspect facilities. In preparing the plan, PNNL adopted the sampling approach presented in the *Beryllium Sampling and Analysis Plan for Hanford Facilities* (Hewitt 1999). For ease of reference, the latter plan is referred to in this document as the Hanford Beryllium Sampling Plan. The

Hanford Beryllium Sampling Plan provides a systematic sampling strategy for characterizing surface and airborne levels of beryllium in facilities at Hanford. It requires categorizing areas according to the following scheme:

- Category 1: Facilities where known beryllium operations have been performed, or where past sampling data indicate significant beryllium contamination.
- Category 2: Facilities where beryllium operations were not routinely performed based on a review of building operations and beryllium contamination is not suspected.

The Hanford Beryllium Sampling Plan required a nonrandom (biased) sampling strategy for Category 1 locations and a random sampling strategy for Category 2 locations. It allowed for a facility to contain both Category 1 and Category 2 areas. It further required collecting a total of 59 wipe samples for Category 1 areas, and 29 wipe samples for Category 2 areas. Lastly, it required a minimum of two general area air samples (regardless of the level of beryllium suspected and regardless of whether the building was occupied or unoccupied). Additional information about the Hanford Beryllium Sampling Plan is provided by Hewitt (1999).

Although the sampling approach in the Hanford Beryllium Sampling Plan required air samples, PNNL's Beryllium Sampling Plan required only wipe samples. In addition, neither the Hanford Beryllium Sampling Plan nor PNNL's Beryllium Sampling Plan addressed bulk sampling. However, PNNL's intent to perform only wipe sampling is documented in PNNL's CBDPP implementation plan, which was approved by PHMC (Hanson 2000) and by DOE-RL (Klein 2001). So, although no explanation for performing only wipe sampling has been located in the records, this approach was clearly communicated to, and approved by, DOE.

5.1.2 Sample Collection

The procedure used to collect the wipe samples in 2000 could not be located in PNNL's records. Therefore, the sampling procedure used is not explicitly known. Some details were gleaned from historical records.

Facility floor plans marked to indicate sample locations were recovered for most sampling conducted in 2000. In most cases, these were accompanied by hand-written notes describing the sample locations. Chain-of-custody forms were also found for a majority of the samples.

Memos summarizing sampling conducted in 1999 and 2000 state that PNNL used 100-cm^2 PaceWipe, pre-moistened wipes (Nicholson 2000a, b, c). Analytical laboratory reports from the Waste Sampling and Characterization Facility (WSCF) for samples analyzed in 2000 state that sample media was Pace wipes.

According to the PNNL Beryllium Sampling Plan, two to seven blanks were collected for each facility sampled. The blanks were recorded on the chain-of-custody logs; sample results for blanks are included in the reports from the analytical laboratories. Results for all blanks were less than the reporting limit for the laboratory performing the analysis.

5.1.3 Sample Analysis

10 CFR 850.24 requires that beryllium samples be analyzed by a laboratory accredited for metals by the American Industrial Hygiene Association (AIHA) or a laboratory that demonstrates quality assurance for metals analysis that is equivalent to AIHA accreditation. Beryllium wipe samples collected in 2000 were analyzed by one of two laboratories, depending on whether the sample was radiologically contaminated or not. Radiologically contaminated samples were analyzed at the WSCF, managed by Fluor Daniel Hanford. Nonradiological samples were analyzed at the Lockheed Martin (now Babcock and Wilcox) Y-12 Plant Analytical Chemistry Organization (ACO) in Oak Ridge, Tennessee.

5.1.3.1 Lockheed Martin Y-12 Analytical Chemistry Organization

In 2000, the Y-12 ACO was accredited by the AIHA (Laboratory ID 9244). The scope of accreditation included industrial hygiene analytical techniques for metals. The most recent certificate provides additional details about the scope and the initial accreditation date. It states that the Y-12 ACO has been accredited for beryllium testing using inductively coupled plasma atomic emission spectroscopy (ICP/AES) since 1989. The accredited method is Y50-AC-65-0019, described as "In house method for high fired beryllium oxide." The Y-12 ACO manager stated that this method is an upgrade to the previously used method, ASO-Y/P65-0019, shown on the analytical reports (email communication from Larissa Welch, 6/30/2014). The 2000 certificate and the most current certificate are provided in Appendix E.

Y-12 ACO reports results that are less than the Lower Limit are report as "less than Lower Limit." The method to calculate the Lower Limit is not defined in the analytical reports.

5.1.3.2 Waste Sampling and Characterization Facility

According to the most recent AIHA accreditation certificate (Appendix E), WSCF has been accredited for beryllium testing using inductively coupled plasma/mass spectroscopy (ICP/MS) and ICP/AES since 6/1/1974 (laboratory ID 101875). Samples taken from the 3731A Building were analyzed using "ICM-EM", which appears to be a typographic error in the memo because this is not a recognized analytical technique.

Results that were less than the Reporting Detection Limit (RDL) are reported as "less than" on WSCF analytical reports. The reports define the RDL as twice the minimum detectable level.

5.2 Categorization of Facilities

According to the Hanford Beryllium Sampling Plan (Hewitt 1999), facilities are categorized as Category 1 or 2, depending on the historical operations performed in the building and/or past indications of beryllium contamination (Section 5.1.1).

Based on the number of samples known to have been collected in 2000, PNNL's categorization of PNNL facilities was reverse-engineered because it provides an indication about what was known in 2000 about historical beryllium operations in the facility.

The initial categorization, as best can be determined, is included in Section 5.4 in Table 5.2.

5.3 Beryllium Airborne Concentration and Surface Contamination Limits

For ease of reference and to aid in interpreting beryllium sample results, the DOE beryllium concentration and contamination limits are provided in Table 5.1.

Table 5.1. Beryllium Concentration and Surface Contamination Limits

Regulation/Driver	Airborne Limit	Surface Limit
29 CFR 1910 − Permissible Exposure Limit	2.0 μg/m^3	-
10 CFR 850 − Exposure Limit	2.0 μg/m^3	-
10 CFR 850 − Action Level Limit[(a)]	0.2 μg/m^3	-
10 CFR 850 − Housekeeping Limit	-	3.0 μg/100 cm^2
10 CFR 850 − Public Release Criteria	-	0.2 μg/100 cm^2

(a) A regulated area is an area demarcated and managed by the employer where the airborne concentration of beryllium exceeds, or can reasonably be expected to exceed, the action level (10 CFR 850).

5.4 Sampling Results

A summary of the beryllium sampling conducted in 2000 is provided in Table 5.2. Detailed results are provided in Appendix F. This information provided the basis for PNNL's baseline beryllium inventory when 10 CFR 850 was implemented. Unless specifically noted in Appendix F, sampling records include a sample map, sample identification, chain-of-custody forms, and analytical laboratory results.

Table 5.2. Summary of Facility Sampling Results

Facility	Category[(a)]	Number of Wipe Samples Planned/Taken	Number of Blank Samples Planned/Taken	Analytical Laboratory	Highest Beryllium Result (μg/100 cm^2) for Non-Blank Samples
303C	2	59/29	3/2	Y-12	2.42
303J	2	29/29	2/2	Y-12	0.145
305B	2	29/29	2/2	Y-12	0.334
306W	1	59/59	3/3	WSCF	<0.5
314	1	59/58	3/3	Y-12	0.116
318	2	29/29	2/2	Y-12	0.102
323	Neither[(b)]			Unknown	<0.5
325	1 and 2 spaces	117/118	7/7	Y-12 and WSCF	0.2

Table 5.2. (contd)

Facility	Category[a]	Number of Wipe Samples Planned/Taken	Number of Blank Samples Planned/Taken	Analytical Laboratory	Highest Beryllium Result (μg/100 cm^2) for Non-Blank Samples
326	1 and 2 spaces	88/88	5/5	Y-12	<1
329	1	59/76	3/3	Y-12	4.39 prior to decontamination; 0.5 after decontamination
331	2	29/29	2 2	Y-12	0.161
3708	2	29/29	2/2	Y-12	<0.1
3720	Neither	Unknown/26	Unknown	WSCF	590 (inside glovebox)
3731A	2	29/29	2/Unknown	WSCF	<0.5
3745-B	2	29/29	2/2	Y-12	<0.1
2400 Stevens	2	29/29	2/2	Y-12	<0.1
BRSW (6th St.)	2	29/29	2/2	Y-12	0.181
EDL	2	29/29	2/2	Y-12	<0.1
MSL5	Unknown	[c]	[c]	Unknown	Note 4
PSL	2	29/29	2/2	Y-12	0.18
RTL[d]	2	59/59	3/3	Y-12	114 (inside hood) 0.879 (balance of facility)

(a) The category assigned to each building was reverse-engineered from the number of samples known to have been taken in 2000:

Category 1: Facilities where known beryllium operations have been performed, or where past sampling data indicate significant beryllium contamination ("suspect contamination").
Category 2: Facilities where beryllium operations were not routinely performed based on a review of building operations and beryllium contamination is not suspected ("expected to be clean").

(b) An internal memo (Nicholson 2000b) states that the purpose of the sampling in the 323 Building was to determine if autoclaves and furnaces contained beryllium contamination. 10 wipe samples were taken.
(c) Sample results for MSL-5 have not been located.
(d) The facility is identified as "RTL" in PNNL's Beryllium Sampling Plan. This is assumed to be RTL520.

5.5 Sampling Information for Select Facilities

This section provides additional information about the sampling and sampling results for facilities where more information may be needed than is provided in Table 5.2. Gaps in building-specific information are detailed in Section 6.2.

5.5.1 323 Building

The rationale for including the 323 Building in the PNNL Beryllium Sampling Plan (see Appendix D) is not clear. The sampling plan lists "323 EQUIP"; this is interpreted to mean that the sample plan was to sample only equipment, not the facility. The sample plan also states that only 10 samples would be collected. The number of samples collected to characterize equipment is not defined in PNNL's Beryllium Sampling Plan or in the Hanford Beryllium Sampling Plan (Hewitt 1999). Thus, the basis for taking only 10 samples is not known.

The 323 Building is not identified as a potential beryllium facility in any historical compilation reports (Barnhart et al. 1997; Savage 1988).

As of the date of this technical basis document, the 323 Building is listed on the Hanford Beryllium website under "Former Hanford Site Beryllium Controlled Facilities" as a facility that has been demolished. Although listed on the website, no information related to the HFBFSs for the 323 Building was located.

5.5.2 329 Building

When sampling was conducted in the 329 Building, 59 samples were collected, including 6 in Room 17C. Sample results for Room 17C exceeded the DOE housekeeping limit. Room 17C was decontaminated and then resurveyed. Although only 17 samples were collected during the resurvey, the 17 samples for Room 17C, combined with the remaining 53 samples from the rest of the facility, provide 70 samples, which are more than the 59 required by the Hanford Beryllium Sampling Plan (Hewitt 1999).

5.5.3 3720 Building

The 3720 Building was included in the PNNL Beryllium Sampling Plan (see Appendix D), but the sampling plan was incomplete because the number of samples required was not specified. It is possible that a decision was made to use sample results from 1999 to characterize the building.

The only beryllium sample data available for the 3720 Building are 26 wipe samples taken in Lab 502 in November 1999. The purpose of these samples was to quantify residual concentrations of beryllium generated by past operations in the lab (Nicholson 2000c). Some results of the 1999 samples were above DOE public release limits, and a few exceeded the DOE housekeeping limit.

5.5.4 MSL-5

From the records available at this time, it appears that the Marine Science Laboratory (MSL)-5 beryllium sample data from 2000 has been lost. It has not been located as of the date of this technical basis document. In addition, there is no evidence that the MSL-5 HFBFS was updated after the 2000 sample campaign. The only HFBFS available for MSL-5 is from March 1998.

MSL-5 is identified as a suspect facility in the UW report (Barnhart et al. 1997), which lists MSL-5 on the Beryllium Facilities List.

The 1998 HFBFS states that the only beryllium used in the MSL-5 is small concentrations of beryllium in standards used to calibrate equipment. When beryllium is used, activities are confined to a ventilated hood.

PNNL's Beryllium Sampling Plan (see Appendix D) does not indicate how many samples were to be collected at MSL-5, but it does indicate that sampling was performed on 5/12/2000. The records do not include sample results, chain of custody, sample map, or any other information for MSL-5.

6.0 PNNL's Baseline Beryllium Inventory, 2000

In 2000, PNNL's baseline beryllium inventory was documented on the Hanford Beryllium Program website (which identified the facilities) and in the HFBFFs (which provided the beryllium characterization and the potential for worker exposure). Both the website and the HFBFSs were managed and maintained by the PHMC. The PNNL Beryllium Sampling Plan (see Appendix D) states that PNNL expected to update the HFBFSs upon completion of the beryllium sampling planned for 2000. An attempt was made to recover the HFBFS versions that would have been current following the updates made after the beryllium sampling. In some cases, relevant versions were located in the historical records (typically, any version published from November 2000 through January 2001 was considered to be the most relevant). In other cases, the only versions that were located were from March 1998 (likely when DOE N 440.1 was implemented) or from dates much later than 2000 (e.g., 2003). If multiple HFBFSs for the same building were located in the historical records, and if they spanned a time frame that included the date 10 CFR 850 was implemented (2001), then both HFBFSs are provided in this technical basis document. The most relevant revisions of the HFBFSs that could be retrieved from historical records are provided in Appendix B. These HFBFSs constitute the best available information about PNNL's baseline beryllium inventory.

6.1 Facilities Added to Baseline Beryllium Inventory After 2000

In conducting research for this technical basis document, information regarding beryllium characterization of facilities not listed in Table 4.4 was found in the historical records. Although outside the scope of this document, the HFBFSs are provided in Appendix G to improve future retrievability of these records.

6.1.1 Life Science Laboratory Annex

A HFBFS for the Life Science Laboratory Annex (LSLA) dated June 10, 2002, was obtained from Mission Support Alliance (MSA) historical records. LSLA was not included in the 2000 Beryllium Sampling Plan. The HFBFS states that sampling was conducted in April 2001.

6.1.2 Process Development Laboratory East

A HFBFS for Process Development Laboratory East (PDL-E) dated January 2003 was obtained from MSA historical records. PDL-E was not included in the PNNL Beryllium Sampling Plan (Appendix D).

The HFBFS states that beryllium sampling was conducted in 2002 as part of the crane bus bar investigation, and that the facility was characterized in 2003.

6.2 Gaps in Baseline Beryllium Inventory and Associated Records

The list below summarizes gaps in the original baseline beryllium inventory, which was established in 2000. These gaps may be actual gaps (e.g., inadequate sampling) or perceived gaps (e.g., activity may have been performed but documented evidence has not been located).

- DOE's definition of a beryllium regulated area is based on the airborne concentrations of beryllium. There is no known correlation between surface activity and airborne concentrations. Consequently, from surface wipe measurements alone, it is not possible to determine that airborne levels did not exceed DOE's action level, which would require controlling the space as a regulated area. Some surface wipe samples from 2000 exceeded DOE's public release limit of 0.2 μg/100 cm^2, and some further exceeded DOE's housekeeping limit of 3 μg/100 cm^2. Consequently, it is not possible to document in this technical basis document whether or not PNNL would have had any beryllium regulated areas had air sampling been conducted when the baseline beryllium inventory was first documented.
- 3720 Building. The Hanford Beryllium Sampling Plan (Hewitt 1999) requires 29 wipe samples in facilities expected to be uncontaminated, and 59 wipe samples in facilities with a history of beryllium activities or that are suspected of having beryllium contamination. An insufficient number of samples were collected in 1999 to characterize the 3720 Building (26 wipe samples were collected instead of the required 29 samples). In addition, the records for the November 1999 sampling in the 3720 Building are incomplete. There is no chain of custody and the original reports from the sample lab are not in the record.
- MSL-5. There is no sampling information from 2000 to characterize MSL-5, even though MSL-5 is explicitly listed in PNNL's Beryllium Sampling Plan (see Appendix D). There is no sample map, chain of custody, or sample results in the records.
- 303C Building. This building was characterized using a sample plan appropriate for a Category 2 facility (expected to be clean) although historical documents, including the HFBFS dated January 2000, indicate there is reason to expect beryllium contamination. Also, some results from the 2000 sampling campaign exceeded DOE's public release limit. Because results exceeded DOE's public release limit, the initial designation as Category 2 appears to be faulty. Consequently, the sampling results may have been inadequate to characterize the extent of beryllium contamination in the 303C Building in 2000.
- The sampling records for several facilities are incomplete. Records may be missing any of the following: chain of custody, sample map, or laboratory reports. In three cases, the only documentation found were memos summarizing the sampling results. These memos and the data in PNNL's industrial hygiene database, DataPipe, were used to reconstruct the sampling results. The detailed sampling results provided in Appendix F indicate when the documentation consists of only a memo.
- 323 Building. As of the date of this technical basis document, the 323 Building is listed on the Hanford Beryllium Program website under "Former Hanford Site Beryllium Controlled Facilities" as a facility that has been demolished. PNNL managed the 323 Building in 2000 but did not

characterize the facility at that time. Nor has a HFBFS been located for the 323 Building. It is not known when this building was added to the baseline beryllium inventory, or if it was added while it was managed by PNNL or after being transferred to another Hanford contractor. If the 323 Building was included in the baseline beryllium baseline in 2000, then PNNL's records are incomplete.

7.0 References

10 CFR 850. Code of Federal Regulations. Title 10, *Energy*, Part 850 − "Chronic Beryllium Disease Prevention Program." Department of Energy, Washington, D.C.

29 CFR 1910. Code of Federal Regulations. Title 29, *Labor*, Part 1910 – "Occupational Safety and Health Standards." Occupational Safety and Health Administration, Department of Labor, Washington D.C.

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Nicholson A. 2000c. Internal memo from Abby Nicholson to Harold Kjarmo, dated February 4, 2000. Subject: "Results of Beryllium Wipe Samples" (Lab 502 in the 3720 Building). Pacific Northwest National Laboratory, Richland, Washington.

Nicholson A. 2000a. Internal memo from Abby Nicholson to Bill Bjorkland, dated April 20, 2000. Subject: "Beryllium Characterization of 3731A." Pacific Northwest National Laboratory, Richland, Washington.

Savage JW. 1988. Letter report from JW Savage to David Evans, dated December 13, 1988. "Task TS1460: Review Hanford Beryllium Records and Provide the Department of Energy – Richland Operations Office with Assessments, Findings, and Recommendations." Stone and Webster Engineering Corporation, Richland, Washington.

Appendix A

PNNL Chronic Beryllium Disease Prevention Program Implementing Document

Appendix A

PNNL Chronic Beryllium Disease Prevention Program Implementing Document

PNNL's implementing document for 10 CFR 850 was submitted to the Project Hanford Management Contractor (PHMC [Fluor Hanford]) for inclusion in the Hanford Site Beryllium Program. After comparing the implementing document with implementing documents from other site contractors and to the Fluor Hanford Beryllium Procedure, to ensure contractors adopted a consistent approach, the PHMC submitted the documents to DOE-RL (Hanson 2000). PNNL's implementing document (Hanson 2000, Attachment 3) is duplicated in this appendix for ease of reference

FH-0001677 R1
Attachment 3

"The Pacific Northwest National Laboratory's
Chronic Beryllium Disease Prevention Program"

3 Total Pages (Including Coversheet)

The Pacific Northwest National Laboratory's Chronic Beryllium Disease Prevention Program

1.0 Introduction

The Pacific Northwest National Laboratory (PNNL) has implemented a program to protect workers who come into contact with beryllium or beryllium-contaminated materials that complies with applicable portions of the Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP). This program applies to operations or activities that involve present or past potential beryllium exposures at DOE facilities. Laboratory operations that meet the definition of laboratory use of hazardous chemicals in 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, are specifically exempted from the Hanford Site CBDPP. It also exempts work with beryllium articles.

All current beryllium tasks at PNNL involve either laboratory use of beryllium or work with beryllium articles (maintenance of radiation detection instruments involving replacement of copper-beryllium screens). However, PNNL also manages DOE facilities where beryllium has been used in the past (see suspect beryllium facilities list http://www.hanford.gov/safety/beryllium/suspect3.htm), and has employees who have been exposed to beryllium in the past. The purpose of this program description is to indicate how PNNL will implement applicable elements of the Hanford Site CBDPP. This program will be fully implemented no later than January 7, 2002.

2.0 Program Elements

PNNL implements all elements of its beryllium control program through its Standards-Based Management System (SBMS). Line management is responsible for the safety of beryllium work.

Characterization of Suspect Beryllium Facilities PNNL will conduct statistical wipe sampling in suspect beryllium facilities to determine whether beryllium is present, and if so, the extent and degree of beryllium contamination. If any samples indicate contamination levels above 3 ug/100 cm^2, the area identified will be controlled as a beryllium contaminated area in accordance with the Hanford CBDPP. As facilities are characterized, summary findings will be reported to the Fluor Hanford Beryllium Program Coordinator to provide a current status of suspect facilities on the Hanford beryllium website. Any current beryllium work in PNNL facilities will also be reported so that those facilities can be listed on the Hanford Beryllium Website. The PNNL Chemical Management System is used to identify locations where beryllium is currently being used.

Exposure Assessment Potential beryllium exposures are assessed in accordance with the "Working with Chemicals" subject area of SBMS. A hazards assessment is documented as part of the Chemical Process Permit. Work in suspect beryllium facilities may be assessed using alternative hazards analysis processes. Where the hazard assessment indicates a potential for airborne beryllium exposure,

- Measures will be identified in the Chemical Process Permit (or alternative work control documents for work in suspect facilities) to eliminate or control potential exposures
- Where control measures cannot eliminate the risk of exposure, employees will receive training as beryllium-associated workers
- The cognizant industrial hygienist will conduct exposure monitoring.

Exposure Monitoring Exposure monitoring will be managed by a qualified individual and conducted in accordance with PNNL IH procedures. The OSHA Permissible exposure limit (PEL) and the DOE action level to be used are specified in the Hanford Site CBDPP. A housekeeping limit for removable contamination is also specified. Monitoring results will be reported to the employee within 10 working days of receipt of laboratory results.

Waste Disposal Operations should be planned to minimize beryllium wastes and dispose of wastes in accordance with the "Managing Nonradioactive Chemical Waste" subject area of SBMS. Wastes must be placed in sealed containers and labeled as specified in the Hanford Site CBDPP.

Exposure Reduction and Minimization PNNL will conduct an initial baseline Chronic Beryllium Disease Prevention Program assessment for compliance with applicable requirements of 10 CFR Part 850. PNNL will annually review characterization and monitoring data and establish exposure reduction and minimization goals to

- Keep potential exposures below the action level, and
- Minimize beryllium contaminated areas and equipment consistent with research requirements.

Occupational Medical Support The Site Occupational Medical Contractor (SOMC) is currently HEHF. PNNL will supply the SOMC with information outlined in the Hanford Site CBDPP. The SOMC will perform those occupational medical actions specified in HEHF's "Hanford CBDPP Medical Support Plan."

Recordkeeping The SOMC will maintain beryllium medical records. PNNL's ES&H Division will maintain exposure monitoring records. The Hanford suspect beryllium facilities website will be maintained by the Fluor Hanford Beryllium Program Coordinator based on information provided by PNNL.

Training Employees whose work involves the use of beryllium receive training as required in the "Working with Chemicals" subject area of SBMS and as described in PNNL's Chemical Hygiene Plan. PNNL's health advocate in Human Resources is available to counsel current workers who are or have been exposed to beryllium and to help them to obtain medical exams and treatment. HEHF will provide additional information and counseling in accordance with their "Hanford CBDPP Medical Support Plan." Because of the presence of beryllium contamination, general beryllium training will be incorporated into existing awareness training given to all employees to include

- An introduction to beryllium
- Beryllium health effects
- How to identify suspect beryllium facilities at Hanford
- Signs used to identify beryllium contaminated areas
- An overview of PNNL's CBDPP, including assistance available from PNNL's health advocate and beryllium counseling offered by the SOMC.

Approved Beryllium Activities The following activities are approved under this plan for work with beryllium or work in suspect facilities. Unlisted activities involving potential airborne beryllium exposure require revision to this plan and approval by DOE-RL.

- Laboratory operations that meet the definition of laboratory use of hazardous
- Work with beryllium articles
- Inspection and maintenance activities
- HVAC maintenance
- HEPA filter removal
- Waste material packaging and removal
- Excessing of equipment
- Housekeeping
- Decontamination
- Sampling

Appendix B

Hanford Facility Beryllium Fact Sheets for PNNL Facilities

Appendix B

Hanford Facility Beryllium Fact Sheets for PNNL Facilities

This appendix provides the best available Hanford Facility Beryllium Fact Sheets (HFBFSs) for PNNL facilities that would have been current when 10 CFR 850 was implemented. As indicated in Table B.1, some HFBFSs date from 1998 when the *Interim Rule* was implemented, and they were likely updated in late 2000 after completion of the Beryllium Sampling Plan (see Appendix D of this report). Some were updated again as part of the ongoing process of maintaining a current baseline inventory. Where two HFBFSs for the same facility spanned a time period that included the period of 2000 to 2002, both HFBFSs are provided.

In 2000, the Project Hanford Managing Contractor (PHMC [Fluor Hanford]) maintained the HFBFSs for all Hanford facilities. PNNL updates were submitted in the form of marked-up copies or emails with additional information. Because PNNL did not maintain independent record copies of HFBFSs for PNNL facilities, retrieval of the historical documents was challenging. The HFBFSs were obtained from several sources. Hard copies of some were included in the facility-specific sampling information and were retrieved from the sampling records. Other Fact Sheets were obtained from personal files. The best source of historical HFBFSs was records provided by the Mission Support Alliance, which manages the Hanford Site Chronic Beryllium Disease Prevention Program as of the date of this technical basis document.

Table B.1. Summary List of Hanford Facility Beryllium Fact Sheets for PNNL Facilities

Facility	Hanford Facilities Beryllium Fact Sheet Preparation (and Update) Date
303C	Prepared January 2000
303J	Prepared January 2000
305B	Prepared November 2000; updated February 2003
306W	Prepared March 1998 Prepared November 2000; updated February 2003
314	Prepared March 1998; updated January 2000
318	Prepared November 2000
323	Not needed; sampling plan says “323 (EQUIP)”
325	Prepared March 1998 Prepared June 2002; updated February 2003
326	Prepared January 2000 Prepared November 2000; updated February 2003
329	Prepared November 2000; updated February 2003
331	Prepared March 1998; updated January 2001

Table B.1. (contd)

2400 Stevens	Prepared November 2000
3708	Prepared March 1998 Prepared February 2004 (by which time facility had transferred to Fluor Hanford Central Plateau)
3720	Prepared March 1998; updated February 2003
3731A	Prepared January 2000
3745-B	Prepared January 2000
BRSW (6th St. Warehouse)	Prepared March 1998; updated October 2002
EDL	Prepared November 2000
MSL5	Prepared February 1998
PSL	Prepared November 2000
RTL[(a)]	Prepared February 1998 Prepared November 2000; updated February 2003

(a) Assumed to be RTL520

The HFBFSs for the PNNL facilities are presented below in the same order they are listed in Table B.1.

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 303-C
Date prepared: January 31, 2000
Responsible Contractor: PNNL
Contact: A. L. Nicholson

PAST OPERATIONS

Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Classified Information
Location(s) in facility that contained beryllium materials: Fume Hood

Description of beryllium activities: This building, one of several 303 buildings known as a Material Balance Area, was built during World War II to store fresh metal (unirradiated uranium), uranium scrap, and chemicals. Beryllium was used in the fume hood, and beryllium contamination is probable. Additional information concerning the work is considered classified information.

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: Fume Hood

Maximum Estimated Past Be exposure: Unknown

CURRENT OPERATIONS

Building still present: YES
Beryllium present: Fume hood, ventilation duct and HEPA filter are posted as being beryllium contaminated.
Current building occupancy/activity: This building is currently inactive with no occupants.

Maximum Estimated Current Be exposure: For staff performing building walkthroughs, exposure to beryllium would be minimal. For non-routine activities such as breaching facility systems, exposure levels are unknown.

Basis for above information: Interview with site personnel.

Comments, including any additional information needed (specify): Contamination levels in the hood, glovebox and surrounding surfaces are unknown.

Hanford Home Page | Beryllium Facilities at Hanford | Beryllium

For questons or comments, please send email to Elton_R_Hewitt@rl.gov
URL: http://www.hanford.gov/safety/beryllium/fctsheet/303-c.htm
Last Updated: 03/23/00 15:31:52

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 303-J
Date prepared: March 25, 1998; Updated: January 31, 2000
Responsible Contractor: PNNL
Contact: A.L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1969 End: 1969
Location(s) in facility that contained beryllium materials: Northwest corner of building

Description of beryllium activities: This building, one of several 303 buildings known as a Fresh Metal Storage Building,
was built during World War II to store fresh metal (unirradiated uranium), uranium scrap, and chemicals. Based on a
1969 report, it appears that beryllium containing products were machined and fabricated in the facility. However, this
could not be verified through discussion with site workers. It is believed that this was an isolated incident.

Building monitoring data summary: The 1969 report identified a single swipe sample collected from the floor in the
northwest corner of the building which had a reported result of 0.002 mg/in2.

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: This building is currently inactive with no occupants.

Maximum Estimated Current Be exposure: For staff performing building walkthroughs, exposure to beryllium would be none. For non-routine activities such as breaching facility systems, exposure levels are unknown.

Basis for above information: Stone and Webster report, publication WHC-MR-0388, and interviews with site personnel.

Comments, including any additional information needed (specify):
Characterization of the building should be performed to quantify contamination levels.

Privacy & Security Notice

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	305-B
Date prepared:	November 20, 2000, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): 1978 End: Present

Location(s) in facility that contained beryllium materials: Beryllium may be present in hazardous and radiological mixed wastes.

Description of beryllium activities: The 305-B building was constructed in two phases. The larger underground portion was constructed to house two test reactors and completed in 1954. This underground portion contained two reactor rooms, two assembly rooms, and a common control room. The aboveground portion was completed in 1959 and consisted of offices, a counting room, instrument room, maintenance shops, and a change room. Both test reactors were shut down prior to 1978 and the building was subsequently used as a storage facility for hazardous materials.

Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES

Current building occupancy/activity: The 305-B Building is currently used to receive, store, and prepare shipments of hazardous and mixed wastes generated by Hanford Site programs. These wastes are primarily generated in support of research and development activities. Beryllium wastes are brought into the facility as a solid.

2000 Characterization: Statistical beryllium wipe sampling was conducted in the basement and east stairwell of this facility on May 12, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than the housekeeping limit for removable beryllium (<3 µg/100 cm^2) with a maximum contamination level of 0.334 µg/100 cm^2).

2002 Fire Protection System Sampling: Five wipe samples were taken June 13, 2002 on the fire protection system in the southwest corner of the highbay prior to installation of a backflow prevention system. All 5 samples were below the public release criteria (0.2 µg/100 cm2).

2002 Decontamination Sampling: Prior to decontamination, additional wipe sampling was performed August 29, 2002 in areas adjacent to the contamination locations to verify the extent of contamination. Of the 14 wipe samples collected, two wipe samples were over the release criteria with the highest being 0.46 µg/100 cm2 additional contamination above the release criteria was found.

Contaminated areas in waste cells 3 and 4, and the east wall of the west basement vault were decontaminated September 19, 2002. Area and personal air samples taken during the decontamination task were all below the level of detection. Ten wipe samples taken following decontamination were all below the release criteria.

2002 Crane Bus Bar Investigation: On November 12, 2002, three wipe samples were taken on bus bars that provide electrical power to the bridge crane in the high bay of 305B. All three samples were above the housekeeping limit with removable beryllium contamination ranging from 3.7 to 10 µg/100 cm2. Followup beryllium sampling was conducted December 4, 2002, to

Hanford Facility Beryllium Fact Sheet

Rm 123 - 132

Building Number/Name: 306-W
Date prepared: March 25, 1998
Responsible Contractor: PNNL
Contact: A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID and LIQUID
Period of beryllium operations (dates): Start: 1972* End: Present

Location(s) in facility that contained beryllium materials: Confirmed beryllium areas include the machine shop and an abrasive cut saw. 132 Hot Shop & 3 potential areas

Description of beryllium activities: The original portion of Building 306 was renamed 306-W in 1972. Based on information from three reports identified, machining of beryllium occurred between 1973 and 1981. Although machining work in the Machine Shop using depleted uranium still occurs, beryllium has not been used in the Machine Shop for the past 15-20 years

Building monitoring data summary: In 1973, 2 air and 9 swipe samples were collected from the machining area. The air results were 0.05 and 0.07 $\mu g/m^3$. Five of the swipes were 0.05 $\mu g/in^2$ or below; two ranged between 0.2 and 0.29 $\mu g/in^2$; and a swipe from a plastic cover was 4.16 $\mu g/in^2$. Six swipes were collected while using an abrasive cut saw in 1981 with a maximum result of 0.003 $\mu g/in^2$.

Personnel monitoring data summary: None identified
Specify Engineering/Administrative controls used during operations: None identified

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES

Current building occupancy/activity: The building is currently used for machining activities in support of research; some offices are present. A "hot" shop is used to machine depleted uranium and a "cold" shop is used to machine tungsten, aluminum, and tool steel. According to chemical inventory records, approximately 5 fluid ounces of beryllium are currently stored in the building.

Maximum Estimated Current Be exposure: LOW

Basis for above information Stone and Webster report, interviews with site personnel, and publication WHC-MR-0388.

Comments, including any additional information needed (specify): Although a small amount of liquid containing beryllium is present. This material is not used and poses no exposure hazard as currently stored. Additionally, beryllium may be present as a contaminant in the exhaust ventilation ducts or on the interior surfaces of machines. Swipe samples are recommended to determine beryllium levels prior to work activities in the exhaust ventilation ducts and prior to release of the machines.

* Considerable additional information may be found in Fact Sheet for Building 306.

Contact Dreyfeal (retired) Mike Watts - 2400 Stevens

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Hanford Facility Beryllium Fact Sheet

Building Number/Name: 314
Date prepared: March 25, 1998; Updated: January 31, 2000
Responsible Contractor: PNNL
Contact: AL Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1960 End: 1970s

Location(s) in facility that contained beryllium materials: Acid etch treatment area, autoclave, and brazing area(s).

Description of beryllium activities: This World War II building known as the Metal Extrusion building, was originally used to extrude and straighten uranium fuel rods; provide radiographic testing; and process scrap uranium. The building was modified in the 1970s and subsequently used by PNNL for a variety of research projects and crafts services. A 1960 report noted that a zirconium spelter (5% beryllium) was used to braze uranium and zirconium cladding of KER fuel-type elements and subsequently autoclaved and cleaned in an acid bath (which caused oxidation and possible flaking).

Building monitoring data summary: Four swipes and one air sample were collected in 1960. Low levels of beryllium (0.003 mg/in2) were identified inside the autoclave; higher levels (0.3 mg/in2) were identified on the fuel elements and coupons. The single air sample was collected 6 inches from the autoclave with a reported value of 0.15 mg/m3.

Personnel monitoring data summary: None identified
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES

Beryllium present: NO
Current building occupancy/activity: This building is currently unoccupied

Maximum Estimated Current Be exposure: For staff performing building walkthroughs, exposure to beryllium would be none. For non-routine activities such as breaching facility systems, exposure levels are unknown

Basis for above information: Stone and Webster report and publication WHC-MR-0388.
Comments, including any additional information needed (specify):
Characterization of the building should be performed to quantify contamination levels.

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	306-W
Date prepared:	November 17, 2000, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS

Beryllium brought in facility: YES
Form of beryllium: SOLID and LIQUID
Period of beryllium operations (dates): Start: 1972* End: Present

Location(s) in facility that contained beryllium materials: Confirmed beryllium areas include the machine shop and an abrasive cut saw.

Description of beryllium activities: The original portion of Building 306 was renamed 306-W in 1972. Based on information from three reports identified, machining of beryllium occurred between 1973 and 1981. Although machining work in the Machine Shop using depleted uranium still occurs, beryllium has not been used in the Machine Shop for the past 15-20 years

Building monitoring data summary: In 1973, 2 air and 9 swipe samples were collected from the machining area. The air results were 0.05 and 0.07 $\mu g/m^3$. Five of the swipes were 0.05 $\mu g/in^2$ or below; two ranged between 0.2 and 0.29 $\mu g/in^2$; and a swipe from a plastic cover was 4.16 $\mu g/in^2$. Six swipes were collected while using an abrasive cut saw in 1981 with a maximum result of 0.003 $\mu g/in^2$.

Personnel monitoring data summary: None identified
Specify Engineering/Administrative controls used during operations: None identified

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS

Building still present: YES
Beryllium present: YES

Current building occupancy/activity: The building is currently used for machining activities in support of research; some offices are present. A "hot" shop is used to machine depleted uranium and a "cold" shop is used to machine tungsten, aluminum, and tool steel. According to chemical inventory records, approximately 5 fluid ounces of beryllium are currently stored in the building.

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility on May 23, 2000 to characterize residual beryllium levels from past operations. All 59 samples taken had less than detectable levels of removable beryllium (<0.5 µg/100 cm^2).

2002 Recharacterization: Statistical beryllium wipe sampling was repeated in 306W on October 25, 2002 and analyzed at a lower detection level. All 59 samples taken were below the release criteria level of 0.2 µg/100 cm2.

2003 Crane Bus Bar Investigation: On January 15, 2003, three wipe samples were taken from crane collector shoes and bus bars in 306W.

Maximum Estimated Current Be exposure: LOW

Basis for above information Stone and Webster report, interviews with site personnel, and publication WHC-MR-0388.

Comments, including any additional information needed (specify): Although a small amount of liquid containing beryllium is present. This material is not used and poses no exposure hazard as currently stored. Additionally, beryllium may be present as a contaminant in the exhaust ventilation ducts or on the interior surfaces of machines. Swipe samples are recommended to determine beryllium levels prior to work activities in the exhaust ventilation ducts and prior to release of the machines.

* Considerable additional information may be found in Fact Sheet for Building 306.

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For questons or comments, please send email to Elton_R_Hewitt@rl.gov
URL: file:///A:/Projects/Beryllium%20Compensatory%20Action%20and%20Recovery/References/Building%20Specific%20Information/fctsheet/306-W%20Nov%202000%20updated%20Feb%202003.htm
Last Updated: 06/02/2014 06:42:31

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	318
Date prepared:	November 17, 2000
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1972 End: 1972
Location(s) in facility that contained beryllium materials: Undetermined

Description of beryllium activities: The main 318 Building was completed in 1967 to house the High Temperature Lattice Test Reactor which operated until 1972. The HTLTR was removed between 1978 and 1982 and the building has subsequently been used by PNL to house offices, computers, and work involving calibration of dosimeters and survey equipment. A 1972 report noted that discs contaminated with beryllium were stored in the building.

Building monitoring data summary: Five swipes were collected from the discs and floor with reported results ranging from <0.002 to 0.005 $\mu g/in^2$.

Personnel monitoring data summary: None identified
Specify Engineering/Administrative controls used during operations: None identified

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES

Current building occupancy/activity: This building is occupied by Health Protection Services which provides technical services in internal and external dosimetry as well as instrument calibration, repair, and testing. Research areas and offices are present. Beryllium was present as a 1.8% beryllium/copper alloy in the screens of radiation probes. Stainless steel replacements were obtained for the commonly used radiation instruments during FY2000.

2000 Characterization: Statistical beryllium wipe sampling was conducted in the first floor and basement of the north end (old HTLTR Bldg) of this facility on April 11, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than detectable levels of removable beryllium (<0.1 $\mu g/100\ cm^2$).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report, publication WHC-MR-0388, and interviews with site personnel.

Comments, including any additional information needed (specify): Potential current beryllium exposures are estimated as none because beryllium is only present as beryllium/copper alloy screens in radiation probes and the metal is not ground, machined, or otherwise subjected to activities which would create dust or other particles with the potential to become airborne.

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Last Updated: 06/02/2014 06:42:31

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 325
Date prepared: March 25, 1998
Responsible Contractor: PNNL
Contact: A. L. Nicholson

The RLW Tank was part of the CFD. was in south part of basement
Dave Beckwith - 416
~~Rm 48 Ray Bell~~

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1960 End: Present

Location(s) in facility that contained beryllium materials: Ceramic Fuels Development (shop and other areas); Rm 30 Room 417 (lab hood); Room 522 (storage); Room 417 (acid etch); Room 33 (high temperature furnace); Room 24 (exhaust duct), research labs. 400, 406, 409, 414, 305, [416] (main)

Description of beryllium activities: The 325 Building, known as the Radiochemistry Building, was built in 1953 to safely house and handle multi-curie level chemical development with high activity substances. During 1959 to 1960, the High Level Radiochemistry wing was constructed. The building was transferred to PNL in 1987 and is now called the Applied Chemistry Laboratory. Historic beryllium operations identified include machining and butt welding of pure beryllium in the ceramic fuels development operation in 1960s and beryllium ring storage, acid etching, and quality control in the 1970s. More recent activities include research that, on occasion, may involve small amounts of beryllium.

Building monitoring data summary: Air and/or swipe samples collected in 1961, 62, 63, 66, 67, 68, 77, and 79. Most swipes were less than 0.005 $\mu g/in^2$ with a high value of 2.1 $\mu g/in^2$ (contaminated area inside a test chamber prior to cleaning). Recent air monitoring was conducted during the placement of small beryllium pellets into a tube. All sample results were below detection limits.

Personnel monitoring data summary: General air samples collected during machining in 1960 ranged from <0.005 to 0.18 $\mu g/m^3$ with approximately half of the samples around 0.1 $\mu g/m^3$. Two air samples collected in 1968 had reported results of <0.002 and 0.0001 $\mu g/m^3$. A laboratory hood was decontaminated for beryllium in November 1960. Five general air samples in during the decontamination ranged between 0.001 and 0.008 $\mu g/m^3$ with a sixth general air sample result of 0.130 $\mu g/m^3$. Personal air samples collected during the decontamination ranged between 0.001 and 1.32 $\mu g/m^3$; decontamination personnel wore assault masks.

Specify Engineering/Administrative controls used during operations: Butt welding was performed in negative pressure chambers. Some acid etching was reportedly done in a basement sink and later moved into a ventilated hood. Gloves were generally worn during procedures.

Maximum Estimated Past Be exposure: SIGNIFICANT through 1980, LOW after 1980

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES

Current building occupancy/activity: Ongoing research activities occur in this facility and beryllium is used on occasion. One recent activity involved the placement of small (1 to 2 mg) beryllium pellets into an open topped tube which was then seal welded to form an encapsulated tube for offsite research.

Maximum Estimated Current Be exposure: LOW

Basis for above information: Stone and Webster report, publication WHC-MR-0388, personnel interviews, and chemical inventory.

Comments, including any additional information needed (specify): 1) Potential maximum beryllium exposure is

listed as low because work activities that expose interior areas of older ductwork may have residual beryllium contamination. Swipe samples are recommended prior to work activities inside the ductwork. 2) Room 522 has been extensively renovated. Lab 417 has been incorporated into Lab 419 and is no longer present. Room 24 (also formerly known as the Ceramic Fuels Development Area) is currently named Room 22.

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For questons or comments, please send email to Deborah_M_Reed@rl.gov
URL: http://www.hanford.gov/safety/beryllium/fctsheet/325.htm
Last Updated: 12/28/99 09:45:30

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	325
Date prepared:	June 25, 2002, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS (Prior to 1988)
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1960 End: Present

Location(s) in facility that contained beryllium materials: Ceramic Fuels Development Operations (CFDO) Lab and Shop; Lab 417 (possible acid etch in hood sink); Room 522 (cleaning beryllium rings in hood); Room 33 (high temperature furnace); Room 24 (exhaust duct).

Description of beryllium activities: The 325 Building, known as the Radiochemistry Building, was built in 1953 to safely house and handle multi-curie level chemical development with high activity substances. During 1959 to 1960, the High Level Radiochemistry wing was constructed. The building was transferred to PNL in 1987 and is now called the Radiochemical Processing Laboratory (RPL). Historic beryllium operations identified include machining and butt welding of pure beryllium in the ceramic fuels development operation in 1960s and beryllium ring storage, acid etching, and quality control in the 1970s. More recent activities include research that, on occasion, may involve small amounts of beryllium.

Building monitoring data summary: Air and/or swipe samples collected in 1961, 62, 63, 66, 67, 68, 77, and 79. Most swipes were less than 0.005 $\mu g/in^2$ with a high value of 2.1 $\mu g/in^2$ (32.6 $\mu g/100\ cm^2$) inside the butt-weld process vacuum chamber prior to cleaning.

Personnel monitoring data summary: General air samples collected during machining in 1960 ranged from <0.005 to 0.18 $\mu g/m^3$ with approximately half of the samples around 0.1 $\mu g/m^3$. Two air samples collected in 1968 had reported results of <0.002 and 0.0001 $\mu g/m^3$. A laboratory hood was decontaminated for beryllium in November 1960. Five general air samples in during the decontamination ranged between 0.001 and 0.008 $\mu g/m^3$ with a sixth general air sample result of 0.130 $\mu g/m^3$. Personal air samples collected during the decontamination ranged between 0.001 and 1.32 $\mu g/m^3$. During the decontamination tasks, personnel wore assault masks.

Specify Engineering/Administrative controls used during operations: Butt welding in the CFDO was performed in a vacuum chamber. A recommendation was made to move an acid etching and cleaning operation that was performed in a sink in the CFDO to a sink in a ventilated hood in Room 417. Gloves were generally worn during procedures. Assault masks were worn during decontamination activities. Lathe work on beryllium in the CFDO lab was on an 8 inch bench lathe inside a hood with a Lucite panel fitted with glove ports and face air velocity past the ends of 150 fpm.

Maximum Estimated Past Be exposure: SIGNIFICANT through 1980, LOW after 1980

Basis for above information: Stone and Webster report, publication WHC-MR-0388 and personnel interviews.

CURRENT OPERATIONS (Since 1988)
Building still present: YES
Beryllium present: YES - CMS Chemical inventory shows that liquid beryllium standards are present in Labs 302, 405 and 415; beryllium acetate in Lab 405; and beryllium pellets in Lab 55. These are present in laboratory quantities that are controlled under the Lab Safety Standard.

Current building occupancy/activity: Ongoing research activities occur in this facility and beryllium is used on occasion.

1998: On January 28, air monitoring was conducted during the placement of small (1-5 mg) beryllium pellets into vanadium capsules that were then EB seal welded under vacuum for offsite research. All sample results were below detection limits (0.2 $\mu g/m^3$). There are 20-50 capsules made about once per year.

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility May 3 and 9, 2000 to characterize residual beryllium levels from past operations. All 118 samples taken had less than detectable levels of removable beryllium (<0.1 $\mu g/100\ cm^2$).

2002 Grinder/Welding Booth Investigation: As part of an evaluation of weld booths and grinders, sampling was conducted in craft shop in Rm 206 on May 15, 2002. Eleven wipe samples were taken in the 329 craft shop including the weld booth in the SW corner of the and from grinders located near the south wall adjacent to the weld booth. All samples were below the release criteria of 0.2 µg/100 cm2.

2003 Crane Bus Bar Investigation: On January 9, 2003, three wipe samples were taken with one from a collector shoe, and two from bus bars that provide electrical power to the crane in 325 manufactured by Ederer Cranes, Inc. with Insul-8 electrical components. All three samples were below the release criteria.

Maximum Estimated Current Be exposure: LOW

Current Areas of Potential Exposure: The south portion of Room 45 (From between Rooms 30A and 31, to south of Room 35) where the CFDO lab and shop were located may contain beryllium contamination. While there is no removable beryllium in accessible areas of this area, there is the potential for pockets of contamination in inaccessible locations, based on the nature of the operations in the CFDO and the monitoring results at the time. Potential exposures could occur during invasive work such as remodeling and D&D. Work activities that expose interior areas of beryllium hoods or exhaust ductwork from present or past beryllium hoods may have residual beryllium contamination. Current use of dispersible beryllium standards and beryllium compounds may result in contamination of exhaust systems. Wipe sampling is recommended prior to work activities in hoods or associated ductwork where beryllium is or has been used.

Comments, including any additional information needed (specify): 1) Room 522 has been extensively renovated. 2) Lab 417 has been incorporated into Lab 419 so 417 no longer exists. A sink in a hood in Lab 417 was recommended in 1964 for an acid etch and cleaning operation of beryllium parts so the exhaust from this area may be contaminated. 3) The Ceramic Fuels Development Operations lab and shop area was located in what is currently the southern portion of Room 45 from between Rooms 30A and 31 to south of Room 35. Beryllium activities in this area were conducted intermittently from 1960 to 1964.

Basis for above information: Memo 3/20/98, "Monitoring Results – Beryllium" by FL Pfeiffer, PNNL IH Case # 814, 1531 and the CMS Inventory for 325, IH Case # 1653, Sample Event 4084.

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URL: file:///A:/Projects/Beryllium%20Compensatory%20Action%20and%20Recovery/References/Building%20Specific%20Information/fctsheet/325%20June%202002%20updated%20Feb%202003.htm
Last Updated: 06/02/2014 06:42:31

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 326
Date prepared: March 25, 1998; Updated: January 31, 2000
Responsible Contractor: PNNL
Contact: A.L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1953 End: 1977

Location(s) in facility that contained beryllium materials: Room 14A (irradiation reactor tube); Rooms 6A (thermocouple inside furnace); 48C (grinding machine); 23B (neutron detector); 19B (beryllium hood); 17A (electron microscopy; and 2A (electron microscopy).

Description of beryllium activities: The 326 Building, then known as the Pile Technology Building, opened in 1953 with two primary missions, both associated with the support and production of production pile operations (including fuel jacketing process improvement studies). A November 1954 memo noted a general laxity toward radiation and contamination precautions including refusal to wear respirators. This memo noted that uranium and beryllium fines and grindings were collected in a bag filter system before the installation of HEPA filters in the early 1960s. A 1957 memo identified the transfer of approximately one pound of beryllium oxide dust from one container to another which was conducted in a glove box. A 1964 memo identified a beryllium oxide rod that was used in an irradiation tube probe (coated with epoxy resin) in Room 14A. Several 1966 reports identified beryllium oxide contamination in Room 6A. One event involved a spill of powder during the repair of a thermocouple in a furnace and the other report identified a release from an explosion of a thermocouple in an oven. A 1968 report noted grinding of a 3% beryllium alloy with a belt sander (with local exhaust) in Room 48C. Two 1971 reports noted that beryllium-coated screens were used as sensing units in a neutron detector in Room 23B. The screens were stored in methanol and adherence (flaking) problems were noted. A 1977 report identified a beryllium hood in Room 19B and a second 1977 memo identified the preparation and analysis of beryllium (electron microscopy) in Rooms 17A and 2A.

Building monitoring data summary: Seventeen swipe samples were collected in and around the two furnace releases in
1966. The maximum result was 0.01 mg/in2 and fourteen of the samples were reported at 0.002 mg/in2 or less. Two air
samples were collected after the 1966 explosion with reported concentrations of <0.0004 mg/m3. A single air sample (32
minutes) was collected during the grinding procedure in 1969 with a reported concentration of 0.003 mg/m3 . Three air
samples were collected during plating and coating procedures with the beryllium-coated screens in 1971 that were Aless
than one-tenth the permissible levels.@ Seven swipe samples were collected in Rooms 19B, 17A, and 2A; all were less
than 0.003 mg/in2. In 1996, some material was collected in a ventilation duct and analysis indicated that the material
contained 1.9 mg/kg of beryllium.

Personnel monitoring data summary: No personal air samples were identified. However air sampling results discussed
above were all at low levels or below detection levels.

Specify Engineering/Administrative controls used during operations: Exhaust ventilation and hoods were noted when
pouring the beryllium oxide dust in 1957, grinding the 3% alloy in 1969, and working with laboratory samples in 1977.
Workers wore COMFO7 half-face respirators when working with the beryllium-coated screens in 1971.

Maximum Estimated Past Be exposure: SIGNIFICANT (through mid 1960s) and LOW (after mid 1960s)

CURRENT OPERATIONS
Building still present: YES
Beryllium present: Unknown

Current building occupancy/activity: This building is currently used as a materials sciences laboratory; no beryllium is
currently used or stored in the facility.

1999 Results: On April 14, 1999, fourteen wipe samples were collected in Lab 10A in the 326 Building to quantify residue concentrations of beryllium generated by recent cutting and grinding operation in the lab. Two saws (ISOMET Saw with a hood and ISOMET Slow Speed (SS)) and one grinder (ECOMET III)

were used to cut and grind the beryllium discs. Water was used during the cutting and grinding. None of the equipment was directly connected ventilation. All three machines were wiped down with wet rags and posted "out of service" prior to obtaining the wipe samples. Results ranged from <0.005 ug/cm2 to 0.38 ug/cm2. Clean-up of the lab occurred shortly after. After clean-up, all wipe samples were below the level of detection of <0.05 ug/cm2.

All samples were 100 square centimeters (cm2) samples and were obtained with PaceWipe, pre-moistened wipes. Analysis of the samples was performed by WSCF, by ICM-EM following dry ashing and acid digestion.

Results of the wipe samples are on file with Industrial Hygiene and Occupational Safety.

Maximum Estimated Current Be exposure: LOW

Basis for above information: Stone and Webster report, publication WHC-MR-0388, personnel interviews, and chemical
inventory.

Comments, including any additional information needed (specify): Due to past beryllium work activities, beryllium may be present as a contaminant in the exhaust ventilation ducts and swipe samples should be collected to evaluate interior conditions prior to work activities
inside the ducts.

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	326
Date prepared:	November 20, 2000, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS

Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1953 End: 1977

Location(s) in facility that contained beryllium materials: Room 14A (irradiation reactor tube); Rooms 6A (thermocouple inside furnace); 48C (grinding machine); 23B (neutron detector); 19B (beryllium hood); 17A (electron microscopy; and 2A (electron microscopy).

Description of beryllium activities: The 326 Building, then known as the Pile Technology Building, opened in 1953 with two primary missions, both associated with the support and production of production pile operations (including fuel jacketing process improvement studies). A November 1954 memo noted a general laxity toward radiation and contamination precautions including refusal to wear respirators. This memo noted that uranium and beryllium fines and grindings were collected in a bag filter system before the installation of HEPA filters in the early 1960s. A 1957 memo identified the transfer of approximately one pound of beryllium oxide dust from one container to another which was conducted in a glove box. A 1964 memo identified a beryllium oxide rod that was used in an irradiation tube probe (coated with epoxy resin) in Room 14A. Several 1966 reports identified beryllium oxide contamination in Room 6A. One event involved a spill of powder during the repair of a thermocouple in a furnace and the other report identified a release from an explosion of a thermocouple in an oven. A 1968 report noted grinding of a 3% beryllium alloy with a belt sander (with local exhaust) in Room 48C. Two 1971 reports noted that beryllium-coated screens were used as sensing units in a neutron detector in Room 23B. The screens were stored in methanol and adherence (flaking) problems were noted. A 1977 report identified a beryllium hood in Room 19B and a second 1977 memo identified the preparation and analysis of beryllium (electron microscopy) in Rooms 17A and 2A.

Building monitoring data summary: Seventeen swipe samples were collected in and around the two furnace releases in 1966. The maximum result was 0.01 $\mu g/in^2$ and fourteen of the samples were reported at 0.002 $\mu g/in^2$ or less. Two air samples were collected after the 1966 explosion with reported concentrations of <0.0004 $\mu g/m^3$. A single air sample (32 minutes) was collected during the grinding procedure in 1969 with a reported concentration of 0.003 $\mu g/m^3$. Three air samples were collected during plating and coating procedures with the beryllium-coated screens in 1971 that were Aless than one-tenth the permissible levels.@ Seven swipe samples were collected in Rooms 19B, 17A, and 2A; all were less than 0.003 $\mu g/in^2$. In 1996, some material was collected in a ventilation duct and analysis indicated that the material contained 1.9 mg/kg of beryllium.

Personnel monitoring data summary: No personal air samples were identified. However air sampling results discussed above were all at low levels or below detection levels.

Specify Engineering/Administrative controls used during operations: Exhaust ventilation and hoods were noted when pouring the beryllium oxide dust in 1957, grinding the 3% alloy in 1969, and working with laboratory samples in 1977. Workers wore COMFO[7] half-face respirators when working with the beryllium-coated screens in 1971.

Maximum Estimated Past Be exposure: SIGNIFICANT (through mid 1960s) and LOW (after mid 1960s)

CURRENT OPERATIONS

Building still present: YES
Beryllium present: Unknown

Current building occupancy/activity: This building is currently used as a materials sciences laboratory; no beryllium is currently used or stored in the facility.

1999 Results: On April 14, 1999, fourteen wipe samples were collected in Lab 10A in the 326 Building. The purpose of collecting the wipe samples was to quantify residue concentrations of beryllium generated by recent cutting and grinding operations in the lab. Two saws (ISOMET Saw with a hood and ISOMET Slow Speed (SS)) and one grinder (ECOMET III) were used to cut and grind the beryllium discs. Water was used during the cutting and grinding. None of the equipment is directly connected ventilation. All three machines were wiped down with wet rags and posted "out of service" prior to obtaining the wipe samples. Results ranged from <0.005 ug/cm2 to 0.38 ug/cm2. Clean-up of the lab occurred shortly after. After clean-up, all wipe samples were below the level of detection of <0.005 ug/cm2.

All samples were 100 square centimeters (cm2) samples and were obtained with PaceWipe, pre-moistened wipes. Analysis of the samples was performed by WSCF, by ICM-EM following dry ashing and acid digestion.

Results of the wipe samples are on file with Industrial Hygiene and Occupational Safety.

2000 Characterization: Statistical beryllium wipe sampling was conducted in suspect areas of this facility (Rooms 2A, 6A, 9A, 10A, 12A, 15A/17A, 21A, 19B, 23B, 47C, and 48C) on April 28, 2000 to characterize residual beryllium levels from past operations. There were 88 samples taken and all were below the housekeeping limit for removable beryllium (<3 µg/100 cm^2). However, two samples in Room 10A were above the release criteria having a maximum contamination level of 0.335 µg/100 cm^2).

2002 Decontamination Sampling: Prior to decontamination, five additional wipe samples were taken August 28, 2002 in Room 10A to determine extent of contamination. All five were below the release criteria.

Room 10A was decontaminated October 10, 2002. Personal and area air samples collected during the cleaning operation were below detection limits. Nine wipe samples were taken to verify decontamination and all were below the release criteria (0.2 µg/100 cm2).

Maximum Estimated Current Be exposure: LOW

Basis for above information: Stone and Webster report, publication WHC-MR-0388, personnel interviews, and chemical inventory.

Comments, including any additional information needed (specify): Beryllium may be present as a contaminant in the exhaust ventilation ducts and swipe samples should be collected to evaluate interior conditions prior to work activities inside the ducts.

Hanford Home Page | Beryllium Facilities at Hanford | Beryllium

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For questons or comments, please send email to Elton_R_Hewitt@rl.gov
URL: file:///A:/Projects/Beryllium%20Compensatory%20Action%20and%20Recovery/References/Building%20Specific%20Information/fctsheet/326%20Nov%202000%20updated%20Feb%202003.htm
Last Updated: 06/02/2014 06:42:31

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	329
Date prepared:	November 20, 2000, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS

Beryllium brought in facility: Yes
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1950s End: Present

Location(s) in facility that contained beryllium materials: Chemistry labs and pre-fabricated windows for X-ray and gamma spectrometers.

Description of beryllium activities: The 329 biophysics Laboratory was completed in 1953 to support the HW environmental and bioassay programs. According to a 1953 memo, an experimental study involved the sawing of 5% beryllium ingots and the use of melt pots for the beryllium alloy. According to the memo industrial hygiene support was recommended; there is no data available indicating that such activities occurred. Interviews with current employees did not uncover any indication that past machining activities occurred. In 1954, a radium-beryllium source being used to calibrate a cobalt-60 source was dropped and spread contamination throughout six labs and an adjacent hallway.
Beryllium is present in pre-fabricated windows in X-ray and gamma spectrometers. Additionally, a chemical inventory records identified 25 grams of solid beryllium and 250 ml of liquid beryllium used for laboratory standards. These laboratory standards have not been used for several years.

Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.

Specify Engineering/Administrative controls used during operations: Lab work is conducted in ventilated hoods.

Maximum Estimated Past Be exposure: LOW prior to 1980, NONE since 1980

CURRENT OPERATIONS

Building still present: YES
Beryllium present: YES

Current building occupancy/activity: Research including wet chemistry. Although a small quantity (25 grams) of beryllium is present, it has not been used for several years.

2000 Characterization: Statistical beryllium wipe sampling was conducted in suspect areas of this facility on May 12, 2000 to characterize residual beryllium levels from past operations. All but one of 59 samples taken had removeable beryllium levels less than the public release limit of (<0.2 µg/100 cm^2). One sample taken on an elevated brace to a splash guard behind a lathe in the machine shop (Room 17C) had a removable beryllium level of 4.39 µg/100 cm^2).

2000 Decontamination: The contaminated brace was cleaned and 17 additional samples were taken from the brace, the floor below, the splash guard, the lathe and from other equipment throughout the shop. All samples had less than detectable levels of removable beryllium (<0.1 µg/100 cm^2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report, publication WHC-MR-0388, personnel interviews, and chemical inventory.

Comments, including any additional information needed (specify): 1) The current maximum potential exposure is estimated as none because the small quantity of beryllium present is maintained in a sealed container. 2) Approximately 80 percent of the exhaust ventilation ducts were removed and replaced in 1995-96. Analysis of the dust/dirt collected in the remaining exhaust fan filter housing did not reveal any concentration of beryllium. 3) Although a 1953 memo identified a potential experimental study involving sawing and melting of beryllium ingots, no confirmation of these activities could be identified. It is believed that this study did not occur.

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Last Updated: 06/02/2014 06:42:32

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	331
Date prepared:	March 25, 1998; updated January 23, 2001
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID (dust)
Period of beryllium operations (dates): Start: 1974 End: 1979
Location(s) in facility that contained beryllium materials: Small animal exposure facility.

Description of beryllium activities: The 331 Life Science Building was constructed in 1970 for biological and botanical research which were believed to include beryllium research. The building was primarily used for animal studies.

Building monitoring data summary: Four swipe samples and two air samples were collected from the small animal facility in 1974. The swipe samples ranged between 0.007 and 0.017 $\mu g/in^2$ and the air samples were below the detection limits (<0.018 $\mu g/m^3$). Two filter samples were submitted in 1979 with reported results of 0.04 and 0.88 ng/m^3 (high volume samples). The location of these two air samples was not identified in the report.

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO

Current building occupancy/activity: This building is currently used for research and experimental studies to understand molecular and cellular processes resulting from insult by physical and chemical agents.

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility on April 14, 2000 to characterize residual beryllium levels from past operations. Samples were taken in Rooms 122, 170W, 170E, and in the second floor mechanical room near penetrations made to suspect rooms. All 29 samples taken had less than the public release limit of removable beryllium (<0.2 µg/100cm2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report, report, publication WHC-MR-0388, and personnel interviews.

Comments, including any additional information needed (specify): None

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Last Updated: 06/02/2014 06:42:32

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	2400 Stevens
Date prepared:	November 17, 2000
Responsible Contractor:	PNNL
Contact:	R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: Unknown
Period of beryllium operations (dates): Start: 1980s End: 1980s
Location(s) in facility that contained beryllium materials: Cabinet in High Bay
Description of beryllium activities: A small amount of beryllium was reportedly used in a research lab.
Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.

Specify Engineering/Administrative controls used during operations: Beryllium is enclosed in plastic. Work conducted in hoods.

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: 221 people. Building is used for research and offices.

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility February 18, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than detectable levels of removable beryllium (<0.1 µg/100 cm^2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Review of chemical inventory and interviews with site personnel.

Comments, including any additional information needed (specify): Beryllium metal is enclosed in plastic wrap and used as a sample (among other metals) for product development.

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Last Updated: 06/02/2014 06:42:30

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	3708
Date prepared:	March 25, 1998
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1950s End: 1980s
Location(s) in facility that contained beryllium materials: Unknown

Description of beryllium activities: This building, known as the Radiation Measurements Building, was built in 1948 to process personnel dosimetry badges and meters. In the early 1960s, the building was an electrical and optical shop used for storage, maintenance, and development of electrical and optical instruments. From 1967 to 1968, the facility was renovated and used as a fuel fabrication facility. In 1968, neptunium oxide fuel targets were manufactured. The following year, another blend was manufactured. Major renovations occurred in the mid-1980s when the floors, ceilings, walls, and major ventilation ducts were replaced. In the early 1990s, the north end of the building was used for the experimental canning of americium oxide and curium oxide fuel blends. From 1986 until 1997 the building was used for wet chemistry work. In 1997, the building occupants were moved out and the building was shut down.

Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: This facility has been unoccupied since 1996.

Maximum Estimated Current Be exposure: NONE

Basis for above information: Interviews with site personnel and WHC-MR-0388.

Comments, including any additional information needed (specify): Although many alpha emitters were used, no information has been identified to support the conclusion that beryllium was brought into the facility or worked with. The probes on counters for the badges have a beryllium alloy (1.84% beryllium) screen which may have been the reason this building was included as a potential beryllium site.

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Last Updated: 12/28/99 09:45:41

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	3708
Date prepared:	February 23, 2004
Responsible Contractor:	FH-CP
Contact:	Kenneth Jaten

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1950s End: 1980s
Location(s) in facility that contained beryllium materials: Unknown

Description of beryllium activities: This building, known as the Radiation Measurements Building, was built in 1948 to process personnel dosimetry badges and meters. In the early 1960s, the building was an electrical and optical shop used for storage, maintenance, and development of electrical and optical instruments. From 1967 to 1968, the facility was renovated and used as a fuel fabrication facility. In 1968, neptunium oxide fuel targets were manufactured. The following year, another blend was manufactured. Major renovations occurred in the mid-1980s when the floors, ceilings, walls, and major ventilation ducts were replaced. In the early 1990s, the north end of the building was used for the experimental canning of americium oxide and curium oxide fuel blends. From 1986 until 1997 the building was used for wet chemistry work. In 1997, the building occupants were moved out and the building was shut down.

Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: This facility has been unoccupied since 1996.

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility on May 12, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than detectable levels of removable beryllium (<0.1 µg/100 cm^2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Interviews with site personnel and WHC-MR-0388.

Comments, including any additional information needed (specify): Although many alpha emitters were used, no information has been identified to support the conclusion that beryllium was brought into the facility or worked with. The probes on counters for the badges have a beryllium alloy (1.84% beryllium) screen which may have been the reason this building was included as a potential beryllium site.

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Last Updated: 06/02/2014 06:42:32

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	3720
Date prepared:	March 25, 1998; Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	A. L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1959 End: 1971
Location(s) in facility that contained beryllium materials: Laboratory, Room 502

Description of beryllium activities: This building, known as the Central Services Laboratory, was built in 1959 and used for analytical chemistry work in support of HW reactors until the early 1970s. In 1971, it was transferred to PNL and used by many departments including craft services; fuels and metallurgy; and atmospheric sciences. Beryllium and other wastes were generated from the analytical work in the 1960s a major beryllium decontamination effort was undertaken by PNL in 1972.

Building monitoring data summary: Thirteen swipe samples were collected in 1972 from the laboratory beryllium zone to identify potential contamination from previous users of the building. Nine swipes were below detection limits of 0.001 to 0.0013 $\mu g/in^2$. Four samples had detectable beryllium including the grinder cast surface (0.0026 $\mu g/in^2$), large hood on east wall (0.0085 $\mu g/in^2$), grinding motor and wheel (0.0831 $\mu g/in^2$), and the top of the grinder (0.0130 $\mu g/in^2$). In 1980, two swipe samples were collected from a ventilation duct prior to planned renovations with reported results below detection limits of 0.002 $\mu g/in^2$.
In May 1990, wipe and breathing zone samples were obtained during a cutting and polishing operation in Room 502. Wet methods were utilized and breathing zone samples were below detection limits. Wipe samples ranged from <0.08 to 0.18 $\mu g/in^2$.

Personnel monitoring data summary: Breathing zone samples obtained during a cutting and polishing operation in 1990 were below detection limits.

Specify Engineering/Administrative controls used during operations: Wet methods are used during a cutting and polishing operations. Lab work is conducted in ventilated hoods.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: Contamination.
Current building occupancy/activity: Laboratory research.

1999 Characterization of Lab 502: Twenty-six (26) wipe samples were taken in November 1999. The results of the samples revealed high concentrations of beryllium inside the glove box located on the south wall (590ug/100cm2). On the outside surface of the glove box, levels of beryllium were at 1.9 ug/100 cm2. Concentrations of beryllium in the fume hoods varied from 0.61ug/100 cm2 to 1.2ug/100 cm2. The top surface of the HEPA filter located on the east side of the lab had beryllium contamination levels of 0.83 ug/100 cm2. All other locations sampled (floor, counter tops, cabinet shelf, canopy hood, light fixtures, and drawers) were below the level of detection (<0.5ug/100 cm2). The lab is currently posted as beryllium contaminated and access into the lab is restricted requiring building management approval.

Maximum Estimated Current Be exposure: Lab 502 has restricted access. For staff performing building walkthroughs in all areas except Lab 502, exposure to beryllium will be none. For non-routine activities associated with Lab 502, such as breaching facility systems, exposure levels are unknown.

Basis for above information: Stone and Webster report, publication WHC-MR-0388, personnel interviews, chemical inventory information, IH Case # 99-075.

Comments, including any additional information needed (specify): Beryllium may be present as a contaminant in the exhaust ventilation duct and associated hood where machining of beryllium was conducted. Swipe samples are recommended to determine potential beryllium concentrations prior to work activities inside the ductwork.

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URL: file:///A:/Projects/Beryllium%20Compensatory%20Action%20and%20Recovery/References/Building%20Specific%20Information/Hanford%20Beryllium%20Facility%20Fact%20Sheets/3720%20March%201998%20updated%20Feb%202003.htm
Last Updated: 06/02/2014 06:42:32

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 3731-A
Date prepared: March 25, 1998; Updated: January 31, 2000
Responsible Contractor: PNNL
Contact: A.L. Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1987 End: 1990
Location(s) in facility that contained beryllium materials: Sheldon lathe in the graphite shop

Description of beryllium activities: Beryllium was machined on the lathe. This may have been a one-time incident.

Building monitoring data summary: Five swipe samples were collected after the machining operation which ranged from
0.1 to 5.2 mg/in2 . Four additional swipes were collected after decontamination of which three were below detection limits
ranging between (0.2 to 0.03 mg/in2) and the fourth had a reported result of 0.04 mg/in2.

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: Contamination from beryllium machining activities may be present.
Current building occupancy/activity: This building is currently unoccupied.

Maximum Estimated Current Be exposure: For staff performing building walkthroughs, exposure to beryllium would be none. For non-routine activities such as breaching facility systems, machines or equipment, exposure levels are unknown.

Basis for above information: Stone and Webster report
Comments, including any additional information needed (specify):
Characterization of the machine shop and equipment should be performed to quantify contamination levels.

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 3745-B
Date prepared: March 25, 1998: Updated: January 31, 2000
Responsible Contractor: PNNL
Contact: AL Nicholson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1949 End: Post-1982
Location(s) in facility that contained beryllium materials: Optical shop

Description of beryllium activities: The 3745-B Building was built in 1949 as a shielded laboratory facility for positive ion accelerator research. Disc targets were plated with beryllium using bell jars under high vacuum and the beryllium was vaporized onto platinum discs. Beryllium rods (wrapped in plastic) were brought into the building in 1982.

Building monitoring data summary: According to a 1962 memo, five swipe samples were collected but no data was provided in the report. According to a 1982 memo, two additional swipe samples were collected in 1982 that were reportedly below detection limits, but detection limits were not reported.

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: This building has been unoccupied since December 1995
Maximum Estimated Current Be exposure: For staff performing building walkthroughs, exposure to beryllium would be none. For non-routine activities such as breaching facility systems, exposure levels are unknown.

Basis for above information: Stone and Webster report.
Comments, including any additional information needed (specify):
Characterization of the building should be performed to quantify contamination levels.

Hanford Facility Beryllium Fact Sheet

Building Number/Name: 6th Street Warehouse
Date prepared: March 25, 1998
Responsible Contractor: PNNL
Contact: R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1983 End: 1980s
Location(s) in facility that contained beryllium materials: Grinder machine North side - Shop area

Description of beryllium activities: According to a Dec 1983 memo, beryllium contamination was identified on a grinder machine in the building.

Building monitoring data summary: Swipe samples were collected with reported values ranging from 0.04 to <1.5 $\mu g/in^2$, however, the number of swipes and resultant concentrations were not identified.

Personnel monitoring data summary: None identified.

Specify Engineering/Administrative controls used during operations: None identified. Additional cleaning and followup sampling were recommended.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO

Current building occupancy/activity: 54 Occupants - This building is used for maintenance shops as well as a shipping and receiving area.

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report, interviews with site personnel.

Comments, including any additional information needed (specify): The grinder was removed in the mid-1980s.

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URL: http://www.hanford.gov/safety/beryllium/fctsheet/6thstwh.htm
Last Updated: 12/28/99 09:45:52

Current - later w/ hoses. - manager: John Anderson.

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	6th Street Warehouse
Date prepared:	July 23, 2002
Responsible Contractor:	PNNL
Contact:	R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1983 End: 1980s
Location(s) in facility that contained beryllium materials: Grinder machine

Description of beryllium activities: According to a Dec 1983 memo, beryllium contamination was identified on a grinder machine in the building.

Building monitoring data summary: Swipe samples were collected with reported values ranging from 0.04 to >1.5 $\mu g/in^2$, however, the number of swipes and resultant concentrations were not identified.

Personnel monitoring data summary: None identified.

Specify Engineering/Administrative controls used during operations: None identified. Additional cleaning and followup sampling were recommended.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO

Current building occupancy/activity: 54 Occupants - This building is used for maintenance shops as well as a shipping and receiving area.

2000 Characterization: Statistical beryllium wipe sampling was conducted throughout this facility on April 26, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than the public release limit of removable beryllium (<0.2 $\mu g/100\ cm^2$).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report, interviews with site personnel.

Comments, including any additional information needed (specify): The grinder was removed in the mid-1980s.

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	EDL
Date prepared:	November 17, 2000
Responsible Contractor:	PNNL
Contact:	R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: pre-1980 End: 1980s
Location(s) in facility that contained beryllium materials: Oven in high bay area

Description of beryllium activities: Beryllium thermocouple sheathing was used in the oven in the high bay area. A meltdown of the thermocouple ocured in 1980 and the oven door was opened potentially exposing occupants in the area.

Building monitoring data summary: Three air and two swipe samples were collected on the day after the thermocouple meltdown. All five samples were below detection limits (<0.029 $\mu g/m^3$ for the airs and <0.002 $\mu g/in^2$ for the swipes).

Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: None identified.

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: Research, 7 occupants

2000 Characterization: Statistical beryllium wipe sampling was conducted in this facility on May 12, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than detectable levels of removable beryllium (<0.1 µg/100 cm^2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report and interviews with site personnel.
Comments, including any additional information needed (specify): None

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Hanford Facility Beryllium Fact Sheet

Building Number/Name: MSL5 Date prepared: 2-5-98

Responsible Contractor: PNNL Prepared by: Richard E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES Form of beryllium: LIQUID
Period of beryllium operations (dates): Start 1992 End Present

Location(s) in facility that contained beryllium materials: Room 227

Description of beryllium activities: Small concentrations of Beryllium used in standards to calibrate equipment (ICP Standards). This equipment is used to analyze marine samples for potential beryllium content.

Building monitoring data summary: None

Personnel monitoring data summary: None

Specify Engineering/Administrative controls used during operations: None

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS
Building still present: YES Beryllium present: YES

Current building occupancy/activity: 37 Occupants/Marine Research

Maximum Estimated Current Be exposure: NONE

Basis for above information: Discussed the research with principle investigator.

Comments, including any additional information needed (specify): There is no potential for inhalation of beryllium.

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Hanford Facility Beryllium Fact Sheet

Building Number/Name:	PSL
Date prepared:	November 17, 2000
Responsible Contractor:	PNNL
Contact:	R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID
Period of beryllium operations (dates): Start: 1981 End: 1980s
Location(s) in facility that contained beryllium materials: Insulated thermocouples

Description of beryllium activities: A September 1981 memo identified potential beryllium exposure from lapping and polishing of mounted metallographic samples of beryllium oxide insulated thermocouples.

Building monitoring data summary: One swipe sample was collected which was below the detection limit of 0.06 $\mu g/in^2$.

Personnel monitoring data summary: None identified. However, the 1981 memo from HEHF stated that "no exposures to beryllium compounds would be anticipated" based on the limited number of materials, minimal lapping and polishing required, minute concentrations of beryllium present, and thoroughly oiled contact surfaces.

Specify Engineering/Administrative controls used during operations: The memo recommended the use of surgeons gloves when handling the materials, changeout of lapping and polishing solutions upon completion of use with beryllium materials, and HEHF support to evaluate cleanup efforts.

Maximum Estimated Past Be exposure: NONE (per HEHF)

CURRENT OPERATIONS
Building still present: YES
Beryllium present: NO
Current building occupancy/activity: Research, 99 occupants.

2000 Characterization: Statistical beryllium wipe sampling was conducted in the shop areas in the basement of this facility (Rooms 249, 251, 200, 201N, 201S) on April 25, 2000 to characterize residual beryllium levels from past operations. All 29 samples taken had less than the public release limit of removable beryllium (<0.2 $\mu g/100\ cm^2$).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report and interviews with site personnel
Comments, including any additional information needed (specify): None

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Hanford Facility Beryllium Fact Sheet

Building Number/Name: RTL520 Date prepared: 2/5/98

Responsible Contractor: PNNL Prepared by: Richard E. Johanson

PAST OPERATIONS

Beryllium brought in facility: YES Form of beryllium: SOLID

Period of beryllium operations (dates): Start 1985 End 1997

Location(s) in facility that contained beryllium materials: Stored in Room 436 and deposition took place in room 418 and 126

Description of beryllium activities: Sputtering. The material is solid and is and atomized onto a surface in the form of a film.

Building monitoring data summary:

Personnel monitoring data summary:

Specify Engineering/Administrative controls used during operations: This process takes place in a vacuum system. In room 126 there was also a negative pressure enclosure protected by a HEPA filter

Maximum Estimated Past Be exposure: NONE

CURRENT OPERATIONS

Building still present: YES Beryllium present: YES

Current building occupancy/activity: 77 Occupants/Research

Maximum Estimated Current Be exposure: NONE

Basis for above information: Talked with research staff involved in this project. The sputtering operation is currently down.

Comments, including any additional information needed (specify:

Sputtering may begin again depending upon clients needs.

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	RTL-520
Date prepared:	November 20, 2000, Updated February 7, 2003
Responsible Contractor:	PNNL
Contact:	R. E. Johanson

PAST OPERATIONS
Beryllium brought in facility: YES
Form of beryllium: SOLID & LIQUID
Period of beryllium operations (dates): Start: 1983 End: 1997
Location(s) in facility that contained beryllium materials: Rooms 436, 418, 126, 346, 432, 415, and 442

Description of beryllium activities: A 1983 report noted that beryllium was used to coat specimen samples in a sputtering chamber (housed in a plexiglass chamber with negative ventilation) in Room 432. Beryllium contamination was identified inside a vacuum furnace according to a 1984 memo; this furnace was subsequently disposed of. Beryllium was identified in swipe samples from a plexiglass containment box located in Room 442 in 1986. Sputtering occurred between 1985 and 1997 in Rooms 436, 418, and 126 where a solid material was atomized onto surfaces in the form of a film.
In January 1996, research activities occurred where beryllium samples were solidified by immersion in liquid nitrogen, sealed in a valved container, warmed up, and stored in a suitable storage area. Approximately 0.5 grams were released into the room during this process when a glass failure occurred. The room was under negative pressure in relation to the corridor and cleanup activities occurred.

Building monitoring data summary: In 1983, six swipe samples were collected in Room 432; all were below detection limits ranging from <0.01 to <0.003 $\mu g/in^2$. Two air samples were collected at the same time with reported results of <0.19 $\mu g/m^3$. Three swipe samples were collected from surfaces of a vacuum furnace in Room 415 in 1984 with results of 0.330, 0.390, and <0.003 $\mu g/in^2$. Three swipe samples were collected inside a ventilated chamber in 1987 where 100% beryllium was sputtered onto titanium chips; sample results were 17.6 $\mu g/in^2$ (on body shield for chamber extension, <0.03 $\mu g/in^2$ (on top flange inside the hood), and 0.21 $\mu g/in^2$ (on miscellaneous chamber pieces). Two air samples were collected during this procedure with results of 28 $\mu g/m^3$ (inside the hood) and <2 $\mu g/m^3$ (in the breathing zone of the worker). Wipe samples were collected inside Room 346 in January 1996 to determine the adequacy of cleanup and the room was determined to be clean.

Personnel monitoring data summary: Additionally to the personal sample described above, monitoring was conducted during the cleanup of Room 346 in 1996; all sample results were below the TLV.

Specify Engineering/Administrative controls used during operations: Work has been conducted in negative pressure enclosures. Workers involved in the cleanup of Room 346 wore respiratory protection.

Maximum Estimated Past Be exposure: LOW

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES
Current building occupancy/activity: 77 Occupants/Research activities

2000 Characterization: Statistical beryllium wipe sampling was conducted in suspect areas of this facility (Rooms 126, 346, 416, 418, 428, 436, 438, and 442) on April 10, 2000 to characterize residual beryllium levels from past operations. All 59 samples taken had less than the housekeeping limit for removable beryllium (<3 $\mu g/100\ cm^2$) but with many above the public release criteria (0.2 $\mu g/100\ cm^2$) with a maximum contamination level of 0.879

µg/100 cm^2). Labs 126, 346, 416, 438 and 442 had contamination above the release criteria.

2002 Grinder/Welding Booth Investigation:

2002 Decontamination Sampling: Air samples collected during the decontamination job were below the detection level. Following decontamination, 43 wipe samples were taken in Rooms 84, 126, 346, 416, 438, and 442 on September 19, 2002 to determine effectiveness of decontamination. All samples were below the release criteria (<0.2 µg/100 cm2).

Maximum Estimated Current Be exposure: NONE

Basis for above information: Stone and Webster report and interviews with current staff.

Comments, including any additional information needed (specify): Although beryllium is present, there is no current potential for exposure because it is not currently used and is stored as solid beryllium articles. In the event that sputtering (or other uses of beryllium) resumes, work will be conducted in a ventilated hood with industrial hygiene supervision to eliminate potential exposure.

Hanford Home Page | Beryllium Facilities at Hanford | Beryllium

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Appendix C

PNNL-Managed Facilities (April 2000)

Appendix C

PNNL-Managed Facilities (April 2000)

The information in the PNNL Managed Space List for April 4, 2000, was provided by Whitney Mosey in May 2014.

Area	Building	Area	Building	Area	Building	Area	Building
300	314	300	331C	RCHN	CEL	RCHN	PGF3
300	318	300	331D	RCHN	CIC	RCHN	PGF4
300	320	300	331G	RCHN	EDL	RCHN	PGF5
300	323	300	331H	RCHN	EESB	PASCO	POP
300	325	300	350A	RCHN	EESB	OS	PORTLAND
300	325	300	350B	300	EMSL	RCHN	PSL
300	326	300	350C	300	EMSL	RCHN	PSL
300	329	300	350D	RCHN	EPRI1	RCHN	ROB
300	331	300	3614A	RCHN	EPRI2	RCHN	RRS
300	331	300	3718A	RCHN	ESB	RCHN	RTL510
300	331	300	3718P	RCHN	ETB	RCHN	RTL520
300	332	300	3718S	RCHN	ETB	RCHN	RTL530
300	336	300	3731A	RCHN	GES	RCHN	RTL540
300	337	300	3745A	RCHN	ISB1	RCHN	RTL550
300	337	300	3745B	RCHN	ISB2	RCHN	RTL560
300	338	600	400EMS	RCHN	LS	RCHN	RTL570
300	350	PASCO	614BYRL	RCHN	LSL	RCHN	RTL580
300	361	PASCO	614BYRL	RCHN	LSLA	RCHN	RTL590
600	614	600	622A	RCHN	LSLB	RCHN	SARR
300	3708	600	622B	RCHN	MATH	RCHN	SIGMA3
300	3720	600	622C	MSL	MSL1	RCHN	SIGMA5
300	3730	600	622F	MSL	MSL1W	OS	TACOMA
300	3731	600	622R	MSL	MSL2	RCHN	TSW
300	3745	600	622R	MSL	MSL3	OS	WDC
300	3760	600	6652C	MSL	MSL4	OS	WDC
300	3762	600	6652CSHED	MSL	MSL5		
300	3764	600	6652D	MSL	MSL5A		
600	100EMS	600	6652DOME1	MSL	MSL5B		
600	1614D3	600	6652DOME2	MSL	MSL5C		
600	1614D3	600	6652E	MSL	MSL6		
600	213J	600	6652G	MSL	MSLTRL1		
RCHN	2400STV	600	6652H	RCHN	OSB		
200E	242B	600	6652I	RCHN	PDLE		
200E	242BL	600	6652J	RCHN	PDLW		
RCHN	2440STVCN	600	6652LP	RCHN	PGF1		
200E	2718E	600	6652M	RCHN	PGF2		
300	300EMS	600	6652UP				
300	303C	700	747A				
300	303J	700	747ATRL1				
300	305B	700	825JADWIN				
300	306W	700	825JADWIN				
300	306W	RCHN	ANNEX				
300	314B	RCHN	APEL				
300	318TRL4	RCHN	AUD				
300	331A	RCHN	BRSW				
300	331B	SEA	BSRC				

Area Acronyms
RCHN Richland
SEA Seattle
MSL Marine Sciences Laboratory (Sequim)
OS Offsite

Appendix D

PNNL Beryllium Sample Plan (Piatt 2000)

Appendix D

PNNL Beryllium Sample Plan (Piatt 2000)

BERYLLIUM SAMPLING PLAN

Background

Worker exposure to beryllium and its associated health risks were identified by the DOE (10 CFR Part 850) as a major health issue that required proactive measures to minimize exposures at DOE facilities. To implement the requirements of this standard, the Site-wide Beryllium Working Group developed the Hanford Site Beryllium Disease Prevention Program (CBDPP), with an appendix for each contractor to describe their implementation plan.

PNNL manages 20 facilities where historical records indicate beryllium may have been used in the past (see suspect beryllium facilities list http://www.hanford.gov/safety/beryllium/suspect3.htm). Fourteen of these facilities house ongoing operations, while the remaining six are vacant. As part of the implementation plan, PNNL is conducting statistical wipe sampling to characterize these facilities. This characterization effort will determine the residual levels of beryllium contamination, if any, that currently exists in those facilities.

Some wipe sampling had been completed in response to ongoing operations that precluded the need for further sampling.

The objective of characterization sampling is to identify areas in facilities where the beryllium contamination warrants attention, and to eliminate suspect facilities from concern where no such areas exist.

Approach

After review by a PNNL statistician, PNNL has adopted, and is using the sampling approach presented in the "Beryllium Sampling and Analysis Plan for Hanford Facilities" developed by FDH. This plan requires either 29 or 59 wipe samples be taken, based on beryllium use and prior sampling data.

Beryllium use information was downloaded from the Hanford Beryllium Facilities list and investigated to determine the area(s) to be sampled in each facility. Where possible, this included interviews with current and former PNNL staff members who had knowledge of the operations during the time frames when beryllium was reported to have been used.

The occupied facilities were given precedence over unoccupied facilities. The attached table shows the facilities and number of samples to be taken (with the number of blank samples for quality control). It also indicates the sampling date and if sampling has been completed. Sampling is being directed by a Certified Industrial Hygienist from the Safety and Health Technical Support Group.

Samples are being aggregated until a full box is accumulated for shipment for analysis. Plans are to have the samples analyzed at the beryllium analysis laboratory at Y-12 at Oak Ridge, due to their extensive experience and lower costs.

When sample analysis information is received, additional sampling will be conducted in any facility shown to have beryllium contamination over the DOE "housekeeping limit" to better define the boundaries of the contamination.

The results of the beryllium characterization sampling will be documented in a written report. It is anticipated that the characterization results will be included in the Hanford suspect beryllium facilities list to reflect the current condition of these facilities.

Table 1: **Beryllium Sampling Plan and Status**

BUILDING	OPERATIONAL (Y/N)	# SAMPLES	SAMPLING DATE	COMPLETED (Y/N)	SHIPMENT DATE
RTL	Y	59 + 3	4-10-00	Y	
303-J	N	29 + 2	5-4-00		
305-B	Y	29 + 2	4-24-00	Y	
306-W	Y	59 + 3	5-2-00		
314	N	59 + 3	5-3-00		
318	Y	29 + 2	4-11-00	Y	
325	Y	117 + 7	5-5-00		
326	Y	88 + 5	4-28-00	N	
329	Y	59 + 3	4-14-00	Y	
331	Y	29 + 2	4-17-00	Y	
3708	N	29 + 2	5-8-00		
3745-B	N	29 + 2	5-9-00		
EDL	Y	29 + 2	4-24-00	Y	
PSL	Y	29 + 2	4-25-00	Y	
6TH ST.	Y	29 + 2	4-26-00	Y	
2400 STEV.	Y	29 + 2	4-18-00	Y	
303-C	N	59 + 3	5-11-00		
MSL-5	Y		5-12-00		
3731-A	N	29 + 2	2-16-00	Y	
3720	Y			Y	
323 (EQUIP)	Y	10	3-6-00	Y	

Expected date to have sampling completed by is May 15, 2000.
Expected date to receive final sample results is June 30, 2000.

Appendix E

Analytical Laboratory Certificates of Accreditation

Appendix E

Analytical Laboratory Certificates of Accreditation

Current certificates and scope statement were obtained from http://www.aihaaccreditedlabs.org/Pages/ListofAccreditedLabs.aspx

The Y-12 Plant Analytical Chemistry Organization's certificate from 2000 was obtained via email correspondence with the Y-12 manager.

November 27, 2013

Laboratory ID: 101875

Bruce Hey
Waste Sampling and Characterization Facility
PO Box 650, Mail Stop S3-30
Richland, WA 99352

Dear Mr. Hey:

Congratulations! The AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC's Analytical Accreditation Board (AAB) has approved Waste Sampling and Characterization Facility as an accredited Industrial Hygiene and Environmental Lead laboratory.

Accreditation documentation includes the IHLAP and ELLAP accreditation certificate, scope of accreditation document and a copy of the current AIHA-LAP, LLC license agreement (if your completed agreement is not on file at AIHA-LAP, LLC). The accreditation logo has been designed for use by all AIHA-LAP, LLC accredited laboratories. If your laboratory chooses to use the logo in its advertising the laboratory's accreditation, you must complete and return the AIHA-LAP, LLC license agreement to a Laboratory Accreditation Specialist. Once submitted, an electronic copy of the accreditation logo will be sent to you. Please inform us if your laboratory does not wish to use the logo in advertising.

Laboratory accreditation shall be maintained by continued compliance with IHPAT and ELPAT requirements *(see Policy Modules 2B, 2C, and 6),* which includes proficient participation in AIHA-LAP, LLC approved proficiency testing, demonstration of competency, or round robin program as indicated on the AIHA-LAP "Approved PT and Round Robin" webpage, its associated PT-Scope table, and as required in Policy Module 6, for all Fields of Testing (FoTs) for which the laboratory is accredited. An accredited laboratory that wishes to expand into a new FoT must submit an updated accreditation application to AIHA-LAP, LLC for review by the AAB.

Any changes in ownership, laboratory location, personnel, FoTs/Methods, or significant procedural changes shall be reported to AIHA-LAP, LLC in writing within twenty (20) business days of the change.

The accreditation certificate is the property of AIHA-LAP, LLC and must be returned to us should your laboratory withdraw or be removed from the IHLAP and ELLAP.

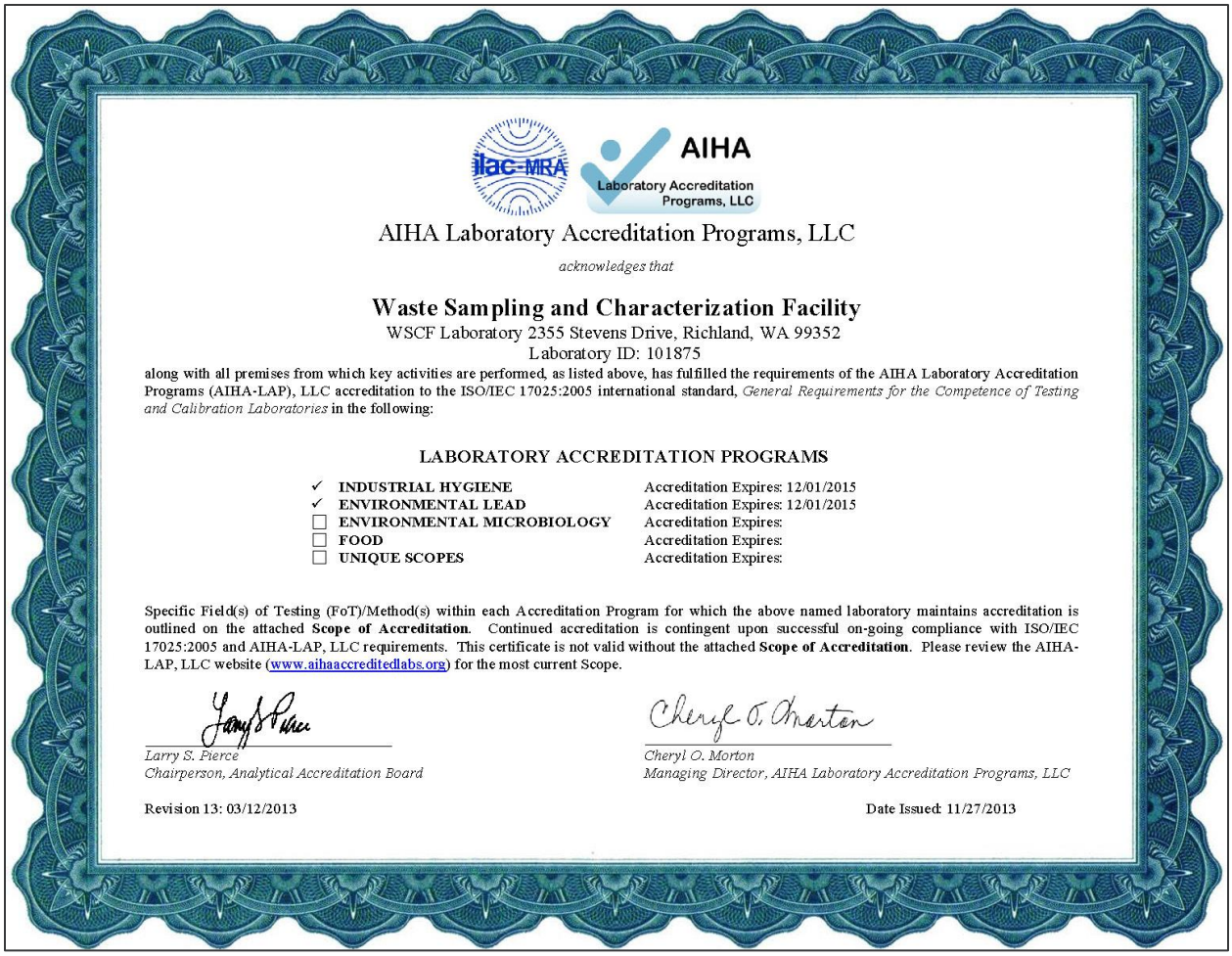
Again, congratulations. If you have any questions, please contact Lauren Maher, Laboratory Accreditation Specialist, at (703) 846-0716.

Sincerely,

Cheryl O. Morton

Cheryl O. Morton
Managing Director
AIHA Laboratory Accreditation Programs, LLC

AIHA Laboratory Accreditation Programs, LLC
3141 Fairview Park Drive, Suite 777, Falls Church, VA 22042 USA
main +1 703-846-0736 *fax* +1 703-207-8558
Twitter: @AIHA_LAP_LLC



AIHA Laboratory Accreditation Programs, LLC

acknowledges that

Waste Sampling and Characterization Facility

WSCF Laboratory 2355 Stevens Drive, Richland, WA 99352

Laboratory ID: 101875

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2005 international standard, *General Requirements for the Competence of Testing and Calibration Laboratories* in the following:

LABORATORY ACCREDITATION PROGRAMS

✓	**INDUSTRIAL HYGIENE**	Accreditation Expires: 12/01/2015
✓	**ENVIRONMENTAL LEAD**	Accreditation Expires: 12/01/2015
☐	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires:
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached **Scope of Accreditation**. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2005 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached **Scope of Accreditation**. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Larry S. Pierce
Chairperson, Analytical Accreditation Board

Cheryl O. Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision 13: 03/12/2013

Date Issued: 11/27/2013

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

Waste Sampling and Characterization Facility
WSCF Laboratory 2355 Stevens Drive, Richland, WA 99352

Laboratory ID: **101875**
Issue Date: 11/27/2013

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Industrial Hygiene Laboratory Accreditation Program (IHLAP)

Initial Accreditation Date: 06/01/1974

IHLAP Scope Category	Field of Testing (FoT)	Technology sub-type/ Detector	Published Reference Method/Title of In-house Method	Method Description or Analyte *(for internal methods only)*
Chromatography Core	**Gas Chromatography**	**GC/FID**	NIOSH 1003 Modified	
			NIOSH 1005 Modified	
			NIOSH 1010 Modified	
			NIOSH 1018 Modified	
			NIOSH 1022 Modified	
			NIOSH 1300 Modified	
			NIOSH 1301 Modified	
			NIOSH 1400 Modified	
			NIOSH 1401 Modified	
			NIOSH 1402 Modified	
			NIOSH 1403 Modified	
			NIOSH 1450 Modified	
			NIOSH 1457 Modified	
			NIOSH 1458 Modified	
			NIOSH 1500 Modified	
			NIOSH 1501 Modified	
			NIOSH 1550 Modified	
			NIOSH 1606 Modified	
			NIOSH 1609 Modified	
			NIOSH 1613 Modified	
			NIOSH 2000 Modified	
			NIOSH 2500 Modified	
			NIOSH 2553 Modified	
			NIOSH 2555 Modified	

AIHA
Laboratory Accreditation Programs, LLC

IHLAP Scope Category	Field of Testing (FoT)	Technology sub-type/ Detector	Published Reference Method/Title of In-house Method	Method Description or Analyte *(for internal methods only)*
Chromatography Core	GC/MS		EPA SW-846 8000 Modified	
			EPA SW-846 8260 Modified	
			NIOSH 2549 Modified	
			USEPA TO-15 Modified	
			USEPA TO-17 Modified	
	Gas Chromatography (Diffusive Samplers)		NIOSH 1003 Modified	
			NIOSH 1005 Modified	
			NIOSH 1010 Modified	
			NIOSH 1022 Modified	
			NIOSH 1300 Modified	
			NIOSH 1301 Modified	
			NIOSH 1400 Modified	
			NIOSH 1401 Modified	
			NIOSH 1402 Modified	
			NIOSH 1450 Modified	
			NIOSH 1457 Modified	
			NIOSH 1458 Modified	
			NIOSH 1500 Modified	
			NIOSH 1501 Modified	
			NIOSH 1550 Modified	
			NIOSH 1606 Modified	
			NIOSH 1609 Modified	
			NIOSH 2500 Modified	
			NIOSH 4000 Modified	
	Ion Chromatography (IC)		NIOSH 7903 Modified	
			OSHA ID-182 Modified	
			OSHA ID-188 Modified	
			OSHA ID-190 Modified	
Spectrometry Core	Inductively-Coupled Plasma	ICP/MS	ASTM D7035-04	
			EPA SW-846 3050 Modified (Solids)	
			EPA SW-846 3050 Modified (Wipes)	
			EPA SW-846 6010 Modified (Filter)	
			EPA SW-846 6010 Modified (Solids)	
			EPA SW-846 6010 Modified (Wipes)	
			NIOSH 7300 Modified	
			NIOSH 7301 Modified	

AIHA
Laboratory Accreditation Programs, LLC

IHLAP Scope Category	Field of Testing (FoT)	Technology sub-type/ Detector	Published Reference Method/Title of In-house Method	Method Description or Analyte *(for internal methods only)*
Spectrometry Core	**Inductively-Coupled Plasma**	**ICP/MS**	NIOSH 7301 Modified (Filter Prep)	
			NIOSH 7303 Modified	
		ICP/AES	ASTM D7035-04	
			EPA SW-846 3050 Modified (Solids)	
			EPA SW-846 3050 Modified (Wipes)	
			EPA SW-846 6010 Modified (Filter)	
			EPA SW-846 6010 Modified (Solids)	
			EPA SW-846 6010 Modified (Wipes)	
			NIOSH 7300 Modified	
			NIOSH 7301 Modified	
			NIOSH 7301 Modified (Filter Prep)	
			NIOSH 7303 Modified	
	Infrared		NIOSH 7602 Modified	
Asbestos/Fiber Microscopy Core	**Polarized Light Microscopy (PLM)**		40 CFR Part 763, Sub. E., Appendix E	Interim Method of the Determination of Asbestos in Bulk Insulation Samples
			EPA 600/R-93/116	
			NIOSH 9002 Modified	
	Phase Contrast Microscopy (PCM)		NIOSH 7400 Modified	
Miscellaneous Core	**Gravimetric**		NIOSH 0500 Modified	
			NIOSH 0600 Modified	
Beryllium Testing	**Inductively-Coupled Plasma**	**ICP/MS**	EPA SW-846 3050 Modified (Solid Prep)	
			NIOSH 7300 Modified	
			NIOSH 7301 Modified (Filter Prep)	
			NIOSH 7303 Modified	
			USEPA 200.8 (Filter)	
			USEPA 200.8 (Solid)	
		ICP/AES	ASTM D-7035-04	Standard Test Method for Determination of Metals and Metalloids in Airborne Particulate Matter by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

AIHA
Laboratory Accreditation Programs, LLC

IHLAP Scope Category	Field of Testing (FoT)	Technology sub-type/ Detector	Published Reference Method/Title of In-house Method	Method Description or Analyte *(for internal methods only)*
Beryllium Testing	**Inductively-Coupled Plasma**	**ICP/AES**	EPA SW-846 3050 Modified (Wipes)	
			EPA SW-846 6010 Modified (Wipes)	
			NIOSH 7300 Modified	
			NIOSH 7301 Modified	
	Optical Fluorescence		NIOSH 7704 Modified	
			NIOSH 9110 Modified	

A complete listing of currently accredited Industrial Hygiene laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

Waste Sampling and Characterization Facility
WSCF Laboratory 2355 Stevens Drive, Richland, WA 99352

Laboratory ID: **101875**
Issue Date: 11/27/2013

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air analysis is not included as part of the NLLAP.

Environmental Lead Laboratory Accreditation Program (ELLAP)

Initial Accreditation Date: 06/25/1996

Field of Testing (FoT)	Method	Method Description *(for internal methods only)*
Paint	EPA SW-846 Method 3050 Modified (Prep)	
	EPA SW-846 Method 6010 Modified (Analysis)	
	NIOSH 7300 Modified	
	NIOSH 7301 Modified	
	NIOSH 7303 Modified	
	USEPA 200.8 Modified	
Soil	EPA SW-846 Method 3050 Modified (Prep)	
	EPA SW-846 Method 6010 Modified (Analysis)	
	NIOSH 7300 Modified	
	NIOSH 7301 Modified	
	NIOSH 7303 Modified	
	USEPA 200.8 Modified	
Settled Dust by Wipe	EPA SW-846 3050 Modified	
	EPA SW-846 6010 Modified	
	NIOSH 7300 Modified	
	NIOSH 7301 Modified	
	NIOSH 7303 Modified	
	USEPA 200.8 Modified	

A complete listing of currently accredited Environmental Lead laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

Effective: 03/12/2013
101875_Scope_ELLAP_2013_11_27
Page 1 of 1

AIHA
The Essential Source

March 8, 1999

Ronald J. McElhaney, Director
Lockheed Martin Energy Systems
Quality Control Room 12
113 C Union Valley Road
Oak Ridge, TN 37831-8190

Laboratory ID: #9244

Dear Mr. McElhaney:

Congratulations! The AIHA IH Laboratory Accreditation Committee and Analytical Accreditation Board of AIHA have approved your reaccreditation. Your laboratory was originally accredited on November 1, 1989 and the enclosed certificate #404 is effective November 1, 1998 until November 1, 2001.

Please note that under the policies of the *Laboratory Quality Assurance Program*, specifically Policy 2.8, laboratories in the IHLAP are required to analyze all proficiency testing samples for those analyte classes accepted for analysis by the laboratory. According to Policy B.6.4, an accredited industrial hygiene laboratory which wishes to expand into a new PAT analyte category must submit an updated accreditation application. A laboratory which fails to comply with these procedures may be subject to revocation of accreditation under Article IV. Advertising that the laboratory is accredited, when the laboratory does not participate in the PAT program is also grounds for revocation of accreditation.

Again, congratulations and we are here to assist you. If you have any needs, problems or questions, please contact me.

Sincerely,

Ms. Charlotte L. Miller
Manager, Laboratory Accreditation Administration

CLM/kjb

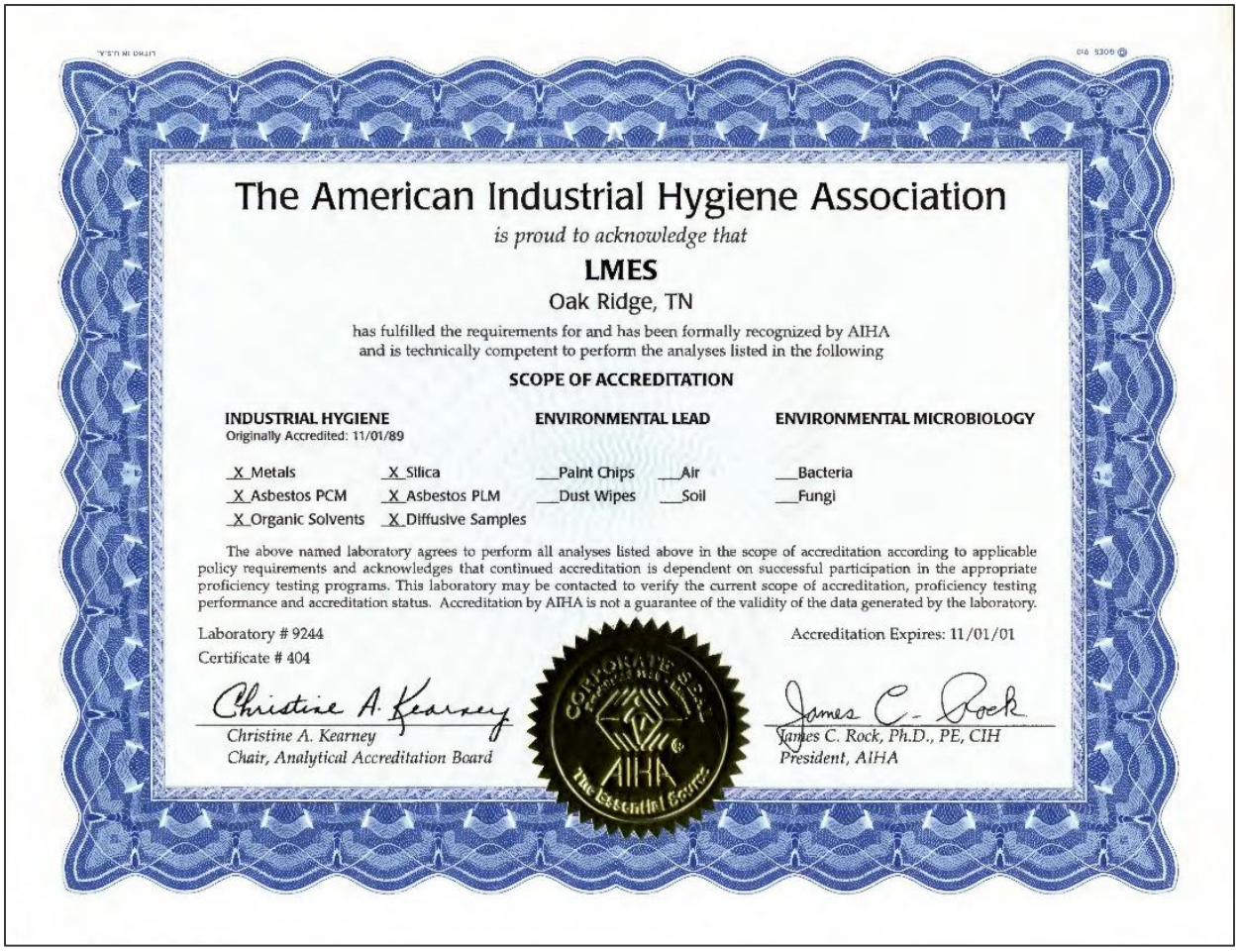
Enclosure

1999 TWENTY FIVE YEARS 25 ACCREDITING LABS AIHA

LABORATORY QUALITY ASSURANCE PROGRAMS

SOUND DATA SMART DECISIONS

American Industrial Hygiene Association
2700 Prosperity Ave., Suite 250, Fairfax, VA 22031
Phone: (703) 849-8888; Fax: (703) 207-3561
InfoFax: (703) 641-4636; Home Page: http://www.aiha.org



The American Industrial Hygiene Association

is proud to acknowledge that

LMES

Oak Ridge, TN

has fulfilled the requirements for and has been formally recognized by AIHA
and is technically competent to perform the analyses listed in the following

SCOPE OF ACCREDITATION

INDUSTRIAL HYGIENE Originally Accredited: 11/01/89		ENVIRONMENTAL LEAD		ENVIRONMENTAL MICROBIOLOGY
_X_Metals	_X_Silica	___Paint Chips	___Air	___Bacteria
_X_Asbestos PCM	_X_Asbestos PLM	___Dust Wipes	___Soil	___Fungi
_X_Organic Solvents	_X_Diffusive Samples			

The above named laboratory agrees to perform all analyses listed above in the scope of accreditation according to applicable policy requirements and acknowledges that continued accreditation is dependent on successful participation in the appropriate proficiency testing programs. This laboratory may be contacted to verify the current scope of accreditation, proficiency testing performance and accreditation status. Accreditation by AIHA is not a guarantee of the validity of the data generated by the laboratory.

Laboratory # 9244
Certificate # 404

Accreditation Expires: 11/01/01

Christine A. Kearney
Christine A. Kearney
Chair, Analytical Accreditation Board

James C. Rock
James C. Rock, Ph.D., PE, CIH
President, AIHA

Appendix F

Beryllium Sampling Results from the 2000 Beryllium Sampling Campaign

Appendix F

Beryllium Sampling Results from the 2000 Beryllium Sampling Campaign

F.1 2400 Stevens

Facility:	**2400 Stevens**
Sample Date:	4/18/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	CO130	2400-01	A001790228	CORRIDOR FROM BACK DOCK E END	< 0.1
1	CO130	2400-02	A001790229	WOMENS RESTROOM DOOR SILL -TOP	< 0.1
1	CORRIDOR	2400-03	A001790230	SILL BELOW ELEVATED DOUBLE DOORS	< 0.1
1	CORRIDOR	2400-04	A001790231	TOP OF ELECTRICAL PANEL G1	< 0.1
1	CO130	2400-05	A001790232	OVER DOUBLE DOORS RM1444 ENTRANCE W END	< 0.1
1	1440	2400-06	A001790233	TOP OF HOOD NW CORNER - HOOD #1	< 0.1
1	1444	2400-07	A001790234	TOP OF OUTLET CONDUIT - N WALL - NW CORNER	< 0.1
1	1448	2400-08	A001790235	TOP OF PANEL BOX FOR EXHAUST HOOD SWITCH NW CORNER	< 0.1

1	1437	2400-09	A001790236	TOP OF ELECTRICAL PANEL L-21 - SE CORNER	<	0.1
1	1441	2400-10	A001790237	SPOT SAMPLES IN OLD CABINET #1450-19	<	0.1
1	1445	2400-11	A001790238	FLOOR - CENTER NORTH	<	0.1
1	1449	2400-12	A001790239	LATHE - BACK SHELF #107.109	<	0.1
1	1845	2400-13	A001790240	TOP OF PANEL MDP 2 BKR #2 - BESIDE ROLLUP DOOR	<	0.1
1	CO125	2400-14	A001790241	CORRIDOR WEST OF RM 1449 - FLOOR - CENTER OF HALL	<	0.1
1	1234	2400-15	A001790242	TOP OF PANEL BOX - N WALL - L16	<	0.1
1	1233	2400-16	A001790243	TOP OF OUTLET CONDUIT - BY SINK - W WALL	<	0.1
1	1230	2400-17	A001790244	TOP OF OUTLET CONDUIT - BEHIND SINK W WALL	<	0.1
1	1229	2400-18	A001790245	TOP OF CABINETS W WALL	<	0.1
1	1225	2400-19	A001790246	TOP OF CABINETS W WALL	<	0.1
1	1226	2400-20	A001790247	TOP OF PANEL BOX N WALL #L17	<	0.1
1	CO119	2400-21	A001790248	DOOR SILL OUTSIDE RM 1222	<	0.1
1	1222	2400-22	A001790249	TOP OF EMERGENCY LIGHT - W WALL	<	0.1
1	1221	2400-23	A001790250	TOP OF DOOR SILL SE CORNER	<	0.1
1	1233	2400-24	A001790251	FLOOR NW CORNER	<	0.1
1	1237	2400-25	A001790252	TOP OF DOOR SILL SW CORNER	<	0.1
1	1241	2400-26	A001790253	TOP OF CABINET - SE CORNER	<	0.1
1	CO119	2400-27	A001790254	TOP OF DOOR SILL OUTSIDE RM 1237	<	0.1
1	1229	2400-28	A001790255	WINDOWSILL - E WALL	<	0.1
1	1221	2400-29	A001790256	CONDUIT - E-WALL	<	0.1
	2400-Blank-1		A001790257	Blank	<	0.1
	2400-Blank-2		A001790258	Blank	<	0.1

F.2 303C Building

Facility:	**303C**
Sample Date:	5/25/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	2.42
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	SE	303C-1	A001890354	TOP OF DOOR SILL - SE ROOM - N DOOR	< 0.1
1	SE	303C-2	A001890355	METAL BRACKET - E WALL	< 0.1
1	SE	303C-3	A001890356	TOP OF DOOR SILL - S DOOR	< 0.1
1	SE	303C-4	A001890357	TOP OF HEPA DUCT - SE AREA	< 0.1
1	SW	303C-5	A001890358	TOP OF ELECT OUTLET - S WALL - W CORNER	< 0.1
1	SW	303C-6	A001890359	FLOOR - SE CORNER - S WALL	< 0.1
1	SW	303C-7	A001890360	TOP OF TUBES - SW CORNER	< 0.1
1	SW	303C-8	A001890361	DIFFUSER GRILL - 2 SECTION	< 0.1
1	W	303C-9	A001890362	FLOOR NEXT TO TUBES (A-11 BLOCK)	< 0.1
1	W	303C-10	A001890363	EDGE OF DIFFUSER GRILL - S CENTRAL AREA	< 0.1
1	W	303C-11	A001890364	WINDOW SILL - S WINDOW, W SIDE	< 0.1
1	W	303C-12	A001890365	TOP OF MOTION DETECTOR, W WALL (CENTER OF ROOM)	< 0.2
1	N	303C-13	A001890366	TOP OF WINDOW SILL - N WINDOW, W SIDE	< 0.1
1	N	303C-14	A001890367	GRILLS ON WALL VENT - CENTER WALL - N END	< 0.2
1	N	303C-15	A001890368	FLOOR - BELOW TUPE #C-02	< 0.2

1	N	303C-16	A001890369	PANEL BOX - N WALL (ALARM BOX)	<	0.1
1	ENTR	303C-17	A001890370	TOP OF COAT RACK - NW WALL - ENTRY ROOM	<	0.1
1	ENTR	303C-18	A001890371	TOP OF DOOR SILL - S DOOR OF ENTRY ROOM	<	0.1
1	ENTR	303C-19	A001890372	TOP OF PANEL BOX - N WALL - E CORNER	<	0.1
1	ENTR	303C-20	A001890373	TOP OF DUCT FROM HEPA FILTER HOUSING - E WALL	<	0.1
1	REC	303C-21	A001890374	WINDOW LEDGE - N END OF CENTER WALL	<	0.1
1	REC	303C-22	A001890375	TOP OF WINDOW SILL - S END OF CENTER WALL	<	0.1
1	REC	303C-23	A001890376	FLOOR - SE CORNER BELOW BENCHTOP	<	0.1
1	REC	303C-24	A001890377	LEDGE BEHIND BENCHTOP - SE CORNER	<	0.1
1	REC	303C-25	A001890378	TOP OF HOOD - E WALL	<	0.2
1	REC	303C-26	A001890379	GLOVEBOX - S END OF FLOOR	=	0.591
1	REC	303C-27	A001890380	GLOVE IN BOX - S END	=	2.43
1	REC	303C-28	A001890381	FUME HOOD - FLOOR N END	<	0.2
1	REC	303C-29	A001890382	FUME HOOD - PASSPORT DOOR - S SIDE	=	0.308
	303C-Blank-1		A001890383	Blank	<	0.1
	303C-Blank-2		A001890384	Blank	<	0.1

F.3 303J Building

Facility:	**303J**
Sample Date:	5/2/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number:	00-066
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	Room 5	303-J-1	A001790537	Base of pillar by double-door exit on W wall	< 0.1
1	Room 5	303-J-2	A001790538	Top of alarm bell - N wall	< 0.1
1	Room 5	303-J-3	A001790539	Top of door sill - NE corner of room	< 0.1
1	Room 5	303-J-4	A001790540	Top of light fixture - E wall - center lamp	< 0.1
1	Room 5	303-J-5	A001790541	floor swipe - center of room	< 0.1
1	Room 5	303-J-6	A001790542	Top of electrical panel box # H3X105	< 0.1
1	Room 12	303-J-7	A001790543	Top of condiut - N wall	< 0.1
1	Room 12	303-J-8	A001790544	Top of light fixture just inside exit doors - E wall	< 0.1
1	Room 1	303-J-9	A001790545	Top of light fixture - NE corner outside cage	< 0.1
1	Room 1	303-J-10	A001790546	Top of breaker box H3X106 - E wall	< 0.1
1	Room 1	303-J-11	A001790547	Top of door sill - E wall entry from kitchen	< 0.1
1	Room 1	303-J-12	A001790548	Top of lamp SE corner - middle lamp	< 0.1

1	Room 1	303-J-13	A001790549	Floor swipe - edge of tile on South side	<	0.1
1	Room 1	303-J-14	A001790550	Top of window sill - SW corner	<	0.1
1	Room 1	303-J-15	A001790551	Top of fire pull box by W door	<	0.1
1	Room 1	303-J-16	A001790552	Top of angle wood beam - N of W door	<	0.1
1	Room 1	303-J-17	A001790553	Top of header unit in cage in NW corner	<	0.1
1	Room 1	303-J-18	A001790554	Top of Flange on piping in NW corner	<	0.1
1	Room 1	303-J-19	A001790555	Louver to heater unit by pullup door - N wall	<	0.1
1	Room 1	303-J-20	A001790556	From center of rollup door	=	0.145
1	Room 1	303-J-21	A001790557	Top of alarm on N wall inside cage	=	0.117
1	Room 1	303-J-22	A001790558	Top 2"0 secondary waste pipe - NE corner	<	0.1
1	Room 1	303-J-23	A001790559	Top of lower lamp - center of room	<	0.1
1	Room 1	303-J-24	A001790560	Top of higher lamps - center of room - West	<	0.1
1	Room 1	303-J-25	A001790561	Floor wipe in/around hole in middle of floor	<	0.1
1	Room 1	303-J-26	A001790562	Floor wipe in/around hole - 4' south CR W cage entrance	<	0.1
1	Room 1	303-J-27	A001790563	Floor wipe in entrance to Rm 12	<	0.1
1	Kitchen	303-J-28	A001790564	Floor wipe near drain	<	0.1
1	Kitchen	303-J-29	A001790565	Top of entry door - East wall	<	0.1
	303-J-Blank-1		A001790566	Blank	<	0.1
	303-J-Blank-2		A001790567	Blank	<	0.1

F.4 305B Building

Facility:	**305B**
Sample Date:	4/24/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	0.334
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	12	305-B-1	A001790290	IN FRONT OF HOOD ON S END OF HIGH BAY - UNDER ON FLOOR	< 0.1
1	12	305-B-2	A001790291	FROM TOP OF SAME HOOD	< 0.1
1	3	305-B-3	A001790292	ALONG WEST WALL - FLOOR	= 0.129
1	3	305-B-4	A001790293	TOP OF HORIZONTAL ROUND DUCT ALONG W WALL	= 0.334
1	3	305-B-5	A001790294	UNDER RACKS - S PART OF CELL	< 0.1
1	3	305-B-6	A001790295	UNDER FLEX DUCT - TOP OF PARTIAL WALL - S CELL	= 0.128
1	3	305-B-7	A001790296	TOP OF FLAMMABLE LIQUIDS REFRIDGERATOR	= 0.262
1	3	305-B-8	A001790297	UNDER CABINETS CENTER OF N SIDE OF CELL	< 0.1
1	4	305-B-9	A001790298	UNDER RACK SE CORNER OF CELL	< 0.1
1	4	305-B-10	A001790299	UNDER RACK SW CORNER OF CELL	< 0.1
1	4	305-B-11	A001790300	TOP OF SHORT WALL - WEST SIDE OF CELL	< 0.1
1	4	305-B-12	A001790301	UNDER CABINET - N SIDE OF CELL	< 0.1

1	4	305-B-13	A001790302	TOP OF ROUND DUCT IN SW CORNER OF CELL	=	0.278
1	4	305-B-14	A001790303	TOP OF CABINET - CENTER OF S SIDE OF CELL	<	0.1
B	B-2	305-B-15	A001790304	TOP OF SHIELDED DOOR - AT ENTRANCE TO ROOM	<	0.1
B	B-2	305-B-16	A001790305	TOP OF DOOR - INNER SHIELDED DOOR	<	0.1
B	B-2	305-B-17	A001790306	FLOOR IN FRONT OF HOOD E WALL	<	0.1
B	B-2	305-B-18	A001790307	FLOOR BETWEEN CABINETS - NORTH WALL	<	0.1
B	B-2	305-B-19	A001790308	TOP OF CLOCK - S WALL	<	0.1
B	B-1	305-B-20	A001790309	TOP OF PIPE PROTRUSION - SW CORNER	<	0.1
B	B-1	305-B-21	A001790310	TOP OF LIGHT DIFFUSE - CENTER OF OFICE	<	0.1
B	B-1	305-B-22	A001790311	FLOOR IN FRONT OF HOOD - E WALL	<	0.1
B	B-1	305-B-23	A001790312	TOP OF SHEILD BLOCK - DOOR TO W ROOM	<	0.1
B	B-3	305-B-24	A001790313	PORT IN BRICKED WALL - E SIDE OF ROOM	=	0.249
B	B-3	305-B-25	A001790314	FLOOR IN NW C0RNER	=	0.127
B	B-3	305-B-26	A001790315	FLANGE OF OVERHEAD I-BEAM INSIDE DOOR	<	0.1
B	B-3	305-B-27	A001790316	WALL BRACKET - S WALL	<	0.1
1	Stairwell	305-B-28	A001790317	LEDGE AT TOP OF STAIRS	<	0.1
1	Stairwell	305-B-29	A001790318	TOP OF ELECTRICAL PANEL BOX A	<	0.1
	305-B Blank-1		A001790319	Blank	<	0.1
	305-B Blank-2		A001790320	Blank	<	0.1

F.5 306W Building

Facility:	**306W**
Sample Date:	5/23/2000
Analytical Laboratory:	WSCF
Analytical Method:	Analyzed by ICP-AES following dry ashing and acid digestion per LA-345-400 and LA-505-417 which are based on NIOSH 7300
Number of Samples:	59
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.5
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	No
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	132	306W-12	W00I001481	conduit N side of dividing wall	< 0.5
1	132	306W-19	W00I001482	top of door sill S. exit SW corner	< 0.5
1	132	306W-21	W00I001483	floor next to saw	< 0.5
1	132	306W-3	W00I001416	NW corner ledge	< 0.5
1	132	306W-4	W00I001417	N wall - ledge next to clock	< 0.5
1	132	306W-6	W00I001418	NE corner ledge by exit	< 0.5
1	132	306W-7	W00I001419	floor - NE wall	< 0.5
1	132	306W-8	W00I001420	electrical conduit center E wall	< 0.5
1	132	306W-9	W00I001421	floor next to I beam - center E wall	< 0.5
1	132	306W-10	W00I001422	floor center of N end	< 0.5
1	132	306W-11	W00I001423	floor center of S. end	< 0.5
1	132	306W-13	W00I001424	angle iron on center wall bottom	< 0.5
1	132	306W-14	W00I001425	electrical box S. side of dividing wall	< 0.5
1	132	306W-15	W00I001426	floor S. side of dividing wall	< 0.5
1	132	306W-16	W00I001427	floor next to SW wall by sink	< 0.5
1	132	306W-17	W00I001428	roll up door SW wall	< 0.5
1	132	306W-18	W00I001429	fire piping SW corner	< 0.5
1	132	306W-20	W00I001430	saw marvel SW room	< 0.5

1	132	306W-22	W00I001431	saw - XLO cut up S. section	<	0.5
1	132	306W-23	W00I001432	conduit S. center of wall	<	0.5
1	132	306W-24	W00I001433	support tupe to I beam S. wall	<	0.5
1	132	306W-25	W00I001434	roll up door, SE side	<	0.5
1	132	306W-26	W00I001435	drill press, SW corner	<	0.5
1	132	306W-27	W00I001436	double EE lathe #3, S. wall	<	0.5
1	132	306W-28	W00I001437	gorton mill - S.	<	0.5
1	132	306W-29	W00I001438	Lodge & Shipley lathe - S.	<	0.5
1	132	306W-30	W00I001439	Englebird sander - S. center	<	0.5
1	132	306W-31	W00I001440	Bridgeport Mill - S. center	<	0.5
1	132	306W-32	W00I001441	levelon lathe	<	0.5
1	132	306W-33	W00I001442	workbench and vise	<	0.5
1	132	306W-34	W00I001443	floor SW in crack	<	0.5
1	132	306W-35	W00I001444	floor SE ~15 ft from S. wall	<	0.5
1	132	306W-36	W00I001445	floor - east of Marvel saw	<	0.5
1	132	306W-37	W00I001446	floor under work bench	<	0.5
1	132	306W-38	W00I001447	clock - SE wall	<	0.5
1	132	306W-39	W00I001448	phone - SE pole	<	0.5
1	132	306W-40	W00I001449	water and air piping on S. center dividing wall	<	0.5
1	152	306W-41	W00I001450	MEECO rotary straightener N side	<	0.5
1	152	306W-42	W00I001451	MEECO rotary traightener S. side	<	0.5
1	152	306W-43	W00I001452	quench tank	<	0.5
1	152	306W-44	W00I001453	induchen heat treatment - E. side	<	0.5
1	152	306W-45	W00I001454	induction heat tratment - W. side	<	0.5
1	152	306W-46	W00I001455	tank - E. wall SR controlled	<	0.5
1	152	306W-47	W00I001456	frame of tank E. wall	<	0.5
1	152	306W-48	W00I001457	angle - NE corner	<	0.5
1	152	306W-49	W00I001458	roll up door East wall	<	0.5
1	152	306W-50	W00I001459	floor SE center of wall	<	0.5
1	152	306W-51	W00I001460	floor crack fron of roll up door E	<	0.5
1	152	306W-52	W00I001461	floor rear process pit - N	<	0.5
1	152	306W-53	W00I001462	top of panel box N. wall	<	0.5
1	152	306W-54	W00I001463	top of west dividing wall center	<	0.5
1	152	306W-55	W00I001464	floor at base of dividing wall W	<	0.5

1	152	306W-56	W00I001465	floor NW rear flammable cabinets	<	0.5
1	152	306W-57	W00I001466	cabinet fehind flammable cabinet - center	<	0.5
1	152	306W-58	W00I001467	chart recorder NE center	<	0.5
1	152	306W-59	W00I001468	top of cabinet next to roll up door - East	<	0.5
1	132	306W-1	W00I001478	west wall ledge	<	0.5
1	132	306W-2	W00I001479	roll up door - west entrance	<	0.5
1	132	306W-5	W00I001480	N - floor by minarch DSG	<	0.5
	306W-Blank-1		W00I001469	Blank	<	0.5
	306W-Blank-2		W00I001470	Blank	<	0.5
	306W-Blank-3		W00I001471	Blank	<	0.5

F.6 314 Building

Facility:	**314**
Sample Date:	5/11/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	59 taken/ 58 analyzed
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	50	314-1	A001890293	HB-E WOOD LEDGE NE CORNER OF HIGH BAY	< 0.1
1	50	314-2	A001890294	HB-E CONDUIT N WALL EAST	< 0.1
1	50	314-3	A001890295	HB-E PIPING N WALL BELOW FIRE LINE	< 0.1
1	50	314-4	A001890296	HB-E DRAIN PIPE E WALL	< 0.1
1	50	314-5	A001890297	HB-E METAL BRACKET CENTER	< 0.1
1	50	314-6	A001890298	HB-E CONDUIT ON CENTER WALL	< 0.1
1	50	314-7	A001890299	HB-E FIRE LINE IN SE CORNER	< 0.1
1	50	314-8	A001890300	HB-E COMPRESSED AIR LINE NEAR FLOOR HIGH BAY E	< 0.1
1	50	314-9	A001890301	HB-E FLOOR NEXT TO CENTER WALL	< 0.1
1	50	314-10	A001890302	HB-S ELECTRICAL OUTLET BOX S WALL NEAR DOOR TO RM 62	< 0.1
1	62	314-11	A001890303	ELECTRICAL OUTLET BOX N WALL NEAR DOOR	< 0.1
1	62	314-12	A001890304	FLOOR S WALL	< 0.1
1	50	314-13	A001890305	HB-S LEDGE ON CENTER WALL	< 0.1
1	50	314-14	A001890306	HB-S DRAIN LINE S WALL	< 0.1
1	50	314-15	A001890307	HB-S METAL BRACKET CENTER	< 0.1
1	50	314-16	A001890308	HB-N ELECTRICAL BOX NEAR JANITORS CLOSET	< 0.1

1	50	314-17	A001890309	HB-N DRAIN LINE N WALL	<	0.1
1	50	314-18	A001890310	HB-N BASE OF PILLAR BEHIND EMERGENCY WASH	<	0.1
1	50	314-19	A001890311	HB-N DRAIN PIPE BY CENTER WALL	<	0.1
1	50	314-20	A001890312	HB-N FLOOR CENTER OF AREA	<	0.1
1	50	314-21	A001890313	HB-N SCALE #625	<	0.1
1	50	314-22	A001890314	HB-N TOP OF CABINET NEAR CENTER BRACKET	<	0.1
1	50	314-23	A001890315	HB-C CONDUIT LINE ON PRESS NEAR N WALL	<	0.1
1	50	314-24	A001890316	HB-C CONDUIT LINE ON N WALL	<	0.1
1	50	314-25	A001890317	HB-C ELECTRICAL OUTLET BOX S WALL BY ROLLUP DOOR	<	0.1
1	50	314-26	A001890318	HB-C FIRE PULL BOX NEXT TO DOOR S	<	0.1
1	50	314-27	A001890319	HB-C FLOOR CENTER OF AREA	<	0.1
1	50	314-28	A001890320	HB-C ROLLER NEXT TO DOOR	<	0.1
1	50	314-29	A001890321	HB-W ELECTRICAL BOX BELOW PANEL # GRP 5 S WALL	<	0.1
1	50	314-30	A001890322	HB-W BLUE LEDGE CENTER OF AREA	<	0.1
1	50	314-31	A001890323	HB-W FIRE PULL BOX NEXT TO N DOOR EXIT	<	0.1
1	50	314-32	A001890324	HB-W STAIR BEAM N WALL	<	0.1
1	50	314-33	A001890325	HB-W WALL VENT W WALL	<	0.1
1	50	314-34	A001890326	HB-W FIRE LINE SW CORNER	<	0.1
1	51 UT RM F	314-35	A001890327	CONDUIT S WALL	<	0.1
1	51 UT RM F	314-36	A001890328	DOOR SILL TO RM 53 N WALL	<	0.1
1	53	314-37	A001890329	SUPPORT BEAM N WALL WEST	<	0.1
	53	314-38	Note	FLOOR NE CORNER	Note	
1	50	314-39	A001890330	HB-N/C FLOOR NEXT TO CA ROPED AREA	<	0.1
1	59	314-40	A001890331	CONDUIT NE CORNER	<	0.1
1	59	314-41	A001890332	CONDUIT NEAR FLOOR SE CORNER	<	0.1
1	59	314-42	A001890333	BENCHTOP SW CORNER	<	0.1
1	59	314-43	A001890334	DRAIN LINE W WALL	<	0.1

1	57	314-44	A001890335	ELECTRICAL CONDUIT NE CORNER	<	0.1
1	57	314-45	A001890336	ELECTRICAL BOX NEXT TO S DOOR	<	0.1
1	57	314-46	A001890337	FLOOR NEXT TO W WALL	<	0.1
1	314-B	314-47	A001890338	DRAIN LINE N WALL	<	0.1
1	HALL B-CELLS	314-48	A001890339	PANEL BOX #5	<	0.1
1	B-CELL 1	314-49	A001890340	CONTROL PANEL W SIDE	<	0.1
1	B-CELL 1	314-50	A001890341	ELECTRICAL OUTLET E SIDE	<	0.1
1	B-CELL 2	314-51	A001890342	ELECTRICAL PANEL/INSTRUMENT W WALL	<	0.1
1	B-CELL 2	314-52	A001890343	TANK E WALL	<	0.1
1	B-CELL 3	314-53	A001890344	ELECTRICAL BOX W WALL	<	0.1
1	B-CELL 3	314-54	A001890345	SS TRAY E WALL	<	0.1
1	B-CELL 4	314-55	A001890346	ELECTRICAL PANEL W WALL	<	0.1
1	B-CELL 4	314-56	A001890347	FLOOR E WALL	=	0.116
1	B-CELL 5	314-57	A001890348	INSTRUMENT BOX ON W WALL	<	0.1
1	B-CELL 7	314-58	A001890349	INSTRUMENT BOX E WALL	<	0.1
1	B-CELL 8	314-59	A001890350	INSTRUMENT BOX E WALL	=	0.116
	314 Blank-1		A001890351	Blank	<	0.1
	314 Blank-2		A001890352	Blank	<	0.1
	314 Blank-3		A001890353	Blank	<	0.1

Note: Sample 314-38 appears on sample log but is not on chain of custody or sample results.

F.7 318 Building

Facility:	**318**
Sample Date:	4/11/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	106	318-1	A001790364	top - red alarm horn by entrance SW corner	< 0.1
1	106	318-2	A001790365	wall conduit - mezzanine - NW corner	< 0.1
1	106	318-3	A001790366	wall conduit - NE corner	< 0.1
1	106	318-4	A001790367	port pass through window - E wall	= 0.102
1	106A	318-5	A001790368	speaker - top E wall	< 0.1
1	113	318-6	A001790369	door sill - top	< 0.1
1	110	318-7	A001790370	bulletin board - top S wall	< 0.1
1	114	318-8	A001790371	electrical box - top - W wall	< 0.1
1	114	318-9	A001790372	door sill top S wall	< 0.1
1	116	318-10	A001790373	Electrical box top w/ coat hangers	< 0.1
1	117	318-11	A001790374	ledge along floor, NW corner of room	< 0.1
1	104	318-12	A001790375	Speaker top S corner of room	< 0.1
1	104	318-13	A001790376	ledge along floor NE corner under bench	< 0.1
1	112	318-14	A001790377	emergency light - top	< 0.1
1	ELVB1	318-15	A001790378	top of light	< 0.1
B	7	318-16	A001790379	top of insulated overhead pipe - 10 ft inside	< 0.1

B	7	318-17	A001790380	top - long vertical pipe at bend - E end of room	<	0.1
B	1	318-18	A001790381	graphite pile - top	<	0.1
B	1	318-19	A001790382	floor - NW corner of room	<	0.1
B	1	318-20	A001790383	electrical box - NE end of N wall near stair exit	<	0.1
B	1	318-21	A001790384	floor under steam piping - S. wall	<	0.1
B	COB1	318-22	A001790385	top - overhead conduit	<	0.1
B	2	318-23	A001790386	conduit - E wall 2" round	<	0.1
B	6	318-24	A001790387	top seam header - overhead NE corner	<	0.1
B	6A	318-25	A001790388	top light center of room	<	0.1
B	6B	318-26	A001790389	top light center of room	<	0.1
B	6C	318-27	A001790390	window sill - E wall	<	0.1
B	8	318-28	A001790391	ledge port on N wall center	<	0.1
B	8	318-29	A001790392	vent screen metal strip S wall	<	0.1
	318 Blank-1		A001790393	Blank	<	0.1
	318 Blank-2		A001790394	Blank	<	0.1

F.8 323 Building

Facility:	**323**
Sample Date:	3/7/2000
Analytical Laboratory:	not available
Analytical Method:	not available
Number of Samples:	10
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.5
IH Case Number:	880
Sample Records Include:	Memo, Nicholson 2000b
Chain of Custody (yes/no):	No
Sample Map (yes/no):	No
Laboratory Results (yes/no):	No

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	5	1	W00I000440	SKUTT FURNACE #1	< 0.5
1	5	2	W00I000441	SKUTT FURNACE #2	< 0.5
1	5	3	W00I000442	SKUTT FURNACE #3	< 0.5
1	5	4	W00I000443	SKUTT FURNACE #4	< 0.5
1	5	5	W00I000444	SKUTT FURNACE #5	< 0.5
1	5	6	W00I000445	SKUTT FURNACE #6	< 0.5
1	5	7	W00I000446	AUTOCLAVE #1	< 0.5
1	5	8	W00I000447	AUTOCLAVE #1	< 0.5
1	5	9	W00I000448	AUTOCLAVE #2	< 0.5
1	5	10	W00I000449	AUTOCLAVE #2	< 0.5

F.9 325 Building

Facility:	**325**
Sample Date:	5/3/2000
Analytical Laboratory:	Y-12 and WSCF
Analytical Method:	ASO-Y/P65-0019 for Y-12 analysis; unknown for WSCF
Number of Samples:	118 taken / results available for 111
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.2
IH Case Number	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	yes, except for 7 results

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
B	45	325-1	A001920093	SW CORNER - METAL CONDUIT	< 0.1
B	45	325-2	A001920094	LEDGE OF MEZZANINE NEAR HVAC	< 0.1
B	45	325-3	A001920095	HVAC - NEAR MEZZ - W SIDE	< 0.1
B	45	325-4	A001920096	PIPING - NEXT TO HVAC - E SIDE	< 0.1
B	45	325-5	A001920097	BOTTOM OF PILLAR NEXT TO R/U DOOR	< 0.1
B	45	325-6	A001920098	PANEL BOX (HISUMP ALARM) NEXT TO DOOR	< 0.1
B	45	325-8	A001920099	TOP OF DUCT NEAR HVAC	< 0.1
B	33	325-19	A001920107	SE CORNER - TOP OF COAT RACK	< 0.1
B	33	325-20	A001920108	SW CORNER - TOP OF HOOD	< 0.1
B	33	325-21	A001920109	NW CORNER BOTTOM OF PILLAR	< 0.1
B	34	325-22	A001920110	OUTSIDE RM34 METAL BRACKET	< 0.1
B	34	325-23	A001920111	OUTSIDE OF RM34 PILLAR F-8	< 0.1
B	33	325-24	A001920112	OUTSIDE RM 33 LAB400 ISO POWER	< 0.1
B	31	325-25	A001920113	OUTSIDE OF RM 31, PF-B-D9 PANEL	< 0.1

B	31	325-26	A001920114	WEST SIDE - WALL ELECTRICAL OUTLET	<	0.1
B	31	325-27	A001920115	TOP OF BENCH TOP - N SIDE	<	0.1
B	31	325-28	A001920116	S SIDE TOP OF SMALL CABINET	<	0.1
B	31A	325-30	A001920117	CABINET SOUTH-WEST CORNER	<	0.1
B	31A	325-31	A001920118	FLOOR - MIDDLE OF ROOM/TOWARDS SOUTHSIDE	<	0.1
B	34	325-32	A001920119	FLOOR - CENTER OF ROOM	<	0.1
B	34	325-33	A001920120	DUCT HVE - 452	<	0.1
B	34	325-34	A001920121	BENCH TOP - NW CORNER	<	0.1
B	30A	325-35	A001920122	SW CORNER - TOP OF STAIRS	<	0.1
B	30A	325-36	A001920123	S CENTRAL - PILLAR	<	0.1
B	30A	325-37	A001920124	SE CORNER - CONDUIT	<	0.1
B	30A	325-38	A001920125	NE CORNER - FLOOR	<	0.1
B	30A	325-39	A001920126	NW CORNER - WINDOW	<	0.1
B	30A	325-40	A001920127	FLOOR - MIDDLE OF ROOM	<	0.1
B	22	325-41	A001920128	TOP OF DOORSILL	<	0.1
B	22	325-42	A001920129	TOP OF WALL TO 22A (N)	<	0.1
B	22	325-43	A001920130	WINDOW LEDGE	<	0.1
B	22	325-44	A001920131	CONDUIT - S WALL NEAR PANEL BOX	<	0.1
B	22	325-45	A001920132	TOP OF PANEL BOX (PHB-AA10) (S)	<	0.1
B	22	325-46	A001920133	FLOOR - (SW SECTION/N WALL)	<	0.1
B	22	325-47	A001920134	PILLAR (BASE) # Aa-9	<	0.1
B	22	325-48	A001920135	TOP OF DOOR SILL TO 23A	<	0.1
B	22	325-49	A001920136	TOP OF DOOR SILL (N DOOR)	<	0.1
B	22A	325-50	A001920137	BASE OF PILLAR - N WALL	<	0.1
B	22A	325-51	A001920138	METAL BRACK ON E WALL (S CORNER)	<	0.1
B	22A	325-52	A001920139	TOP OF PANEL BOX N-79-DIS (N WALL)	<	0.1
B	22	325-53	A001920140	FLOOR - CENTER OF ROOM	<	0.1
B	22	325-54	A001920141	METAL BRACKET - OVERHEAD (NE END)	<	0.1
1	MEZZ	325-55	A001920142	S SIDE OF PILLAR - METAL LEDGE	<	0.1
1	MEZZ	325-56	A001920143	TOP OF PANEL BOX - SPARE DISCONNECT	<	0.1

1	MEZZ	325-57	A001920144	TOP OF DUCT NEXT TO EAST DOOR	<	0.1
1	MEZZ	325-58	A001920145	TOP OF PANEL BOX (PJ-BM-F1O)	<	0.1
1	MEZZ	325-59	A001920146	TOP OF PANEL BOX (PJ-BM-D1O)	<	0.1
1	409	325-60	A001920210	SHELF - SOUTH WALL	<	0.1
1	409	325-61	A001920211	CONDUIT - WEST	<	0.1
1	409	325-62	A001920212	FLOOR NW WALL	<	0.1
1	409	325-63	A001920213	TOP OF VENT - N WALL	<	0.1
1	520	325-64	A001920214	TOP OF CABINET N WALL NEAR HOOD	<	0.1
1	520	325-65	A001920215	TOP OF DOOR SILL - NE CORNER	<	0.1
1	520	325-66	A001920216	TOP OF DOOR SILL - SE CORNER	<	0.1
1	520	325-67	A001920217	TOP OF WALL VENT W WALL	<	0.1
1	520	325-68	A001920218	TOP OF CAN - CENTER ISLAND	<	0.1
1	520	325-69	A001920219	GRATED FLOORING AT W ENTRANCE	<	0.1
1	520	325-70	A001920220	FLOOR - IN FRONT OF WALK-IN HOOD (EAST)	<	0.1
1	305	325-72	A001920221	FLOOR - NEXT TO HOOD #2	<	0.1
1	305	325-73	A001920222	TOP OF CABINET - SW CORNER	<	0.1
1	305	325-74	A001920223	TOP OF GLOVEBOX AIRLOCK - GB #1	<	0.1
1	305	325-75	A001920224	TOP OF PIPING - W WALL	<	0.1
1	305	325-76	A001920225	TOP OF WALL DUCT SECTION	<	0.1
1	305	325-77	A001920226	TOP OF PIPING BETWEEN GBS	<	0.1
1	305	325-78	A001920227	TOP OF SPEAKER - E WALL	<	0.1
1	419	325-79	A001920228	TOP OF CLOCK - EAST WALL/SOUTH ENTRANCE	<	0.1
1	419	325-80	A001920229	CONDUIT - SE WALL	<	0.1
1	419	325-81	A001920230	CONDUIT - SW WALL	<	0.1
1	419	325-82	A001920231	FLOOR - (W WALL)	<	0.1
1	419	325-83	A001920232	TOP OF CABINET NW WALL	<	0.1
1	419	325-84	A001920233	TOP OF HOOD #5	<	0.1
1	419	325-85	A001920234	2ND SHELF OF CABINET - E WALL	<	0.1
1	419	325-86	A001920235	TOP OF HOOD #2 - S WALL	<	0.2
1	414	325-87	A001920236	CONDUIT - NW WALL	<	0.1
1	414	325-88	A001920237	TOP OF DOOR SILL	<	0.1
1	414	325-89	A001920238	FLOOR - SE CORNER	<	0.1

1	414	325-90	A001920239	TOP OF CONDUIT NE WALL	<	0.1
1	406	325-92	A001920240	METAL LEDGE SW SIDE	<	0.1
1	406	325-93	A001920241	TOP OF CABINET - SW CORNER	<	0.1
1	406	325-94	A001920242	METAL BRACKET - S WALL	<	0.1
1	406	325-95	A001920243	CORNER OF GB S/SW SIDE	<	0.1
1	406	325-96	A001920244	FLOOR - CORNER NEXT TO EAST PILLAR	<	0.1
1	406	325-97	A001920245	TOP OF LIGHT ON GB - CENTER	<	0.1
1	406	325-98	A001920246	METAL SHELF E WALL (N)	<	0.1
1	406	325-99	A001920247	TOP OF PANEL BOX - N WALL	<	0.1
1	406	325-100	A001920248	FLOOR UNDER HOOD #2 (N)	<	0.1
1	406	325-101	A001920249	SPEAKER ABOVE N DOOR (W)	<	0.1
1	406	325-102	A001920250	FLOOR - UNDER GB (CENTER)	<	0.1
1	400	325-103	A001920251	DOOR SILL N ENTRANCE	<	0.1
1	400	325-104	A001920252	METAL LEDGE - NW WALL	<	0.1
1	400	325-105	A001920253	CONDUIT - NE WALL	<	0.1
1	400	325-106	A001920254	FLOOR - FRONT OF FRG - E WALL	<	0.1
1	400	325-107	A001920255	TOP OF DUCT - SE CORNER	<	0.1
1	400	325-108	A001920256	TOP DI WATER FILTER UNIT - CENTER	<	0.1
1	400	325-109	A001920257	TOP OF DOOR SILL - S ENTRANCE	<	0.1
1	400	325-110	A001920258	TOP OF CABINET - W WALL	<	0.1
1	416	325-111	A001920259	TOP OF LEDGE SW CORNER	<	0.1
1	416	325-112	A001920260	LEDGE WEST END OF BENCH IN MIDDLE OF RM	<	0.1
1	416	325-113	A001920261	LEDGE SOUTH WALL, MIDDLE OF ROOM	<	0.1
1	416	325-114	A001920262	FLOOR, EAST SIDE OF ROOM, NEAR COLUMN	<	0.1
1	416	325-115	A001920263	LEDGE, NE CORNER OF ROOM	<	0.1
1	416	325-116	A001920264	TOP OF HOOD #1, NORTH SIDE OF RM, HVE-343FN	<	0.1
1	416	325-117	A001920265	CENTER OF BENCH, MIDDLE OF ROOM	<	0.1
1	416	325-118	A001920266	NORTHWEST END, TOP OF ELECTRICAL CONDUIT	<	0.1
B	45	325-11	A00192100	TOP OF LAMP EAST OF SE STAIRS	<	0.1
B	45	325-12	A00192101	TOP OF FIRE LINE - NEAR RM 40	<	0.1

B	45	325-13	A00192102	TOP OF PIPING - NEAR PILLAR J-9	< 0.1
B	45	325-14	A00192103	BOTTOM OF PILLAR - K-9	< 0.2
B	45	325-15	A00192104	BOTTOM OF PILLAR K-8	< 0.1
B	45	325-16	A00192105	METAL BRACKET ON PILLAR H-8	< 0.1
B	45	325-18	A00192106	LIGHT FIXTURE NEAR PIT	< 0.1
B	45	325-10	WSCF	TOP OF LAMP NEAR SE STAIRS	Incomplete Record
B	45	325-17	WSCF	CRANE RAIL - SW	Incomplete Record
B	31A	325-29	WSCF	FLOOR NE CORNER BEHIND SINK	Incomplete Record
B	45	325-7	WSCF	LAMP NEAR SW STAIRS	Incomplete Record
1	305	325-71	WSCF	TOP OF HOOD #1 LEFT FRONT CORNER	Incomplete Record
B	45	325-9	WSCF	TOP OF PROCESS SEWER - CENTER	Incomplete Record
1	406	325-91	WSCF	DOOR SILL - S ENTRANCE	Incomplete Record
	325-Blank-1		A001920147	Blank	< 0.1
	325-Blank-2		A001920148	Blank	< 0.1
	325-Blank-3		A001920149	Blank	< 0.1
	325-Blank-4		A001920267	Blank	< 0.1
	325-Blank-5		A001920268	Blank	< 0.1
	325-Blank-6		A001920269	Blank	< 0.1

F.10 326 Building

Facility:	**326**
Sample Date:	4/28/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	88
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	1
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
B	2-A	326-1	A001890137	FLOOR- SE CORNER BY GAS BOTTLES	< 0.1
B	2-A	326-2	A001890138	CONDUIT - SE CORNER	< 0.1
B	2-A	326-3	A001890139	LEDGE BEHIND DOOR	< 0.1
B	2-A	326-4	A001890140	LEDGE - NE CORNER	< 0.1
B	2-A	326-5	A001890141	PIPING NW CORNER	< 0.1
B	6-A	326-6	A001890142	TOP OF CABINET (S CENTER) BY DOOR	< 0.1
B	6-A	326-7	A001890143	PIPING (S CENTER) WALL	= 0.122
B	6-A	326-8	A001890144	METAL BRACKET BELOW FIRE BOX (SE WALL)	< 0.1
B	6-A	326-9	A001890145	WALL VENT (EAST)	< 0.1
B	6-A	326-10	A001890146	TOP OF CABINET (NE WALL)	< 0.1
B	6-A	326-11	A001890147	METAL BRACKET - N	< 0.1
B	6-A	326-12	A001890148	VENT PIPE (HVE-63-DMP) N	< 0.1
B	6-A	326-13	A001890149	TOP OF CABINET (NW WALL)	< 0.1
B	6-A	326-14	A001890150	PROCESS DRAIN PIPE (W WALL)	< 0.1
B	6-A	326-15	A001890151	PIPE HANGAR (SW WALL)	< 0.1
B	10-A	326-16	A001890152	METAL BRACKET NEXT TO DOOR	< 0.1
B	10-A	326-17	A001890153	CONDUIT (NE WALL)	< 0.1
B	10-A	326-18	A001890154	EMERGENCY LIGHT (NE WALL)	< 0.1

B	10-A	326-19	A001890155	METAL LEDGE (SE WALL) BY DOOR	<	0.1
B	10-A	326-20	A001890156	METAL LEDGE CENTER OF S WALL	=	0.335
B	10-A	326-21	A001890157	METAL CONDUIT (SW WALL)	<	0.1
B	10-A	326-22	A001890158	DOOR SILL ON N WALL	=	0.203
B	10-A	326-23	A001890159	DARK ROOM - FLOOR - NEXT TO CUTTING EQUIP	<	1
B	10-A	326-24	A001890160	TOP OF PANEL (RETENTION WASTE 4)	=	0.184
B	10-A	326-25	A001890161	CONDUIT (NE - SAMPLE PREP AREA)	<	0.1
B	10-A	326-26	A001890162	AC CONTROL BOX - TOP	=	0.161
B	10-A	326-27	A001890163	FLOOR NEXT TO CENTER ISLAND (SE SIDE)	<	0.1
B	10-A	326-28	A001890164	BENCHTOP - CENTER ISLAND (SE SIDE)	<	0.1
B	10-A	326-29	A001890165	TOP OF HOOD #1 (W WALL)	<	0.1
B	12-A	326-30	A001890166	WALL VENT (S EAST)	<	0.1
B	12-A	326-31	A001890167	NITROGEN PIPING (E WALL)	<	0.1
B	12-A	326-32	A001890168	EMERGENCY SHOWER LINE (NW CORNER)	<	0.1
B	12-A	326-33	A001890169	WALL VENT (S WEST WALL)	<	0.1
B	12-A	326-34	A001890170	FLOOR - CENTER OF ROOM	<	0.1
B	15-A	326-35	A001890171	STORAGE CAVES - W WALL (BE IN CAVES)	<	0.1
B	15-A	326-36	A001890172	STORAGE CAVE - E WALL	<	0.1
B	15-A	326-37	A001890173	TOP OF BLUE CABINET - W WALL	<	0.1
B	15-A	326-38	A001890174	TOP OF METAL LEDGE - SW CORNER	<	0.1
B	15-A	326-39	A001890175	AIR VENT N WALL	<	0.1
B	15-A	326-40	A001890176	S WALL - METAL LEDGE	<	0.1
B	15-A	326-41	A001890177	TOP OF COMPUTER CABINET - CENTER OF RM	<	0.1
B	15-A	326-42	A001890178	FLOOR - BETWEEN ISLAND BENCHTOPS - SW	<	0.1
B	15-A	326-43	A001890179	CLOCK - EAST WALL	<	0.1
B	15-A	326-44	A001890180	TOP OF CELL - CENTER (SW)	<	0.1
B	21-A	326-45	A001890181	CONDUIT - SW WALL NEAR DOOR	<	0.1
B	21-A	326-46	A001890182	CAT WALK SUPPORT - SE WALL	<	0.1

B	21-A	326-47	A001890183	VENT - SE CORNER	<	0.1
B	21-A	326-48	A001890184	METAL LEDGE (CENTER OF S WALL)	<	0.1
B	21-A	326-49	A001890185	TABLE LEDGE - SE (CORNER)	<	0.1
B	21-A	326-50	A001890186	DRAIN - E WALL	<	0.1
B	21-A	326-51	A001890187	FLOOR - (SE CORNER) - BEHIND DOOR	<	0.1
B	21-A	326-52	A001890188	CONDUIT - NORTH WALL	<	0.1
B	21-A	326-53	A001890189	METAL SHELF - NORTH WALL	<	0.1
B	21-A	326-54	A001890190	(NO ORIG INFO)	<	0.1
B	9-A	326-55	A001890191	TOP OF HOOD - SW CORNER	<	0.1
B	9-A	326-56	A001890192	METAL OUTLET S WALL	<	0.1
B	9-A	326-57	A001890193	CONDUIT - WEST WALL	<	0.1
B	9-A	326-58	A001890194	PIPING - N WALL	<	0.1
B	9-A	326-59	A001890195	FLOOR - CENTER	<	0.1
1	19-B	326-60	A001890196	WALL VENT - WEST (listed as 19-A on written report)	<	0.1
1	19-B	326-61	A001890197	CONDUIT - WEST (CENTER) WALL	<	0.1
1	19-B	326-62	A001890198	FLOOR - NW CORNER	<	0.1
1	19-B	326-63	A001890199	METAL LEDGE - N WALL	<	0.1
1	19-B	326-64	A001890200	TABLE LEDGE (CENTER)	<	0.1
1	19-B	326-65	A001890201	METAL LEDGE - NE CORNER	<	0.1
1	19-B	326-66	A001890202	METAL BRACKET - EAST WALL	<	0.1
1	19-B	326-67	A001890203	TOP OF HOOD SASH - SE CORNER	<	0.1
1	19-B	326-68	A001890204	TOP OF CABINET - 2 WALL	<	0.1
1	23-B	326-69	A001890205	WALL VENT - WEST WALL	<	0.1
1	23-B	326-70	A001890206	METAL LEDGE - SW CORNER	<	0.1
1	23-B	326-71	A001890207	TOP OF CABINET - S WALL	<	0.1
1	23-B	326-72	A001890208	TOP OF CABINET - SE WALL	<	0.1
1	23-B	326-73	A001890209	TOP OF ELECTRICAL BOX - E WALL (FAN)	<	0.1
1	23-B	326-74	A001890210	TOP OF CONDUIT OVER CENTER ISLAND	<	0.1
1	23-B	326-75	A001890211	FLOOR UNDER CENTER ISLAND	<	0.1
1	23-B	326-76	A001890212	WALL VENT - NW WALL	<	0.1
1	23-B	326-77	A001890213	TOP OF HOOD #1 - NW CORNER	<	0.1
2	47-C	326-78	A001890214	CONDUIT - NW CORNER	<	0.1
2	47-C	326-79	A001890215	TOP OF CABINET - NE WALL	<	0.1
2	47-C	326-80	A001890216	TOP OF DOOR SILL TO 48C	<	0.1

2	47-C	326-81	A001890217	TOP OF DOOR SILL TO HALL	<	0.1
2	48-C	326-82	A001890218	TOP OF CABINET - NW WALL (NEAR HOOD)	<	0.1
2	48-C	326-83	A001890219	CONDUIT - N WALL	<	0.1
2	48-C	326-84	A001890220	FLOOR - NE CORNER	<	0.1
2	48-C	326-85	A001890221	TOP OF CENTER ISLAND BENCHTOP - N	<	0.1
2	48-C	326-86	A001890222	TOP OF CABINET - E WALL	<	0.1
2	48-C	326-87	A001890223	TOP OF CONDUIT - S WALL	<	0.1
2	48-C	326-88	A001890224	TOP OF DOOR SILL	<	0.1
	326-Blank-1		A001890225	Blank	<	0.1
	326-Blank-2		A001890226	Blank	<	0.1
	326-Blank-3		A001890227	Blank	<	0.1
	326-Blank-4		A001890228	Blank	<	0.1
	326-Blank-5		A001890229	Blank	<	0.1

F.11 329 Building

Facility:	**329**
Sample Dates:	4/14/2000 and 8/18/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	76
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	4.39
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	13C	329-1	A001790475	NE CORNER - WALL SHELF	< 0.1
1	13C	329-2	A001790476	NW CORNER CONDUIT	< 0.1
1	13C	329-3	A001790477	CENTER - CABLE CHASE	< 0.1
1	13C	329-4	A001790478	SW - DOOR	< 0.1
1	13C	329-5	A001790479	SE EMERG LIGHT	< 0.1
1	14C	329-6	A001790480	NW CORNER - CABLE CHASE	< 0.1
1	14C	329-7	A001790481	CENTER - CABLE CHASE	< 0.1
1	14C	329-8	A001790482	SW - ELCT PANEL BOX (TOP)	< 0.1
1	14C	329-9	A001790483	SE - BROWN CONDUIT	< 0.1
1	14C	329-10	A001790484	NE CORNER - CONDUIT	< 0.1
1	16C	329-11	A001790485	SE CORNER - TOP OF CABINET (WALL UNIT)	< 0.1
1	16C	329-12	A001790486	CENTER - E METAL PLATE BELOW DIFFUSER	< 0.1
1	16C	329-13	A001790487	NE - WALL BRACE	< 0.1
1	16C	329-14	A001790488	NW CORNER - TOP OF WALL SHELF	< 0.1
1	16C	329-15	A001790489	CENTER (W) - METAL PLATE BELOW DIFFUSER	< 0.1
1	16C	329-16	A001790490	SW CORNER - TOP OF DUCT	< 0.1
1	8C	329-17	A001790491	NE - TOP OF HOOD	< 0.1
1	8C	329-18	A001790492	NW - TOP OF WALL CABINET	< 0.1

1	8C	329-19	A001790493	CENTRAL - METAL PLATE BELOW DIFFUSER	<	0.1
1	8C	329-20	A001790494	SW - ELECTRICAL CONDUIT	<	0.1
1	17C	329-21	A001790495	SE - TOP OF PRESS LATHE	<	0.1
1	17C	329-22	A001790496	S CENTRAL WALL - METAL SHELF	=	4.39
1	17C	329-23	A001790497	W CENTRAL - SANDER/GRINDER	=	0.135
1	17C	329-24	A001790498	NW CORNER - METAL PANEL	<	0.1
1	17C	329-25	A001790499	N WALL - SHELF	<	0.1
1	17C	329-26	A001790500	DIFFUSER - E	<	0.1
1	18C	329-27	A001790501	GRILL ON N WALL	<	0.1
1	1	329-28	A001790502	S WALL - ELECT PANEL BOX	<	0.1
1	1	329-29	A001790503	N WALL - ELECT PANEL BOX	=	0.113
1	131	329-30	A001790504	TOP OF CABINET - NE WALL	<	0.1
1	131	329-31	A001790505	TOP OF CABINET - NW WALL	<	0.1
1	131	329-32	A001790506	TOP OF SHELF - CENTER ISLAND	<	0.1
1	131	329-33	A001790507	TOP OF CABINET - SE WALL	<	0.1
1	131	329-34	A001790508	TOP OF ELECT PANEL - SW WALL	<	0.1
1	131	329-35	A001790509	TOP OF HOOD - SE CORNER	<	0.1
1	15A	329-36	A001790510	SW WALL - ELECT PANEL BOX	<	0.1
1	15A	329-37	A001790511	S CENTER WALL - TOP OF CABINET	<	0.1
1	15A	329-38	A001790512	SE CORNER - WALL LEDGE	<	0.1
1	15A	329-39	A001790513	CENTER - E CABLE RUN	<	0.1
1	15A	329-40	A001790514	NE WALL CABINET - TOP	<	0.1
1	15A	329-41	A001790515	N CENTER WALL - METAL BRACKET	<	0.1
1	15A	329-42	A001790516	CENTER - METAL BRACKET	<	0.1
1	15A	329-43	A001790517	NW - WALL BRACKET	<	0.1
1	15A	329-44	A001790518	W CENTER - CABLE RUN	<	0.1
1	16A	329-45	A001790519	S DOOR - TOP OF DOOR	<	0.1
1	16A	329-46	A001790520	SE CORNER - CONDUIT	<	0.1
1	16A	329-47	A001790521	NE CORNER - METAL SHELF/LEDGE	<	0.1
1	16A	329-48	A001790522	NE CORNER - FLOOR	<	0.1
1	16A	329-49	A001790523	SW CORNER - TOP OF CABINET	<	0.1
1	16A	329-50	A001790524	NW CORNER - METAL CONDUIT	<	0.1
1	17A	329-51	A001790525	NE CORNER - METAL LEDGE	<	0.1

1	17A	329-52	A001790526	NW CORNER - METAL LEDGE	<	0.1
1	17A	329-53	A001790527	N DOOR - TOP OF SILL	<	0.1
1	17A	329-54	A001790528	SW WALL - TOP OF E PANEL BOX	<	0.1
1	17A	329-55	A001790529	SE WALL - CONDUIT	<	0.1
1	17A	329-56	A001790530	CENTER - CABLE RUN	<	0.1
1	17A	329-57	A001790531	NW DOOR SILL	<	0.1
1	HALL	329-58	A001790532	HALL	<	0.1
1	HALL	329-59	A001790533	HALL	<	0.1
1	17C	329-DC-1	A002350135	MONARCH LATHE - TRAY - NW CORNER NEAR DOOR	<	0.1
1	17C	329-DC-2	A002350136	MONARCH LATHE - BASIN - N WALL	<	0.1
1	17C	329-DC-3	A002350137	SHELDON LATHE - CHIP TRAY - N WALL	<	0.1
1	17C	329-DC-4	A002350138	LAGOUNA MILLING MACHINE - DROP TRAY - E WALL	<	0.1
1	17C	329-DC-5	A002350139	LODGE AND SHIPLEY LATHE - CHIP TRAY - S WALL	<	0.1
1	17C	329-DC-6	A002350140	LODGE AND SHIPLEY LATHE - TOP OF FRAME (E END) S WALL	<	0.1
1	17C	329-DC-7	A002350141	LODGE AND SHIPLEY LATHE - FRONT RAIL - S WALL	<	0.1
1	17C	329-DC-8	A002350142	SPLASH GUARD BEHIND L&S LATHE - CENTER OF GUARD (S)	<	0.1
1	17C	329-DC-9	A002350143	CIRCULAR SPLASH GUARD ON SHELF BEHIND L&S LATHE	<	0.1
1	17C	329-DC-10	A002350144	METAL SHELF (W SIDE) BEHIND L&S LATHE	<	0.5
1	17C	329-DC-11	A002350145	L&S LATHE - ELECTRIC MOTOR - (E END) S WALL	<	0.1
1	17C	329-DC-12	A002350146	FLOOR BEHIND SPLASH GUARD - S WALL	<	0.1
1	17C	329-DC-13	A002350147	CHUCK RACK (E END) BEHIND L&S LATHE - S WALL	<	0.1
1	17C	329-DC-14	A002350148	TOOL GRINDER ON BACK MOTOR AREA - CENTER OF ROOM (E)	<	0.5
1	17C	329-DC-15	A002350149	BRIDGEPORT MILL-SHELF ON E SIDE - S WALL	<	0.1

1	17C	329-DC-16	A002350150	BRIDGEPORT MILL- ARM TOWARDS BACK - CENTER OF ROOM (W)	<	0.1
1	17C	329-DC-17	A002350151	METAL SHELF (CENTER) BEHIND L&S LATHE: DECONNED	<	0.1
	329-Blank-1		A001790533	Blank (4/14/2000)	<	0.1
	329-Blank-2		A001790534	Blank (4/14/2000)	<	0.1
	329-Blank-3		A001790535	Blank (4/14/2000)	<	0.1
	329-Blank-1		A002350152	Blank (8/18/2000)	<	0.1
	329-Blank-2		A002350153	Blank (8/18/2000)	<	0.1

F.12 331 Building

Facility:	**331**
Sample Date:	4/14/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	0.161
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	122	331-1	A001790395	EXHAUST LOWERS N END - OVERHEAD DUCT	< 0.1
1	122	331-2	A001790396	TOP LIGHT FIXTURE - OUTSIDE N WASH UNIT	< 0.1
1	122	331-3	A001790397	STEAM PIPING - TOP BY MPS-278-STR LABEL	< 0.1
1	122	331-4	A001790398	CONDUIT NEAR DOOR ON S SIDE	< 0.1
1	122	331-5	A001790399	SILL OVER S WASH UNIT	< 0.1
1	122	331-6	A001790400	DOOR TOP - E DOOR	< 0.1
2	200	331-7	A001790401	FLOOR PENETRATION AT DUCT WORK LEADING TO HVE-291 HEPA	= 0.161
2	200	331-8	A001790402	FLOOR- SEALED PENETRATION JUST N OF #7	< 0.1
2	200	331-9	A001790403	FLOOR - SEALED PENETRATION - BELOW HEPA FILTER #270	< 0.1
2	200	331-10	A001790404	FLOOR - DUCT PENETRATION LEADING TO HEPA #234	< 0.1
2	200	331-11	A001790405	FLOOR - DUCT PENETRATION LEADING TO HEPA #576	< 0.1
1	170	331-12	A001790406	TOP OF CABINET EAST OF DOOR	< 0.1

1	170	331-13	A001790407	TOP OF CABINET WEST OF DOOR	<	0.1
1	170	331-14	A001790408	TOP OF HOOD #4 NE CORNER	<	0.1
1	170	331-15	A001790409	TOP OF METAL RACK SW CORNER	<	0.1
1	170	331-16	A001790410	TOP OF HOOD #3 N CENTER	<	0.1
1	170	331-17	A001790411	TOP OF HOOD #2 N CENTER	<	0.1
1	170	331-18	A001790412	TOP OF CLOCK WEST WALL	<	0.1
1	170	331-19	A001790413	TOP OF SHELVING - NW CORNER	<	0.1
1	170	331-20	A001790414	TOP OF LAMINAR FLOW HOOD - BIOSAFETY CAB #1	<	0.1
1	170	331-21	A001790415	TOP OF CABINET W OF DOOR	<	0.1
1	170	331-22	A001790416	TOP OF CABINET E OF DOOR	<	0.1
1	170	331-23	A001790417	TOP OF CABINET W DIVIDER WALL	<	0.1
1	170	331-24	A001790418	TOP OF FUME HOOD #5	<	0.1
1	170	331-25	A001790419	TOP OF FUME HOOD #1	<	0.1
1	170	331-26	A001790420	TOP OF BIOSAFETY CAB #3	<	0.1
1	170	331-27	A001790421	TOP OF INCUBATOR - NE CORNER	<	0.1
1	170	331-28	A001790422	TOP OF DOOR SILL - E WALL	<	0.1
1	170	331-29	A001790423	TOP OF CABINET - OVER BENCH BY PENETRATION - SE PART OF ROOM	<	0.1
	331-Blank-1		A001790424	Blank	<	0.1
	331-Blank-2		A001790425	Blank	<	0.1

F.13 3708 Building

Facility:	**3708**
Sample Date:	5/12/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number	00-066
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	No
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	Rm 106	3708-1	A001890231	Top of panel box (Plasma Quad) - S wall	< 0.1
1	Rm 106	3708-2	A001890232	Floor - NE corner	< 0.1
1	Rm 106	3708-3	A001890233	Floor - beside cabinet - W wall (S)	< 0.1
1	Rm 106	3708-4	A001890234	Top of cabinet - W wall (N)	< 0.1
1	Rm 106	3708-5	A001890235	Insulated pipe along cable chase - center of room	< 0.1
1	Rm 107	3708-6	A001890236	Top of door	< 0.1
1	Rm 107	3708-7	A001890237	Top of chalkboard - W wall	< 0.1
1	Rm 107	3708-8	A001890238	Floor - between wall & pillar (S)	< 0.1
1	Rm 107	3708-9	A001890239	Floor - near NW wall	< 0.1
1	Rm 111	3708-10	A001890240	Top of light - SE end	< 0.1
1	Rm 111	3708-11	A001890241	Top of ventilation diffuser (SW end)	< 0.1
1	Rm 111	3708-12	A001890242	Top of door sill (NW entrance)	< 0.1
1	Rm 111	3708-13	A001890243	Floor - under bench top (NE side)	< 0.1
1	Rm 112	3708-14	A001890244	sm. Conduit (NW corner)	< 0.1
1	Rm 112	3708-15	A001890245	Floor - E wall (N)	< 0.1
1	Rm 112	3708-16	A001890246	Top of Rm exhauster - E wall	< 0.1
1	Rm 112	3708-17	A001890247	Top of door sill (W)	< 0.1

1	Rm 116	3708-18	A001890248	Floor - NW corner	<	0.1
1	Rm 116	3708-19	A001890249	Conduit on E wall	<	0.1
1	Rm 116	3708-20	A001890250	Top of center benchtop (SE side)	<	0.1
1	Rm 116	3708-21	A001890251	Conduit on N wall (above gas valves)	<	0.1
1	Rm 115	3708-22	A001890252	Piping along N wall	<	0.1
1	Rm 115	3708-23	A001890253	Top of back ledge of B. top (NW corner)	<	0.1
1	Rm 115	3708-24	A001890254	Top of door sill - (SW exit)	<	0.1
1	Rm 115	3708-25	A001890255	Top of panel box - E wall (#20, 22)	<	0.1
1	Hall	3708-26	A001890256	Floor - at door threshold - N entrance	<	0.1
1	Hall	3708-27	A001890257	Top of sm. Corkboard next to Rm. 122 (E)	<	0.1
1	Hall	3708-28	A001890258	Top of drinking fountain (W)	<	0.1
1	Hall	3708-29	A001890259	Top of Alarm bell #2 - (South west wall)	<	0.1
	3708-Blank-1		A001890260	Blank	<	0.1
	3708-Blank-2		A001890261	Blank	<	0.1

F.14 3720 Building

Facility:	**3720**
Sample Date:	11/30/1999
Analytical Laboratory:	WSCF
Analytical Method:	ICP-AES following dry ashing and acid digestion
Number of Samples:	26
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	590
IH Case Number:	1109
Sample Records Include:	Memo, Nicholson 2000c
Chain of Custody (yes/no):	No
Sample Map (yes/no):	No
Laboratory Results (yes/no):	No

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)	
1	502	1	W991003878	GLOVEBOX TRANSFER TRAY	=	23
1	502	2	W991003874	INSIDE THE GLOVEBOX	=	590
1	502	3	W991003886	INSIDE THE GLOVEBOX	=	370
1	502	4	W991003870	OUTSIDE GLOVEBOX ON PLASTIC FACE	=	1.9
1	502	5	W991003879	TOP SURFACE OF HEPA FILTER	=	0.83
1	502	6	W991003875	INSIDE FUME HOOD	=	0.75
1	502	7	W991003882	INSIDE FUME HOOD	=	1.2
1	502	8	W991003888	FLOOR IN FRONT OF FUME HOODS	<	0.5
1	502	9	W991003885	INSIDE FUME HOOD	=	1
1	502	10	W991003890	INSIDE FUME HOOD	<	0.5
1	502	11	W991003867	COUNTER TOP AT FUME HOOD	<	0.5
1	502	12	W991003871	COUNTER TOP BEHIND FUME HOODS	<	0.5
1	502	13	W991003866	COUNTER TOP	<	0.5
1	502	14	W991003891	CABINET SHELF	<	0.5
1	502	15	W991003864	CANOPY HOOD	<	0.5
1	502	16	W991003884	CANOPY HOOD	<	0.5
1	502	17	W991003868	TOP OF FLUORESCENT LIGHT FIXTURE	<	0.5
1	502	18	W991003876	FLOOR IN FRONT OF COUNTER	<	0.5
1	502	19	W991003869	FLOOR IN FRONT OF COUNTER	<	0.5

1	502	20	W991003877	FLOOR IN FRONT	<	0.5
1	502	21	W991003889	FLOOR IN FRONT OF CA HOOD	<	0.5
1	502	22	W991003883	TOP SURFACE OF CA HOOD	<	0.5
1	502	23	W991003863	COUNTER NEXT TO CA HOOD	<	0.5
1	502	24	W991003887	INSIDE CA FUME HOOD	=	0.98
1	502	25	W991003880	INSIDE CA FUME HOOD	=	0.61
1	502	26	W991003881	IN DRAWER IN CABINET UNDER COUNTER NEXT TO CA HOOD	<	0.5

F.15 3731A Building

Facility:	**3731A**
Sample Date:	2/14/2000
Analytical Laboratory:	WSCF
Analytical Method:	Memo written summarizing the sample states that the analytical technique was "ICM-EM following dry ashing and acid digestion." This is likely a typo as ICM-EM isn't a recognizable as an analytical technique. Analysis method used was likely ICP-MS.
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.5
IH Case Number:	872
Sample Records Include:	Memo, Nicholson 2000a
Chain of Custody (yes/no):	No
Sample Map (yes/no):	No
Laboratory Results (yes/no):	No

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	SHOP	1	W00I000319	FLOOR IN FRONT OF SAW	< 0.5
1	SHOP	2	W00I000320	FLOOR NEAR PILE OF GRAPHITE/DIRT	< 0.5
1	SHOP	3	W00I000321	FLOOR IN FRONT OF LATHE	< 0.5
1	SHOP	4	W00I000322	FLOOR IN FRONT OF SHELDON LATHE	< 0.5
1	SHOP	5	W00I000323	SURFACE AREA ON SHELDON LATHE	< 0.5
1	SHOP	6	W00I000324	INSIDE SURFACE OF THE FLEX HOSE BETWEEN LATHE AND COMPRESSOR	< 0.5
1	SHOP	7	W00I000325	INSIDE FLEX HOSE LAYING BEHIND SHELDON LATHE	< 0.5
1	SHOP	8	W00I000326	OUTSIDE HOSE LAYING BEHIND SHELDON LATHE	< 0.5
1	SHOP	9	W00I000327	TOP SURFACE OF ELECTRICAL BOX, OLIVER SAW	< 0.5
1	SHOP	10	W00I000328	FLOOR AREA BEHIND OLIVER SAW	< 0.5
1	SHOP	11	W00I000329	FLOOR ARE IN FRONT OF COMPRESSOR	< 0.5
1	SHOP	12	W00I000330	TOP SURFACE OF ELECTRICAL BOX ON COMPRESSOR	< 0.5

1	SHOP	13	W00I000331	FLOOR AREA BEHIND COMPRESSOR	<	0.5
1	SHOP	14	W00I000332	FLOOR AREA NEXT TO GORTON	<	0.5
1	SHOP	15	W00I000333	FLOOR AREA IN FRONT OF CINCINNATI	<	0.5
1	SHOP	16	W00I000334	IN FLEX HOSE BEHIND CINCINNATTI	<	0.5
1	SHOP	17	W00I000335	IN FLEX HOSE BEHIND PLANER	<	0.5
1	SHOP	18	W00I000336	FLOOR AREA NEXT TO ELECTRIC DIE	<	0.5
1	SHOP	19	W00I000337	FLOOR AREA NEXT TO ELECTRIC DIE	<	0.5
1	SHOP	20	W00I000338	SURFACE AREA ON SHELDON LATHE	<	0.5
1	SHOP	21	W00I000339	SURFACE AREA ON SHELDON LATHE	<	0.5
1	SHOP	22	W00I000340	TOP SURFACE OF DUCT BEHIND SHELDON LATHE	<	0.5
1	SHOP	23	W00I000341	INSIDE HARD DUCT BEHIND SHELDON	<	0.5
1	SHOP	24	W00I000342	OFF SURFACE OF FLUORESCENT LIGHT FIXTURE ABOVE SHELDON LATHE	<	0.5
1	SHOP	25	W00I000343	SURFACE AREA OF DRILL	<	0.5
1	SHOP	26	unknown	TOP SURFACE OF DUCT ON PLANER	<	0.5
1	SHOP	27	unknown	OFF SURFACE OF FLUORESCENT LIGHT FIXUTRE MID SHOP	<	0.5
1	SHOP	28	unknown	SURFACE ON DUCT LAYING NEAR SWEEP PILE	<	0.5
1	SHOP	29	unknown	OFF SURFACE OF FLUORESCENT LIGHT FIXTURE MID SHOP	<	0.5

F.16 3745B Building

Facility:	**3745B**
Sample Date:	5/12/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	2	3745-1	A001890262	FLOOR WHERE CABINET PREVIOUSLY PLACED	< 0.1
1	4	3745-2	A001890263	CENTER OF PIT - END OF BEAM LINE (NE)	< 0.1
1	4	3745-3	A001890264	METAL BASE FOR MAGNET (N END OF PIT)	< 0.1
1	4	3745-4	A001890265	FLOOR - S END OF PIT (CENTER)/END OF LINE	< 0.1
1	4	3745-5	A001890266	TOP OF SHIELDED DOOR W WALL	< 0.1
1	4	3745-6	A001890267	FLOOR - CENTER OF ROOM (NEAR WH MARKINGS) CRACKED AREA	< 0.1
1	12	3745-7	A001890268	TOP OF DIVIDING WALL - N END	= 0.133
1	12	3745-8	A001890269	FLOOR - CENTER OF WHITE MARK	< 0.1
1	3	3745-9	A001890270	TOP OF VG BEAM SPLITTER (E)	< 0.1
1	3	3745-10	A001890271	TOP OF ION CHAMBER/VACCUUM TANK (E)	< 0.1
1	12	3745-11	A001890272	FLOOR (~10 FT FROM SW DOOR)	< 0.1
1	12	3745-12	A001890273	FLOOR CRACKED AREA ON WHITE	< 0.1

1	12	3745-13	A001890274	TOP OF LIGHT SE SIDE OF AREA	<	0.1
1	5	3745-14	A001890275	WALL PENETRATION ON E WALL (8" O)	<	0.1
1	5	3745-15	A001890276	STEEL BRACKET IN SW CORNER	<	0.1
1	5	3745-16	A001890277	FLOOR - W WALL	<	0.1
1	12	3745-17	A001890278	TOP OF DIFFUSER GRILL - E AREA	<	0.1
1	12	3745-18	A001890279	TOP OF PANEL BOX #6 - NE SIDE	<	0.1
1	12	3745-19	A001890280	FLOOR NEAR DRAIN AREA - S-WALL	<	0.1
1	12	3745-20	A001890281	TOP OF TRANSFORMER BOX W WALL	<	0.1
1	3	3745-21	A001890282	FLOOR - EAST END OF VG (NEAR E WALL)	<	0.1
1	2	3745-22	A001890283	ELECTRONICS CABINET SHELF E END	<	0.1
1	2	3745-23	A001890284	CONDUIT ON SW WALL (OVER AC BOX)	<	0.1
1	2	3745-24	A001890285	BASE OF STAIRWELL TO PIT AREA	<	0.1
B	B-1	3745-25	A001890286	TOP OF TANK - SE CORNER	<	0.1
B	B-1	3745-26	A001890287	BASE OF PILLAR - SW CORNER	<	0.1
B	B-1	3745-27	A001890288	METAL SHELF IN NW CORNER	<	0.1
B	B-1	3745-28	A001890289	BASE OF PILLAR IN NE CORNER	<	0.1
B	B-1	3745-29	A001890290	METAL PLATE 2'X2' SUSPENDED FROM CEILING	<	0.1
	3745 Blank-1		A001890291	Blank	<	0.1
	3745 Blank-2		A001890292	Blank	<	0.1

F.17 Battelle Receiving and Shipping Warehouse

Facility:	**BRSW**
Sample Date:	4/26/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	0.181
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	No
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	W REC	WSHE-1	A001790444	TOP OF WALL SHELF UNIT - SOUTHEAST WALL	< 0.1
1	W REC	WSHE-2	A001790445	FLOOR - BENEATH COPIER - NEAR SOUTH WALL	< 0.1
1	W REC	WSHE-3	A001790446	TOP OF CLOCK - SOUTH WALL	< 0.1
1	W REC	WSHE-4	A001790447	TOP OF COLD SPOT FRIDGE	< 0.1
1	W REC	WSHE-5	A001790448	TOP OF 8" SPRIKLER PIPE	< 0.1
1	W REC	WSHE-6	A001790449	EDGE OF AIR SUPPLY DIFFUSER	< 0.1
1	W REC	WSHE-7	A001790450	TOP OF FENCE RAIL	< 0.1
1	W REC	WSHE-8	A001790451	TOP OF FLUORECENT LAMP SHADE	< 0.1
1	W REC	WSHE-9	A001790452	TOP OF EMERGENCY LIGHTING UNIT - NORTH WALL	< 0.1
1	W REC	WSHE10	A001790453	TOP OF OLD ROLLUP DOOR FRAME - NORTH WALL	< 0.1
1	W REC	WSHE-11	A001790454	FLOOR - JUST WEST OF OLD ROLLUP DOOR-NORTH WALL	< 0.1
1	W REC	WSHE12	A001790455	TOP OF SPRINKLER PIPE RISER - WEST WALL	< 0.1
1	W REC	WSHE-13	A001790456	TOP OF REFRIGERATOR - CENTER OF RECEIVING AREA	< 0.1
1	W REC	WSHE-14	A001790457	CRACK IN FLOOR 20' EAST OF WEST DOOR	< 0.1

1	W REC	WSHE-15	A001790458	TOP OF EXIT SIGN - WEST WALL	=	0.11
1	W REC	WSHE-16	A001790459	TOP OF BULLITIN BOARD - SOUTH WALL	<	0.1
1	W REC	WSHE-17	A001790460	LIP ALONG FLOOR - SOUTH WALL	<	0.1
1	W REC	WSHE-18	A001790461	TOP OF LOCKER - WEST WALL	=	0.147
1	12	WSHE-19	A001790462	TOP OF PANEL 1-A BOX - MACHINE SHOP	<	0.1
1	12	WSHE-20	A001790463	TOP OF CLOCK-MACHINE SHOP	<	0.1
1	12	WSHE-21	A001790464	BELOW SINK-MACHINE SHOP	=	0.181
1	12	WSHE-22	A001790465	TOP OF PANEL B3 - BESIDE BREAK ROOM DOOR	<	0.1
1	12	WSHE-23	A001790466	EDGE OF AIR SUPPLY DIFFUSER	<	0.1
1	12	WSHE-24	A001790467	TOP OF 2" CONDUIT - NW CORNER	<	0.1
1	12	WSHE-25	A001790468	TOP EDGE OF CORKBOARD NW CORNER	<	0.1
1	12	WSHE-26	A001790469	CRACK IN FLOOR - NORTH CENTER OF SHOP	<	0.1
1	12	WSHE-27	A001790470	TOP OF WHITE CABINET, CHANGE AREA, NORTH WALL	<	0.1
1	12	WSHE-28	A001790471	DOOR SILL INSIDE BREAK ROOM	<	0.1
1	12	WSHE-29	A001790472	TOP OF TRACK OF ROLLUP DOOR	<	0.1
	WSHE Blank-1		A001790473	Blank	<	0.1
	WSHE Blank-2		A001790474	Blank	<	0.1

F.18 Engineering Development Laboratory

Facility:	**EDL**
Sample Date:	4/21/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	<0.1
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	No
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	100	EDL-1	A001790259	TOP OF EXIT SIGN OVER DOOR - SOUTH WALL SE CORNER	< 0.1
1	100	EDL-2	A001790260	TOP OF OUTLET MIDDLE OF SOUTH WALL OVER TOP OF WALL	< 0.1
1	100	EDL-3	A001790261	FLOOR SWIPE SW CORNER	< 0.1
1	100	EDL-4	A001790262	BEHIND ACOUSTIC WALL SW CORNER TOP OF BLOCK WALL	< 0.1
1	100	EDL-5	A001790263	TOP OF PARTICIAN WALL 30' FROM SOUTH WALL	< 0.1
1	100	EDL-6	A001790264	TOP OF DIAMOND PLATE - FLOOR COVER	< 0.1
1	100	EDL-7	A001790265	FLOOR SWIPE- 50' FROM SOUTH WALL	< 0.1
1	100	EDL-8	A001790266	FRONT OF GRILL ON AIR INTAKE	< 0.1
1	100	EDL-9	A001790267	UNDER EDGE OF ACOUSTIC WALL	< 0.1
1	100	EDL-10	A001790268	TOP OF WALL OVER DOUBLE DOOR	< 0.1
1	100	EDL-11	A001790269	TOP OF METAL DRAWER UNIT - GRAY	< 0.1
1	100	EDL-12	A001790270	CRACK 100' FROM SOUTH WALL CENTER OF HIGHBAY	< 0.1

1	100	EDL-13	A001790271	UNDER EDGE OF ACOUSTIC WALL 50' FROM SOUTH WALL	<	0.1
1	100	EDL-14	A001790272	BENCH TOP NORTH OF DOUBLE DOORS THROUGH DIVIDED WALL	<	0.1
1	100	EDL-15	A001790273	ALONG CRACK IN FLOOR 75' FROM SOUTH WALL	<	0.1
1	100	EDL-16	A001790274	WEST UNDER ACOUSTIC WALL 75' FROM SOUTH WALL	<	0.1
1	100	EDL-17	A001790275	WEST OF ACOUSTIC WALL TOP OF CABINET #12 W WALL	<	0.1
1	100	EDL-18	A001790276	TOP OF PARTITION ALONG DIVIDED WALL 20' S OF N WALL	<	0.1
1	100	EDL-19	A001790277	FLOOR CENTER - 20' FROM NORTH WALL ALONG CRACK	<	0.1
1	100	EDL-20	A001790278	TOP OF AIR HANDLING CABINET - WEST WALL	<	0.1
1	100	EDL-21	A001790279	TOP OF EXIT SIGN - OVER DOOR IN NE CORNER	<	0.1
1	100	EDL-22	A001790280	ALONG I-BEAM AT ENTANCE TO PIT	<	0.1
1	100	EDL-23	A001790281	INSIDE GREEN STORAGE BOX NEAR NW CORNER	<	0.1
1	100	EDL-24	A001790282	FLOOR NW CORNER	<	0.1
1	100	EDL-25	A001790283	TOP OF CABINET NORTH WALL	<	0.1
1	HALL	EDL-26	A001790284	TOP OF DOOR LEDGE OVER DOUBLE DOORS TO RM 108	<	0.1
1	HALL	EDL-27	A001790285	ON LEDGE OF BLUE DUCT MIDDLE OF EAST WALL	<	0.1
1	HALL	EDL-28	A001790286	TOP OF PANEL BOX 3E E WALL	<	0.1
1	HALL	EDL-29	A001790287	TOP OF EXIT SIGN SOUTH WALL IN MIDDLE OF DIVIDER WALL	<	0.1
	EDL-Blank-1		A001790288	Blank	<	0.1
	EDL-Blank-2		A001790289	Blank	<	0.1

F.19 Physical Science Laboratory

Facility:	**PSL**
Sample Date:	4/25/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	29
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	0.18
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	No
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
B	251	PSL-1	A001790321	TOP OF LAMP - NW CORNER	< 0.1
B	251	PSL-2	A001790322	UNDER CENTER BENCH - N SIDE	< 0.1
B	251	PSL-3	A001790323	TOP OF BOOKCASE - ON TOP OF CABINET - SW CORNER	< 0.1
B	251	PSL-4	A001790324	UNDER SINK - FLOOR IN NE CORNER	< 0.1
B	251	PSL-5	A001790325	INSIDE BEIGE SOCKET DRAWER	< 0.1
B	251	PSL-6	A001790326	TOP OF LAMP - JUST INSIDE DOOR - E SIDE OF ROOM	< 0.1
B	251	PSL-7	A001790327	TOP OF BENCH TOP	< 0.1
B	249	PSL-8	A001790328	TOP OF CENTER LAMP - SOUTH END OF ROOM	< 0.1
B	249	PSL-9	A001790329	NW CORNER - FLOOR	< 0.1
B	249	PSL-10	A001790330	TOP OF BRAKER BOX - JUST INSIDE DOOR - ON E WALL	< 0.1
B	249	PSL-11	A001790331	SW CORNER - OVERHEAD PIPING	< 0.1
B	249	PSL-12	A001790332	BRAKER BOX FOR PLANER - CENTER OF ROOM	< 0.1
B	249	PSL-13	A001790333	INSIDE DRILL BIT DRAWER (DRILLS 1-24)	< 0.1

B	201	PSL-14	A001790334	OUTLET CONDUIT - SE SIDE OF SOUTH WALL	<	0.1
B	201	PSL-15	A001790335	TOP OF PANEL BOX MH	=	0.130
B	201	PSL-16	A001790336	TOP OF BRAKERBOX FOR BRIDGEPORT MILL 2	=	0.133
B	201	PSL-17	A001790337	FLOOR BELOW FIRE EXTINGUSHER - NE SIDE BY DOORWAY	<	0.1
B	201	PSL-18	A001790338	TOP OF LIGHT - CENTER OF ROOM	<	0.1
B	201	PSL-19	A001790339	CABINET IN NW CORNER - SPOT CHECK - 4 SHELVES 2X2/SELF	<	0.1
B	201	PSL-20	A001790340	TOP OF DIGITAL CONTROL BOX (MINI WIZARD) ON MONARCH LATHE	<	0.1
B	201	PSL-21	A001790341	TOP OF EXHAUST OVER NE MILLING MACHINE (MASTER JOURNEYMEN)	<	0.1
B	201	PSL-22	A001790342	TOP OF TOOL KIT CABINETS ON - S WALL (ON TOP OF BENCH)	=	0.180
B	200	PSL-23	A001790343	TOP OF LIGHT - JUST INSIDE DOOR	<	0.1
B	200	PSL-24	A001790344	TOP OF LAPPING MACHINE - BY SPLASH PAN	=	0.171
B	200	PSL-25	A001790345	BEHIND LAPPING MACHINE - BY SPLASH PAN	<	0.1
B	200	PSL-26	A001790346	TOP OF CONDUIT - SOUTH WALL	<	0.1
B	200	PSL-27	A001790347	TOP OF ELECTRICAL BOX - W WALL	<	0.1
B	200	PSL-28	A001790348	BELT SANDER BELOW BELT	<	0.1
B	200	PSL-29	A001790349	CONDUIT - NW CORNER	<	0.1
	PSL-Blank-1		A001790350	Blank	<	0.1
	PSL-Blank-2		A001790351	Blank	<	0.1

F.20 Research Technology Laboratory

Facility	**RTL520**
Sample Date:	4/10/2000
Analytical Laboratory:	Y-12
Analytical Method:	ASO-Y/P65-0019
Number of Samples:	59
Sampled Area:	100 cm^2
Maximum Result (µg / 100 cm^2) =	114
IH Case Number:	814
Sample Records Include:	
Chain of Custody (yes/no):	Yes
Sample Map (yes/no):	Yes
Laboratory Results (yes/no):	Yes

Floor	Room Number	PNL Number	Lab Number	Location	Results (µg)
1	346	RTL-1	A001790166	TOP OF HOOD - W WALL	< 0.1
1	346	RTL-2	A001790167	TOP OF BENCH - E WALL	< 0.1
1	346	RTL-3	A001790168	BASE OF JIB CRANE IN NW CORNER OF ROOM	= 0.745
1	346	RTL-4	A001790169	BRACKET ON WALL IN NE CORNER OF ROOM	= 0.375
1	126	RTL-5	A001790170	TOP OF CABINET - NE WALL	< 0.2
1	126	RTL-6	A001790171	BLUE INSTRUMENT - E WALL	< 0.1
1	126	RTL-7	A001790172	FLOOR - FRONT OF ACCESS DOOR	< 0.1
1	126	RTL-8	A001790173	TOP OF FILTERING UNIT - SE WALL	< 0.1
1	126	RTL-9	A001790174	TOP OF DIFFUSER - W	< 0.1
1	126	RTL-10	A001790175	TOP OF BENCH - W WALL	= 0.143
1	126	RTL-11	A001790176	TOP OF CYLINDER - SW CORNER	= 0.152
1	126	RTL-12	A001790177	BE CABINET - SPOTS OF 4 SHELVES (N WALL)	= 0.291
1	416	RTL-13	A001790178	TOP OF STORAGE CABINET SW CORNER	< 0.5
1	416	RTL-14	A001790179	TOP OF CABLE RUN ALONG W WALL	= 0.879
1	416	RTL-15	A001790180	FLOOR FRONT OF ACCESS DOOR N WALL	< 0.5

1	416	RTL-16	A001790181	TOP OF WALL CABINET SE CORNER	<	0.5
1	418	RTL-17	A001790182	TOP OF WALL CABINET SW CORNER OF ROOM	=	0.278
1	418	RTL-18	A001790183	ELECTRICAL CABLE RUN W WALL	=	0.299
1	418	RTL-19	A001790184	FLOOR IN FRONT OF ACCESS DOOR ON N WALL	=	0.224
1	418	RTL-20	A001790185	TOP OF WALL CABINET SW CORNER ON S WALL	=	0.282
1	418	RTL-21	A001790186	WALL CLOCK - SOUTH WALL	=	0.159
1	418	RTL-22	A001790187	CABLE RUN - CEILING	<	0.1
1	418	RTL-23	A001790188	POWER PANEL BOX ON NW WALL	=	0.249
1	418	RTL-24	A001790189	TOP OF SPEAKER ON S WALL	=	0.247
1	418	RTL-25	A001790190	FLOOR IN CENTER OF ROOM UNDER EQUIPMENT	=	0.384
1	418	RTL-26	A001790191	SILL OVER DOUBLE DOORS IN CENTER OF S WALL	=	0.296
1	418	RTL-27	A001790192	TOP OF STORAGE CABINET ON EAST SIDE OF S WALL	=	0.334
1	418	RTL-28	A001790193	TOP OF DOOR SILL IN SE CORNER	=	0.395
1	418	RTL-29	A001790194	GRILLWORK ON E WALL	<	0.1
1	418	RTL-30	A001790195	OVERHEAD CONDUIT NEAR E WALL	<	0.1
1	418	RTL-31	A001790196	CONDUIT N WALL CENTER	=	0.346
1	418	RTL-32	A001790197	TOP OF AIR HANDLING SYSTEM N WALL EAST END	=	0.281
1	418	RTL-33	A001790198	BENCH ON SOUTH WALL	=	0.313
1	428	RTL-34	A001790199	CLOCK ON S WALL	<	0.1
1	428	RTL-35	A001790200	TOP OF CABINET - SE WALL	=	0.143
1	428	RTL-36	A001790201	TOP OF LAMINAR HOOD - N END	<	0.1
1	428	RTL-37	A001790202	GRILL ON HOOD	=	0.189
1	428	RTL-38	A001790203	FLOOR - FRONT OF ACCESS DOOR	<	0.1
1	428	RTL-39	A001790204	ELBOW OF DUCT - W WALL	<	0.1
1	428	RTL-40	A001790205	MITRE ELBOW - E SIDE	<	0.1
1	428	RTL-41	A001790206	TOP OF W DOOR	<	0.1
1	428	RTL-42	A001790207	TOP OF BENCH - SOUTH	<	0.1
1	428	RTL-43	A001790208	LOWER WEST WALL (CENTER)	<	0.1

1	436	RTL-44	A001790209	TOP OF WALL CABINET ON W WALL (CENTER)	<	0.1
1	436	RTL-45	A001790210	TOP OF WORK BENCH BY SINK - NW CORNER	<	0.1
1	436	RTL-46	A001790211	CENTER OF ROOM BESIDE VERTICAL CONDUIT	<	0.1
1	436	RTL-47	A001790212	TOP OF CABINET ON E WALL	<	0.1
1	438	RTL-48	A001790213	TOP OF HOOD - MIDDLE OF E WALL	=	0.164
1	438	RTL-49	A001790214	INSIDE BLUE HOOD W/ "DANGER BERYLLIUM CHEMICAL COMPOUND" - NE CORNER	=	114
1	438	RTL-50	A001790215	FLOOR BY ACCESS DOOR	=	0.217
1	438	RTL-51	A001790216	TOP OF SPEAKER - S WALL	=	0.143
1	442	RTL-52	A001790217	DOOR SILL OVER DOUBLE DOOR ON S WALL	<	0.1
1	442	RTL-53	A001790218	ELECTRICAL CONDUIT MIDDLE OF E WALL	=	0.154
1	442	RTL-54	A001790219	TOP OF ELECTRICAL PANEL AG	<	0.1
1	442	RTL-55	A001790220	CENTER OF WORK BENCH ON W WALL	<	0.1
1	442	RTL-56	A001790221	FLOOR CENTER OF ROOM	=	0.156
1	442	RTL-57	A001790222	TOP OF ELECTRICAL PANEL BOX A-V ON W WALL	=	0.231
1	442	RTL-58	A001790223	TOP OF CABINET ON S WALL	<	0.1
1	442	RTL-59	A001790224	DIFFUSER JUST INSIDE DOUBLE DOOR	<	0.1
	RTL-Blank-1		A001790225	Blank	<	0.1
	RTL-Blank-2		A001790226	Blank	<	0.1
	RTL-Blank-3		A001790227	Blank	<	0.1

Appendix G

Hanford Facility Beryllium Fact Sheets for Facilities Added to Baseline After 2000

Appendix G

Hanford Facility Beryllium Fact Sheets for Facilities Added to Baseline After 2000

This appendix contains the Hanford Facility Beryllium Fact Sheets for the Life Science Laboratory Annex and Process Development Laboratory East.

Privacy & Security Notice

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	**LSLA,** Life Science Laboratory Annex
Date prepared:	June 10, 2002
Responsible Contractor:	PNNL
Contact:	Scott Nickerson

PAST OPERATIONS
Beryllium brought in facility: Nonsparking 1.8% Beryllium-Copper (CuBe) alloy tools have been used in this facility designed for intrinsically safe storage of flammable and combustible gases and liquids for use in the adjacent Life Science Laboratory 2 Building.
Form of beryllium: Solid
Period of beryllium operations (dates): Since completion of construction in 1988.
Location(s) in facility that contained beryllium materials: Toolbox
Building monitoring data summary: None identified.
Personnel monitoring data summary: None identified.
Specify Engineering/Administrative controls used during operations: Until information at Hanford and other DOE sites in 2001 indicated that simple storage and use might result in removable beryllium contamination, these tools were not considered to present any hazard as long as they were not modified or refaced.

Maximum Estimated Past Be exposure: There could have been brief inhalation exposures to beryllium if workers used compressed air to clean the tool box in which CuBe tools were stored. Nonsparking tools were used infrequently and stored in this facility.

CURRENT OPERATIONS
Building still present: YES
Beryllium present: While aluminum-bronze alloy replacements were found for most CuBe nonsparking tools in 2001, there are still a small number of CuBe tools requiring high tensile strength for which replacements are not available. These remaining CuBe tools are kept in a separate toolbox labeled to indicate that they contain beryllium and the control measures required.
Current building occupancy/activity: This facility is in use, but is normally unoccupied except during chemical transfer or maintenance activities.

April 2001 Sampling: Wipe samples were collected from inside the toolbox, on the floor under the toolbox, and in a tote tray which was reportedly used to carry CuBe tools during use. The wipe sample from within the toolbox was above the release criteria at 0.76 mg/100cm2. The other samples from the floor and tote tray were less than the 0.2 mg/100cm2 release criteria limit. The toolbox and all tools inside were bagged for disposal immediately following sampling.

Maximum Estimated Current Be exposure: None

Basis for above information: PNNL Facility Use Agreement for LSL2 and PNNL IH Case #787.

Comments, including any additional information needed (specify): None

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For questons or comments, please send email to Elton_R_Hewitt@rl.gov
URL: file:///A:/Projects/Beryllium%20Compensatory%20Action%20and%20Recovery/References/Building%20Specific%20Information/fctsheet/LSL-A%20June%2010%202002.htm
Last Updated: 06/02/2014 06:42:33

Hanford Facility Beryllium Fact Sheet

Building Number/Name:	PDL-E
Date prepared:	January 15, 2003
Responsible Contractor:	PNNL
Contact:	S. A. Nickerson

PAST OPERATIONS
Beryllium brought in facility: No history of beryllium use. Crane electrical power components are believed to be made from a copper-2%beryllium alloy.
Form of beryllium: Solid Articles.
Period of beryllium operations (dates):

Maximum Estimated Past Be exposure: Unknown

CURRENT OPERATIONS
Building still present: YES
Beryllium present: YES (Collector shoes are a CuBe alloy).
Current building occupancy/activity: The PDL-E Building, Process Development Laboratory East, is a high-bay building that is used for pilot-scale research projects. It has a low occupancy with no resident staff.

2002 Crane Bus Bar Investigation: On December 23, 2002, three wipe samples were taken on electrical components on the east side of the building that provide electrical power to the bridge crane. Two samples from bus bars had 7.2 and 1.6 µg beryllium per estimated 100 cm2 and the wipe sample from the collector shoe revealed 0.58 micrograms for an area which was probably less than 100 cm2. The highest level of beryllium measured exceeds both the release criteria and the housekeeping limit. The Crane Manufacturer was F.T. Crowe & Company (F.T. Crowe | Konecranes USA http://www.kciamericas.com/ftcrowe.htm). In a similar crane by the same manufacturer in 305B, the bus bars are made of galvanized steel and the collector shoes, the electrical contacts that slide along the bus bars, are a 2% beryllium-copper alloy (these electrical components are from the Howell Corporation, SAF-T-BAR Howell Corporation, Insulated Conductor Bar, Mobile Electrification Systems http://www.howellcorporation.com/. Further testing is necessary to verify these materials in PDL-E.

2003 Characterization: There were 29 wipe samples and baseline air sample taken January 13, 2003 to characterize and determine the extent of contamination in the PDL-E highbay resulting from use of beryllium-alloy crane components. No beryllium contamination above the release criteria was found in surface samples. No beryllium was detected in the baseline air sample.

Maximum Estimated Current Be exposure: Based on sampling from a crane by the same manufacturer in 305B, it is anticipated that contamination is localized. Preventative maintenance activities directly on the bus bars, collector shoes and nearby surfaces should be considered a potential airborne beryllium hazard. Further sampling is planned to characterize this facility and determine the extent of contamination.

Basis for above information: PNNL IH Case # 1653, Sample Event 4088, Sample Event 4095.

Comments, including any additional information needed (specify): Full facility characterization sampling is planned to determine the extent of contamination.

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